

A large, stylized blue logo of a phoenix or dragon, the symbol of Drexel University, is positioned in the upper left corner of the dark blue header.

Drexel University

Undergraduate Course Catalog

2016-2017



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About Drexel University

Mission Statement

To serve our students and society through comprehensive integrated academic offerings enhanced by technology, co-operative education, and clinical practice in an urban setting, with global outreach embracing research, scholarly activities, and community initiatives.

Yesterday, Today, and Tomorrow

In 1891, near the end of a long and prosperous life, Philadelphia financier and philanthropist Anthony J. Drexel founded the Drexel Institute of Art, Science and Industry. As society's need for technically proficient leaders grew, so did Mr. Drexel's institution, first becoming the Drexel Institute of Technology in 1936, and then Drexel University in 1970. Drexel University is privately controlled, nonsectarian, and coeducational.

Today, nearly 16,000 undergraduate and over 9,000 graduate students attend Drexel's nine colleges and five schools:

- College of Arts and Sciences (<http://drexel.edu/coas>) grants bachelor's, master's, and PhD degrees
- LeBow College of Business (<http://www.lebow.drexel.edu>) grants bachelor's, master's, and doctorate degrees
- LeBow College of Business: School of Economics (<http://www.lebow.drexel.edu/faculty-and-research/disciplines/economics>) grants bachelors, master's and PhD degrees
- College of Computing & Informatics (<http://www.cci.drexel.edu>) grants bachelor's, master's, and PhD degrees
- College of Engineering (<http://www.drexel.edu/coe>) grants bachelor's, master's, and PhD degrees
- Pennoni Honors College (<http://drexel.edu/pennoni>) enriches the University experience for students from all majors with demonstrated academic achievement and broad intellectual interests
- Westphal College of Media Arts and Design (<http://www.drexel.edu/westphal>) grants bachelor's, master's degrees, and a PhD degree
- Drexel College of Medicine (<http://www.drexel.edu/med>) grants MD, master's and PhD degrees
- College of Medicine: School of Biomedical Science and Professional Studies (<http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences>) grants master's and PhD degrees
- College of Nursing and Health Professions (<http://www.drexel.edu/cnhp>) grants bachelor's, master's, and PhD degrees
- Goodwin College of Professional Studies (<http://drexel.edu/goodwin>) grants interdisciplinary bachelor's and master's degrees to part-time students, houses the First-Year Exploratory Studies program for undergraduate freshman, and offers non-credit continuing professional education courses
- School of Biomedical Engineering, Science, and Health Systems (<http://www.biomed.drexel.edu>) grants bachelor's, master's, and PhD degrees
- School of Education (<http://drexel.edu/soe>) grants bachelor's, master's, EdD and PhD degrees, and recommends issuance of Pennsylvania instructional and teaching certificates
- Close School of Entrepreneurship (p. 35) grants bachelor's and a master's degree, and provides curriculum and activities for students to learn and practice innovative behavior in alignment with all other colleges and schools at Drexel

- Center for Hospitality and Sport Management (<http://catalog.drexel.edu/graduate/centerforhospitalityandsportmanagement>) grants bachelor's and master's degrees
- Dornsife School of Public Health (<http://www.publichealth.drexel.edu>) grants master's and doctorate degrees
- Thomas R. Kline School of Law (<http://www.drexel.edu/law>) grants Master's degrees and prepares students for the practice of law by offering a JD degree

Drexel Co-op

Drexel University has been a pioneer in cooperative education since 1919—operating one of the largest cooperative education programs in the nation. Undergraduates alternate on-campus study with full-time employment in fields related to their academic interests. More than 1,700 employer organizations in business, government, health care and education participate at locations in 35 states and 45 countries. The Steinbright Career Development Center (SCDC) works to ensure that students and alumni get the most from their experiential and career placement activities.

Technology

Technology is integrated into every aspect of the Drexel educational experience, marking the university as a leader in educational innovation.

Drexel made history in 1983 when it became the first university to mandate that all students must have personal access to a microcomputer. This tradition of leadership in integrating state-of-the-art technologies into a Drexel education continued when Drexel, in early 1998, inaugurated the first totally wireless library in the nation. In 2000, Drexel again made history by becoming the nation's first major university to offer completely wireless Internet access across the entire campus.

A pioneer in online learning, Drexel offers distance education programs leading to certificates and degrees in areas including engineering management, business administration, information systems and library and information science. Drexel University Online has over 7,500 unique students from all 50 states and more than 20 countries pursuing one of more than 130 graduate and undergraduate degree and certificate programs. Over all, there are more than 13,000 Drexel University students taking at least one course online.

Drexel is widely recognized for excellence in technology-based, experiential learning and is ranked among the best national doctoral universities by *U.S. News & World Report* in its "America's Best Colleges 2013." Drexel ranked third in the *US News* 2013 poll of America's "Up-and-Coming Schools."

Location

Drexel's 74-acre University City Main Campus is located in the vibrant University City district of Philadelphia, Pennsylvania. Drexel makes full use of its metropolitan setting by integrating Philadelphia and its resources into the classroom, co-op/internship experience, and student life, making it a model for other urban universities. The main campus is a 10-minute walk from Center City, the core of Philadelphia's commercial and business district.

Drexel teaches at two additional locations: the Center City Campus for the College of Nursing and Health Professions and the Queen Lane Medical Campus in East Falls for the College of Medicine.

Programs

Civic Engagement

Civic engagement, participation in the public life of the community, is important to the Drexel University's strategic plan. Civic engagement can take many forms, from volunteerism doing community service, to electoral participation and advocacy.

Drexel University offers a Certificate in Civic Engagement (p. 972), designed for those whose commitment to civic engagement extends beyond the civic-engagement requirement of University 101, enables students of all majors to attach a recognized body of civic engagement work to their transcript. The program will also provide students with an intellectual core and an element of critical thinking for future civic engagement activities. The program is administered by the Lindy Center for Civic Engagement (<http://www.drexel.edu/lindycenter>).

Honors Program

The Pennoni College offers a number of academic options for its students. These opportunities are designed to be intensive, and are taught by faculty members who understand and accommodate Honors students' abilities and aspirations.

The Honors Program offers a number of academic options for its students. These opportunities are designed to be intensive, and are taught by faculty members who understand and accommodate Honors students' abilities and aspirations.

These options include:

- **Honors Colloquia:** These interdisciplinary courses introduce students to topics not typically covered elsewhere. These courses are small, discussion-based, seminar style classes. Past Honors Colloquia topics include: The Hidden God in Cinema; Theory of Special Relativity; The Graphic Novel; Torture and Terrorism, and many others.
- **Honors-Section Courses:** These courses fulfill traditional major requirements but offer Honors credit. While the subject remains the same, the classes are taught to smaller groups, consisting entirely of Honors students, and on an advanced level that encourages discussion and practical application. Honors-section courses include, among other subjects, physics, English, business, general psychology, chemistry, and biology.
- **Honors Options:** With permission from their instructors and approval from the Honors Program, Honors students may elect to enhance non-honors courses to yield honors credit. The student and faculty member conducting may agree on the specific terms before the course begins and jointly submit a proposal to the Honors Program.
- **Independent Study:** Honors students frequently come across topics in their general coursework that they would like to investigate in greater detail. To accommodate this, the Honors College encourages students to study and research a topic of their choosing with guidance from a faculty member.

The Great Works Symposium

The Great Works Symposium (<http://www.drexel.edu/interdisciplinary-inquiry/great-works-symposium/overview>) is a series of team-taught, interdisciplinary courses, each one focused upon a great human achievement or important global problem. Each course typically has at least three instructors, representing three different academic disciplines, and typically there is a series of about ten guest lecturers, recognized experts on the topic, also representing a wide variety of disciplines and points of view. Each course is broader in its content than what could be covered by any one academic discipline or any single textbook, but each

has a concrete center of focus. Each topic is broad and important enough that it is relevant to the education of any student.

ROTC

The Army Reserve Officers' Training Corps (<http://www.armyrotc.com/edu/drexel>), established at Drexel in 1918, is an integral part of the University. Army ROTC courses are open to all students, and enrollment alone does not carry a military obligation. Students selected for the advanced course (normally pre-junior, junior, and senior years) will complete their academic and military studies concurrently, and upon graduation will be commissioned as lieutenants in the United States Army, Army Reserve, or Army National Guard. Participation in the advanced course may qualify participants to receive financial aid through a series of scholarships and cooperative education programs. For further information, contact the Professor of Military Science, Drexel University, The Armory, 33rd and Market Streets, Philadelphia, PA 19104.

Drexel students are eligible to participate in the Naval Reserve Officers' Training Corps (<http://www.vpul.upenn.edu/nrotc>) (NROTC) through a cross-enrollment agreement with the University of Pennsylvania. All naval science courses are held on Penn's campus. The NROTC program enables a college student to earn a commission in the Navy or the Marine Corps while concurrently satisfying requirements for his or her baccalaureate degree. Scholarship and nonscholarship programs are available.

Drexel students are eligible to participate in the Air Force Reserve Officers' Training Corps (<http://www.sju.edu/afrotc>) (AFROTC) through a cross-enrollment agreement with St. Joseph's University. All aerospace studies courses will be held on the St. Joseph's campus. The AFROTC program enables a college student to earn a commission as an Air Force officer while concurrently satisfying requirements for his or her baccalaureate degree.

Study Abroad

Drexel University's Study Abroad programs are open to students in all disciplines who meet the qualifications of each individual program. Please see the study abroad website (<http://www.drexel.edu/studyabroad>) for eligibility requirements of each individual program and for the most up to date program offerings.

Certification of Proficiency in a Foreign Language

The University awards an advanced-level Certification of Proficiency in a foreign language in recognition of exceptional ability in oral and written communication in that language. Certification is listed on the official college transcript.

Examinations leading to proficiency certification include listening comprehension, reading comprehension, and written analysis, and the ETS Achievement Test, which is also the qualifying examination for proficiency testing. Certification also requires successful completion of an extensive oral interview, with at least a "2" rating on the FSI/ACTFL rating scale. Certification indicates proven ability to function effectively in professional and social situations in a country in which the target language is spoken.

Affirmative Action and Equal Opportunity

University Policy: Affirmative Action and Equal Opportunity

It is the policy of the University to provide a working and learning environment in which employees and students are able to realize their full potential as productive members of the University community. To this end, the University affirms its commitment to equal opportunity and nondiscrimination in employment and education for all qualified

individuals regardless of race, religion, color, national origin, sex, age, sexual orientation, disability or applicable veteran status or any other characteristic protected by applicable federal or state law. Further, the University is committed to taking affirmative action to increase opportunities at all levels of employment and to increase opportunities for participation in programs and activities by all faculty, staff, and students.

Affirmative Action is directed toward racial and ethnic minorities, women, persons with disabilities, and Vietnam-era veterans. All member of the University community -- faculty, staff, and students – are expected to cooperate fully in meeting these goals.

It is the policy of the University that no qualified individual with a disability shall, on the basis of the disability, be excluded from participation in University programs and activities. Disability is defined as any physical or mental impairment that substantially limits one or more major life activities; or having a record of such impairment; or being regarded as having such impairment. A qualified individual with a disability means an individual as defined above, who is capable of performing the essential functions of a particular job or of participating in a particular course of study, with or without reasonable accommodations for his/her disability. Reasonable accommodations are determined on a case-by-case basis.

Accreditation

Drexel University's educational programs are accredited by MSCHE (Middle States Commission on Higher Education).

The Antoinette Westphal College of Media Arts and Design

- Architecture is one of the few part-time evening programs accredited by NAAB (National Architectural Accrediting Board).
- Design curricula are accredited by NASAD (National Association of Schools of Arts and Design).
- Media arts curricula, with the exception of the BS in Dramatic Writing, are accredited by NASAD (National Association of Schools of Arts and Design).
- The BS in Interior Design is accredited by CIDA (Council for Interior Design Accreditation).
- The MS in Interior Architecture and Design is accredited by CIDA (Council for Interior Design Accreditation).

The Bennett S. LeBow College of Business

- The Bennett S. LeBow College of Business is accredited by AACSB (Association to Advance Collegiate Schools of Business).

The College of Engineering

- The undergraduate programs for Architectural Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Environmental Engineering, Materials Science and Engineering, and Mechanical Engineering are accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.
- The Construction Management program is accredited by ACCE (American Council for Construction Education).
- The undergraduate Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>.

The College of Arts and Sciences

- The Chemistry BS is certified by ACS (American Chemical Society).
- The Clinical Psychology PhD program is accredited by APA (American Psychological Association).
- The English Language Center is accredited by CEA (Commission on English Language Program Accreditation).

The College of Nursing and Health Professions

- Nursing programs are accredited by the CCNE (Commission on Collegiate Nursing Education), and the PA State Board of Nursing.
- The Couple and Family Therapy MFT degree and Post-Master's Certificates are accredited by COAMFTE (Commission on Accreditation of Marriage and Family Therapy Education).
- The Creative Arts in Therapy MA degrees in Dance/Movement Therapy, Music Therapy, and Art Therapy are approved by the ADTA (American Dance Therapy Association), the AMTA (American Music Therapy Association), and the AATA (American Art Therapy Association), respectively.
- The Didactic Program in Nutrition is accredited by ADA (American Dietetic Association).
- The Health Services Administration program is certified by AUPHA (Association of University Programs in Health Administration).

- The Nurse Anesthesia program is accredited by COA (Council on Accreditation of Nurse Anesthesia Educational Programs).
- The Nutrition and Foods BS is accredited by ADA (American Dietetic Association, Commission on Accreditation of Dietetic Education).
- The Professional Physical Therapy (DPT) program is accredited by CAPTE (Commission on Accreditation in Physical Therapy Education).
- The Physician Assistant program is accredited by ARC-PA (Accreditation Review Commission on Education for the Physician Assistant).
- The Radiologic Technology program is accredited by JRCERT (Joint Review Committee on Education in Radiologic Technology).

The College of Computing & Informatics

- The Computer Science BS and BA programs are accredited by the Computing Accreditation Commission (CAC) of ABET (<http://www.abet.org>).
- The Information Systems BS is accredited by the Computing Accreditation Commission (CAC) of ABET (<http://www.abet.org>). The College of Information Science and Technology was in the first group of schools to have their information systems programs be accredited by ABET (<http://www.abet.org>).
- The Library and Information Science MS degree is accredited by ALA (American Library Association).

The Drexel University College of Medicine

- The MD degree is accredited by LCME (Liaison Committee on Medical Education).
- The MS degree in Pathologists' Assistant program is accredited by NAACLS (National Accrediting Agency for Clinical Laboratory Sciences).

The Dornsife School of Public Health

- The Dornsife School of Public Health is accredited by CEPH (Council on Education for Public Health).

The School of Biomedical Engineering, Science and Health Systems

- The undergraduate biomedical engineering curriculum is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

The School of Education

- Teacher education programs leading to Pennsylvania State Teacher Certification for various K-12 specialties as well as Instructional Technology Specialist, School Principal, and School Superintendent certification programs are approved by the Pennsylvania Department of Education. Other state-approved programs include K-12 Library Science certification in collaboration with the College of Information Science and Technology and K-12 English as a Second Language Program Specialist in collaboration with the English Language Center.

The Thomas R. Kline School of Law

- The Thomas R. Kline School of Law is accredited by ABA (American Bar Association).

Any student or prospective student may request a copy of the documents describing the institution's accreditation. This information is available in

the Provost's Office and in the Financial Aid Office, both located in the Main Building.

Tuition/Fees

Undergraduate

- Drexel Central: (<http://drexel.edu/drexelcentral/finaid/costs>) Full-Time Undergraduate Tuition, Student Financial Aid and Registration information
- Part-time undergraduate admissions (<http://drexel.edu/part-time>) (Saturday Scholars, and non-enrolling students)
- Drexel University Online (<http://online.drexel.edu/financing/tuition.aspx>)

Graduate

- Drexel Central: (<http://drexel.edu/drexelcentral/finaid/costs/grad>) Graduate Program Tuition, Fees and Expenses
- Drexel Central: (<http://drexel.edu/drexelcentral/finaid/costs/medicine>) College of Medicine Tuition, Fees and Expenses
- Drexel Central: (<http://drexel.edu/drexelcentral/finaid/costs/law>) School of Law Tuition, Fees, and Expenses

The Steinbright Career Development Center

The Steinbright Career Development Center (Steinbright) (<http://www.drexel.edu/scdc>) serves all students and recent alumni through cooperative education and career services offerings. For information about potential co-op experiences, or to access career guides for specific majors, visit the Steinbright Center's Co-op Career Guide (<http://www.drexel.edu/scdc/career-services/counseling/career-guides>) page.

I. Drexel Undergraduate Co-op

Cooperative Education at Drexel (<http://www.drexel.edu/scdc/coop>) enables full-time undergraduate students to alternate periods of classroom theory with professional experience prior to graduation. Participation in co-op is available in most academic programs. Successful completion of the cooperative education experience is a graduation requirement for students enrolled in a co-op degree program. Students have the opportunity to gain 6 to 18 months of career-related work experience integrated with their coursework. Cooperative education helps students explore and confirm their career choices by assisting students in several areas of career development, including self-assessment and career exploration. Through co-op students develop confidence, professionalism and a sense of purpose. Students are expected to take advantage of every possible opportunity to observe different aspects of the workplace and to gain experience.

To learn more about undergraduate co-op, visit the Steinbright Career Development Center's website (<http://www.drexel.com/scdc>).

A. Co-op Program Schedule Options (<http://www.drexel.edu/scdc/co-op/undergraduate>)

B. Co-op Cycle Assignments and Eligibility (<http://www.drexel.com/scdc>)

C. Classes During Co-op Go to the Provost's website (http://www.drexel.edu/provost/policies/pdf/ug_classes_coop.pdf)

II. Drexel Graduate Co-op Program (GCP)

Drexel's long tradition in the field of experiential education for undergraduates has been extended into its graduate programs (<http://www.drexel.com/scdc/co-op/graduate>).

Participating Graduate Co-op Programs

MS, MBA, LeBow College of Business

MS, Information Systems, College of Computing & Informatics

MS, Food Science, Center for Hospitality and Sport Management

MS, Engineering, College of Engineering

MS, Biomedical Engineering, School of Biomedical Engineering, Science, and Health Systems

III. Career Services

Career Services offers assistance to all current students and alumni in securing employment consistent with personal career goals and objectives. All services are free of charge to active students and alumni. Services, resources, and events include:

- Individual career counseling, including assessments designed to help individuals choose long-range career goals consistent with their abilities, education, interests, values and personality.
- Individual appointments and group programs covering topics including resume writing, interview preparation, job search strategies and offer negotiation.
- On-Campus Interview Program arranges on-campus interviews with employers from business, industry, education, and government services.
- Dragon Jobs allows students to review job postings and schedule interviews with employers who are interested in hiring Drexel students and alumni. Students can also research companies, information on career fairs, and company-hosted information sessions with Dragon Jobs (<http://www.drexel.edu/scdc/dragonjobs>).
- Comprehensive pre-professional advising services to students and alumni who are considering careers in law or medicine.
- Steinbright hosts two of the largest career fairs in the Delaware Valley in October and April for all students and alumni. Engineering students are also invited to an engineering major-specific career fair at their college.

Center for Hospitality and Sport Management

The Center for Hospitality and Sport Management includes undergraduate programs in culinary arts and science, culinary science, hospitality management and sport management.

Through supportive and connected faculty, co-op opportunities, the most relevant guest lecturers, and partnerships with key regional and national employers, our programs build an industry-relevant resume and a strong network before graduation.

The Department of Culinary Arts and Food Science is a unique department which marries the creativity and science of food. The programs combine the practical techniques of cooking with the technical areas of food science while exploring the history, culture, food systems and the business of food. Students are trained for careers in a variety of areas within the food industry including chef, research chef, restaurateur, product developer, quality assurance technician, food technologist and more.

The Department of Hospitality and Tourism Management's undergraduate program is designed to prepare students for careers in restaurant operations, tourism, event planning, casino management and hotel administration. Students learn the fundamental principles of hospitality and of business management in the areas of customer service, human resources, law, marketing, operations and more.

The Department of Sport Management's innovative undergraduate major is focused on the business of sport; the program offers coursework in analytics, economics, finance, digital media, facility and event management, law, sponsorships and ticket sales. The program is intended for students who plan to pursue careers in sport-oriented organizations such as professional sports teams, collegiate athletic departments, sport media networks, sport marketing firms, recreational sport organizations, and more.

Majors

- Culinary Arts & Science (BS) (p. 14)
- Culinary Arts (BS) (p. 18)
- Culinary Science (BS) (p. 23)
- Hospitality Management (BS) (p. 28)
- Sport Management (BS) (p. 31)

Minors

- Culinary Arts (p. 22)
- Food Science (p. 33)
- Food Studies (p. 33)
- Gaming and Casino Operations (p. 34)
- Sport Coaching Leadership (p. 34)
- Sport Management (p. 33)

Culinary Arts & Science

Major: Culinary Arts & Science

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 185.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Program (CIP) code: 12.0503

Standard Occupational Classification (SOC) code: 35-2014

About the Program

The major in culinary arts and science allows students to deeply explore cuisine—the practical techniques of cooking, but also its science, history, culture, politics and economics. Students receive a broad overview of cooking and cuisine and specialize in food and beverage management, which prepares students for leadership positions in the restaurant and food industry.

Students majoring in culinary arts and science are prepared for careers in the food industry such as pastry chef, chef, research chef or product developer.

This baccalaureate degree in culinary arts and science is among the first of its kind in the United States. This program comprises approximately equal parts liberal arts, business, hospitality management, food science, and culinary arts. The aim of the program is to prepare students as independent thinkers who can work collaboratively in the food industry.

For more information, visit the Culinary Arts & Science (<http://drexel.edu/hsm/academics/Culinary-Arts-Food-Science>) page on the Center for Hospitality and Sport Management's website (<http://drexel.edu/hsm>).

Program Delivery Options

Drexel's BS degrees include courses in the liberal arts, the humanities, sciences, hospitality management and culinary arts. Three business minors are also offered. The BS degree can be completed on a full-time or part-time basis:

Traditional Four-year option, with one co-op experience:

This option includes one six-month period of full-time employment in the junior year.

Four plus One option BS/MBA combined degree, with co-op experience:

This option combines the four-year BS degree followed by the one-year Professional MBA to qualify freshmen applicants. Incoming freshmen will generally have a minimum of 1300 on the SAT, a GPA of 3.5 or higher, and be in the top 10% of their high school graduating class. For MBA requirements visit the LeBow College Professional MBA (<http://www.lebow.drexel.edu/academics/programs/mba>) website.

Part-time option without co-op experience:

Students work closely with academic advisors to develop a customized plan of study toward degree completion.

London option:

(Available for Hospitality Management and Culinary Arts and Science students.) Students are invited to spend a term in their sophomore, junior or senior year in the Study Abroad Program (<http://www.drexel.edu/studyabroad>), Drexel in London, while earning up to 18.0 credits. The program's emphasis is on the global implications of and opportunities within the hospitality industry.

Degree Requirements

Food & Beverage Management Concentration

General Education Requirements

CHEM 201

Why Things Work: Everyday Chemistry

3.0

or CHEM 101	General Chemistry I	
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
UNIV SH101	The Drexel Experience	1.0
Arts & Humanities		9.0
Social Science		6.0
Food Science Courses		
FDSC 100	ServSafe	1.0
FDSC 120	Food and the Senses	3.0
FDSC 154	Science of Food and Cooking	4.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
FDSC 350	Experimental Foods: Product Development	3.0
FDSC 401	Modernist Cuisine	3.0
Culinary Arts Courses		
CULA 115	Culinary Fundamentals	3.0
CULA 120	Techniques and Traditions I	3.0
CULA 121	Techniques and Traditions II	3.0
CULA 125	Foundations of Professional Baking	3.0
CULA 216	A la Carte	3.0
CULA 235	Professional Dining Room Management	3.0
CULA 291	Culinary Arts Practicum II	6.0
CULA 303	Global Cuisine Studio (Course taken twice for 6.0 credits total)	6.0
CULA 316	Butchery Laboratory	2.0
CULA 320	Advanced Culinary Studio	3.0
CULA 325	Garde Manger Laboratory	3.0
CULA 400	Directed Studies with a Master Chef	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
CULA 440	Food in the Arts	3.0
CULA 421	Senior Design Project I	2.0
CULA 422	Senior Design Project II	2.0
CULA 423	Senior Design Project III	2.0
Hospitality Management Courses		
HRM 120	Principles of Food-Service Management	3.0
HRM 150	Food & Beverage Customer Service	3.0
HRM 160	Laws of the Hospitality Industry	3.0
HRM 220	Purchasing for the Hospitality Industry	3.0
HRM 330	Hospitality Marketing and Branding	3.0
HRM 335	Beverage Management	3.0
HRM 350	Cost Controls in Hospitality	3.0
HRM 435	Wine and Spirits	3.0
CULA Electives		18.0
Free Electives		12.0
Business/Minor Requirements		24.0
Total Credits		185.0

Culinary Science Concentration**General Education Requirements**

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV SH101	The Drexel Experience	1.0
Arts/Humanities Electives		9.0
Social Science Electives		6.0
Math/Science		

CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
NFS 215	Nutritional Chemistry	3.0
NFS 217	Nutrient Quality & Composition	1.0
PHYS 103	General Physics I	4.0
PHYS 104	General Physics II	4.0
STAT 201	Introduction to Business Statistics	4.0
STAT 202	Business Statistics II	4.0
Food Science Courses		
FDSC 100	ServSafe	1.0
FDSC 120	Food and the Senses	3.0
FDSC 154	Science of Food and Cooking	4.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
FDSC 350	Experimental Foods: Product Development	3.0
FDSC 401	Modernist Cuisine	3.0
FDSC 450	Food Microbiology	3.0
FDSC 451	Food Microbiology Laboratory	2.0
FDSC 454	Microbiology & Chemistry of Food Safety	3.0
FDSC 456	Food Preservation Processes	3.0
FDSC 460	Food Chemistry	3.0
FDSC 461	Food Analysis	3.0
FDSC 468	Functional Foods	3.0
FDSC 487	Food Engineering	3.0
FDSC 490	Seminar in Food Science	1.0
Culinary Arts Courses		
CULA 115	Culinary Fundamentals	3.0
CULA 120	Techniques and Traditions I	3.0
CULA 121	Techniques and Traditions II	3.0
CULA 125	Foundations of Professional Baking	3.0
CULA 291	Culinary Arts Practicum II	6.0
CULA 303	Global Cuisine Studio (Course taken twice for 6.0 credits total)	6.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
CULA 421	Senior Design Project I	2.0
CULA 422	Senior Design Project II	2.0
CULA 423	Senior Design Project III	2.0
Culinary Arts Electives		9.0
Free electives (or Business Minor)		23.0
Total Credits		185.0

Sample Plans of Study

Term 1		Credits
CHEM 101	General Chemistry I	3.5
CULA 115	Culinary Fundamentals	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FDSC 100	ServSafe	1.0
MATH 101	Introduction to Analysis I	4.0
UNIV SH101	The Drexel Experience	1.0
Term Credits		15.5
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
CHEM 102	General Chemistry II	4.5
CULA 120	Techniques and Traditions I	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0

MATH 102	Introduction to Analysis II	4.0	FDSC 454	Microbiology & Chemistry of Food Safety	3.0
	Term Credits	15.5	FDSC 461	Food Analysis	3.0
Term 3			CULA elective		3.0
CHEM 103	General Chemistry III	5.0	Free elective		3.0
CULA 121	Techniques and Traditions II	3.0		Term Credits	14.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0	Term 12		
FDSC 154	Science of Food and Cooking	4.0	CULA 423	Senior Design Project III	2.0
FDSC 120	Food and the Senses	3.0	FDSC 468	Functional Foods	3.0
	Term Credits	18.0	FDSC 490	Seminar in Food Science	1.0
Term 4			Culinary Elective		3.0
NFS 100	Nutrition, Foods, and Health	2.0	Free elective		3.0
NFS 101	Introduction to Nutrition & Food	1.0		Term Credits	12.0
PHYS 103	General Physics I	4.0		Total Credit: 185.0	
Arts & Humanities Elective		3.0	Term 1		Credits
Free elective		3.0	CULA 115	Culinary Fundamentals	3.0
	Term Credits	13.0	ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
Term 5			MATH 101	Introduction to Analysis I	4.0
CHEM 241	Organic Chemistry I	4.0	CHEM 201	Why Things Work: Everyday Chemistry	3.0
CULA 125	Foundations of Professional Baking	3.0	FDSC 100	ServSafe	1.0
NFS 215	Nutritional Chemistry	3.0	UNIV SH101	The Drexel Experience	1.0
NFS 217	Nutrient Quality & Composition	1.0		Term Credits	15.0
PHYS 104	General Physics II	4.0	Term 2		
	Term Credits	15.0	ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Term 6			CIVC 101	Introduction to Civic Engagement	1.0
CHEM 242	Organic Chemistry II	4.0	CULA 120	Techniques and Traditions I	3.0
CULA 303	Global Cuisine Studio	3.0	CULA 125	Foundations of Professional Baking	3.0
FDSC 270	Microbial Food Safety and Sanitation	4.0	NFS 101	Introduction to Nutrition & Food	1.0
STAT 201	Introduction to Business Statistics	4.0	NFS 100	Nutrition, Foods, and Health	2.0
Free elective		3.0		Term Credits	13.0
	Term Credits	18.0	Term 3		
Term 7			ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
CULA 291	Culinary Arts Practicum II	6.0	CULA 121	Techniques and Traditions II	3.0
STAT 202	Business Statistics II	4.0	FDSC 120	Food and the Senses	3.0
Free elective		3.0	FDSC 154	Science of Food and Cooking	4.0
Arts/Humanities/Social Science		3.0	CULA/HOSP elective		3.0
	Term Credits	16.0		Term Credits	16.0
Term 8			Term 4		
CULA 405 [WI]	Culture and Gastronomy I	3.0	CULA 316	Butchery Laboratory	2.0
FDSC 350	Experimental Foods: Product Development	3.0	CULA 405 [WI]	Culture and Gastronomy I	3.0
FDSC 450	Food Microbiology	3.0	HRM 120	Principles of Food-Service Management	3.0
FDSC 451	Food Microbiology Laboratory	2.0	HRM 220	Purchasing for the Hospitality Industry	3.0
Free elective		3.0	Free Elective		3.0
Arts/Humanities/Social Science		3.0		Term Credits	14.0
	Term Credits	17.0	Term 5		
Term 9			HRM 150	Food & Beverage Customer Service	3.0
CULA 303	Global Cuisine Studio	3.0	HRM 160	Laws of the Hospitality Industry	3.0
FDSC 401	Modernist Cuisine	3.0	CULA 325	Garde Manger Laboratory	3.0
FDSC 460	Food Chemistry	3.0	HRM 350	Cost Controls in Hospitality	3.0
CULA elective		3.0	Business Minor Course		4.0
Free elective		3.0		Term Credits	16.0
Arts/Humanities/Social Science		3.0	Term 6		
	Term Credits	18.0	CULA 303	Global Cuisine Studio	3.0
Term 10			FDSC 270	Microbial Food Safety and Sanitation	4.0
CULA 421	Senior Design Project I	2.0	CULA/HOSP elective		3.0
FDSC 456	Food Preservation Processes	3.0	Free elective		3.0
FDSC 487	Food Engineering	3.0	Business Minor Course		4.0
Arts/Humanities/Social Science Elective		3.0		Term Credits	17.0
Free elective		2.0	Term 7		
	Term Credits	13.0	CULA 291	Culinary Arts Practicum II	6.0
Term 11					
CULA 422	Senior Design Project II	2.0			

Arts/Humanities/Social Science elective	3.0
CULA/HOSP elective	3.0
Business Minor Course	4.0
Term Credits	16.0
Term 8	
CULA 235 Professional Dining Room Management	3.0
FDSC 350 Experimental Foods: Product Development	3.0
CULA 440 Food in the Arts	3.0
CULA/HOSP electives	6.0
Arts/Humanities/Social Science elective	3.0
Term Credits	18.0
Term 9	
HRM 335 Beverage Management	3.0
FDSC 401 Modernist Cuisine	3.0
HRM 330 Hospitality Marketing and Branding	3.0
Arts/Humanities/Social Science elective	3.0
Business Minor Course	4.0
Term Credits	16.0
Term 10	
CULA 303 Global Cuisine Studio	3.0
CULA 421 Senior Design Project I	2.0
CULA 216 A la Carte	3.0
Free electives	3.0
Business Minor Course	4.0
Term Credits	15.0
Term 11	
CULA 320 Advanced Culinary Studio	3.0
CULA 422 Senior Design Project II	2.0
HRM 435 Wine and Spirits	3.0
Arts/Humanities/Social Science Elective	3.0
CULA/HOSP elective	3.0
Term Credits	14.0
Term 12	
CULA 423 Senior Design Project III	2.0
CULA 400 Directed Studies with a Master Chef	3.0
Arts/Humanities/Social Science Elective	3.0
Business Minor Courses	4.0
Free elective	3.0
Term Credits	15.0

Total Credit: 185.0

Baking and Pastry Specialization

The Baking and Pastry Specialization provides BS Culinary Arts & Science students interested in pursuing a career in the bakeshop with the skills necessary to move up the ranks of the professional bakery. High-quality, from-scratch baked goods and pastries continue to find prominent places on menus in fine-dining restaurants, coffee shops, cafes, and dedicated bakery retail shops. For those restaurants and shops that have the facility space, many hire skilled bakers to run internal pastry departments. The need to feature fresh-baked goods has led to the opening of more wholesale and commissary bakeries throughout the Northeast and across the country. Graduates who are highly-skilled in baking and patisserie are in demand to serve in restaurant pastry programs and to run these high-volume commercial bakeries.

Required Courses

CULA 125 Foundations of Professional Baking	3.0
CULA 220 Patisserie I	3.0
CULA 225 Patisserie II	3.0
CULA 227 Wheat and Grains: Artisan Breads	3.0
CULA 228 Design, Presentation, and Decorating in Pastry	3.0

CULA 229 Confectionery	3.0
CULA 328 Brasserie Applied Baking	3.0
Total Credits	21.0

Co-op/Career Opportunities

The hospitality industry employs 15 million people nationwide. According to the National Restaurant Association statistics, employment is growing at the rate of eleven percent each year, making this industry one of the fastest growing in the country. Our Culinary Arts & Science program enjoys close relationships with outstanding and internationally acclaimed chefs, in the finest restaurants, hotels and tourism partners in the greater Philadelphia area. We also have relationships with professional organizations that represent the industry on a regional, national and international level such as Research Chefs Association, Institute of Food Technologists and International Association of Culinary Professionals. These relationships result in over \$80,000 a year in scholarship funding for our students.

Typical career paths for graduates include the following:

- Restaurants and private clubs, which employ over 9 million people in the US
- Hotels Resorts & Casinos with almost 2.5 million employees
- Airlines, tour operating companies, travel agencies and tourism consulting
- Convention, special events, meeting planning, and tourism agencies
- Food Service and beverage brokers, distributors, and suppliers to the industry
- Food waste and sustainability practices and solutions.

Co-Op Opportunities

Drexel University has long been known for its cooperative education/ internship programs, which allow students to mix periods of full-time, career-related employment with their studies. Culinary Arts & Science students pursue the 6-month co-op employment. This six-month experience during the junior year is tailored to fit the interests of each student. The following hotels, facilities, restaurants and clubs have recently offered co-op positions to Drexel's Culinary Arts & Science students. Although many of these examples are located in the Philadelphia area, co-op jobs are not limited to any region.

- Vernick Restaurant
- High Street Hospitality Group
- Jose Garces - Garces Group
- Marc Vetri - Vetri Family of Restaurants
- Kevin Spraga - Sbraga Restaurants
- Philadelphia Convention and Visitors Bureau
- America's Test Kitchen
- Philadelphia Chamber of Commerce
- Frog Commissary Catering at The Franklin Institute
- Walt Disney World Co
- Saxbys

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Facilities

The major facility of the Culinary Arts & Science program is located on the sixth floor of the Academic Building. It is a 6,500 square foot space that includes three state-of-the-art commercial kitchens, bakery and laboratories, as well as the Academic Bistro (<http://drexel.edu/hsm/about/academic-bistro>), the student-run restaurant, bar and lounge. The facility also includes a sensory analysis lab, hospitality and gaming lab, and conference room. As part of the curriculum, students in this major are required to take food safety and sanitation courses which include lab work at Papadakis Integrated Science Building.

Philadelphia Location

A unique feature of the Culinary Arts & Science program at Drexel is our location in Philadelphia, with proximity to New York City, Boston, Baltimore, and Washington DC, as well as the resort centers on the Atlantic seacoast and in the Pocono Mountains. These regions include hundreds of hotels, restaurants, and resorts, that are used for field trips and campus visits by hospitality resource professionals. Students also gain hands-on experience through faculty-directed field trips throughout the region.

Culinary Arts & Science Faculty

Jonathan Deutsch, PhD (*New York University*). Professor. Social and cultural aspects of food, culinary education, culinary improvisation, recipe and product development; food sustainability.

Jake Lahne, PhD (*University of Vermont*). Assistant Professor. Sensory perception and preference in foods; flavor chemistry and sensory properties of alcoholic beverages; artisan, traditional, and local foods; consumer food choice and taste; cooking practice and food agency

Brandy-Joe Milliron, PhD (*Arizona State University*). Assistant Professor. The development and evaluation of modifications in the natural environment to promote healthier living; farm to table school initiatives;

Michael Traud, JD (*Villanova University*) Program Director, *Hospitality and Tourism Management*. Assistant Clinical Professor. Implementation of Korean Cuisine in the United States; hospitality law; Italian cuisine.

Rosemary Trout, MS (*Drexel University*) Interim Program Director, *Culinary Arts and Food Science*. Instructor. Food labeling and regulations; food safety and sanitation in food service and food manufacturing; food processing; sensory evaluation.

Charles Ziccardi, MS (*Drexel University*). Assistant Teaching Professor. Classic Italian cuisine, Italian culture, gardening for the kitchen, food sustainability, and professional hospitality management.

Emeritus Faculty

A. Philip Handel, PhD (*University of Massachusetts*). Professor Emeritus. Food science, especially lipid chemistry; food composition and functionality; evaluation and analysis of frying fats and fried foods.

Culinary Arts

Major: Culinary Arts

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 184.0

Classification of Instructional Programs (CIP) code: 12.0503

Standard Occupational Classification (SOC) code: 25-1011; 11-9051

About the Program

Note: Effective Fall Term 2015, students are no longer being accepted into this program; however, students may apply to the combined BS in Culinary Arts & Science (p. 14) degree program.

The major in culinary arts prepares students for leadership positions in the fine foods segment of the hospitality industry. This baccalaureate degree in culinary arts is among the first of its kind in the United States. This program comprises approximately equal parts liberal arts, business, hospitality management, and culinary arts. The aim of the program is to prepare students as independent thinkers who can work collaboratively in the field of culinary arts.

Students completing this program also receive a business minor with a choice of one of the following areas:

- Business Administration
- Marketing
- Entrepreneurship

Alternatively, students may meet with their Advisor to select a minor that is more in line with their personal and professional goals.

For more information, visit the Culinary Arts (<http://drexel.edu/hsm/academics/Culinary-Arts-Food-Science>) page on the Center for Hospitality and Sport Management's website (<http://drexel.edu/hsm>).

Program Delivery Options

Drexel's BS degrees include courses in the liberal arts, the humanities, sciences, hospitality management and culinary arts. Three business minors are also offered. The BS degree can be completed on a full-time or part-time basis:

Traditional Four-year option, with one co-op experience:

This option includes one six-month period of full-time employment in the junior year.

Four plus One option BS/MBA combined degree, with co-op experience:

This option combines the four-year BS degree followed by the one-year Professional MBA to qualify freshmen applicants. Incoming freshmen will generally have a minimum of 1300 on the SAT, a GPA of 3.5 or higher, and be in the top 10% of their high school graduating class. For MBA requirements visit the LeBow College Professional MBA (<http://www.lebow.drexel.edu/academics/programs/mba>) website.

Full-time Status Evening option without co-op experience:

To be eligible, students should have a minimum of two years full-time work experience related to students' majors, and a minimum of one year of college level work. Full-time students are eligible for full-time financial aid packages.

Part-time option without co-op experience:

Students work closely with academic advisors to develop a customized plan of study toward degree completion.

London option:

(Available for Hospitality Management and Culinary Arts students.) Students are invited to spend a term in their sophomore, junior or senior year in the Study Abroad Program (<http://www.drexel.edu/studyabroad>), Drexel in London, while earning up to 18.0 credits. The program's

emphasis is on the global implications of and opportunities within the hospitality industry.

Degree Requirements

General Education Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FDSC 154	Science of Food and Cooking	4.0
MATH 101	Introduction to Analysis I	4.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
UNIV G101	The Drexel Experience	2.0
Arts and Humanities Electives **		9.0
Social Science Elective ***		3.0
Free Electives		15.0-19.0

Program Requirements

FDSC 270	Microbial Food Safety and Sanitation	4.0
HRM 110	Introduction to the Hospitality Industry	3.0
HRM 120	Principles of Food-Service Management	3.0
HRM 150	Food & Beverage Customer Service	3.0
HRM 160	Laws of the Hospitality Industry	3.0
HRM 200	Software for Hospitality Industry	3.0
HRM 215	Commercial Food Production	4.0
HRM 220	Purchasing for the Hospitality Industry	3.0
HRM 225	Equipment Design and Layout	3.0
HRM 310	Hospitality Accounting Systems	3.0
HRM 320	Hospitality Management Information Systems	3.0
HRM 330	Hospitality Marketing and Branding	3.0
HRM 335	Beverage Management	3.0
HRM 350	Cost Controls in Hospitality	3.0
HRM 360	Hospitality Industry Public Relations	3.0
HRM 455	Hospitality Human Resources Management	3.0

Culinary Arts Requirements

CULA 120	Techniques and Traditions I	3.0
CULA 121	Techniques and Traditions II	3.0
CULA 125	Foundations of Professional Baking	3.0
CULA 216	A la Carte	3.0
CULA 220	Patisserie I	2.0
CULA 225	Patisserie II	2.0
CULA 235	Professional Dining Room Management	3.0
CULA 300	Fundamentals of Vegetarian Cuisine	3.0
CULA 305	Fundamentals of Italian Cuisine	3.0
CULA 310	Fundamentals of French Cuisine	3.0
CULA 315	Fundamentals of American Cuisine	3.0
CULA 316	Butchery Laboratory	2.0
CULA 325	Garde Manger Laboratory	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
CULA 410	Culture and Gastronomy II	3.0
CULA 415	Food Styling and Photography	3.0
CULA 420	Senior Design Project	3.0

Culinary Arts (CULA) Electives 6.0-9.0

Business Minor Requirements (See Options Below) 24.0

Total Credits 180.0-187.0

* Students who wish to minor in Business Administration must take MATH 101 and MATH 102 or MATH 181, 182 and 183. Marketing and Entrepreneurship minors need only take MATH 101.

** Students choose three classes from the following subject areas: ARTH, COM, ENGL, FMVD, HIST, HUM, JUDA, LING, MUSC, PHIL, PHTO, PRST, PSCI, THTR, WGST. Students can also select any of the language courses to fulfill Arts and Humanities requirements.

*** Students may choose from AFAS, ANTH, PSY, and SOC courses.

Business Minor Requirements

Students have the option of satisfying the business minor requirement by completing one of three possible business minors: **General Business Administration, Marketing or Entrepreneurship.**

Business Administration Minor Option

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
MKTG 301	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0
Total Credits		24.0

Entrepreneurship Minor Option

ACCT 120	Accounting Essentials for New Ventures	4.0
MGMT 260	Introduction to Entrepreneurship	4.0
MGMT 364	Technology Management	4.0
MGMT 365	Business Plan for Entrepreneurs	4.0
Select two of the following:		8.0
BLAW 346	Entrepreneurial Law *	
FIN 301	Introduction to Finance *	
FIN 335	Entrepreneurial Finance	
MKTG 347	New Product Development	
MGMT 363	Directed Study in Entrepreneurship	
ORGB 300 [WI]	Organizational Behavior	
Total Credits		24.0

* Prerequisites must be taken as unrestricted electives.

Marketing Minor Option

MKTG 301	Introduction to Marketing Management	4.0
MKTG 380	Seminar in Marketing Strategy	4.0
Select four of the following:		16.0
MKTG 321	Selling and Sales Management	
MKTG 322	Advertising & Integrated Marketing Communications	
MKTG 324	Marketing Channels and Distribution Systems	
MKTG 326	Marketing Insights	
MKTG 344	Professional Personal Selling	
MKTG 347	New Product Development	
MKTG 348	Services Marketing	
MKTG 351	Marketing for Non-Profit Organizations	
MKTG 353	Business-to-Business Marketing	
MKTG 355	Interactive Marketing	
MKTG 356	Consumer Behavior	
MKTG 357	Global Marketing	
MKTG 358	Transportation and Logistics	
Total Credits		24.0

Sample Plans of Study

BS in Culinary Arts: Minor in Business Administration

(See below for the additional plans illustrating the other Business Minor options)

Term 1		Credits
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HRM 110	Introduction to the Hospitality Industry	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV G101	The Drexel Experience	1.0
Term Credits		14.5
Term 2		
ANTH 101	Introduction to Cultural Diversity	3.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV G101	The Drexel Experience	1.0
Term Credits		15.5
Term 3		
CHEM 103	General Chemistry III	5.0
CULA 120	Techniques and Traditions I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FDSC 154	Science of Food and Cooking	4.0
MATH 239	Mathematics for the Life Sciences	4.0
Term Credits		19.0
Term 4		
BIO 122	Cells and Genetics	4.5
HRM 120	Principles of Food-Service Management	3.0
NFS 215	Nutritional Chemistry	3.0
NFS 217	Nutrient Quality & Composition	1.0
NFS 230	Intermediate Nutrition	4.0
Term Credits		15.5
Term 5		
CULA 315	Fundamentals of American Cuisine	3.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
HRM 215	Commercial Food Production	4.0
Culinary Arts (CULA) or HRM (Hospitality Management) elective		3.0
Term Credits		14.0
Term 6		
BIO 126	Physiology and Ecology	4.5
ECON 201	Principles of Microeconomics	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Free Elective		3.0
Term Credits		15.5
Term 7		
COM 230	Techniques of Speaking	3.0
COOP 101	Career Management and Professional Development	0.0
CULA 291	Culinary Arts Practicum II	6.0
ECON 202	Principles of Macroeconomics	4.0
Culinary Arts (CULA) or HRM (Hospitality Management) elective		3.0
Term Credits		16.0
Term 8		
CULA 310	Fundamentals of French Cuisine	3.0
FDSC 350	Experimental Foods: Product Development	3.0
FDSC 456	Food Preservation Processes	3.0

PHYS 103	General Physics I	4.0
Term Credits		13.0
Term 9		
FDSC 460	Food Chemistry	3.0
FDSC 468	Functional Foods	3.0
NFS 365 [WI]	Nutrition Laboratory: Food and Nutrient Analysis	4.0
PHYS 104	General Physics II	4.0
Term Credits		14.0
Term 10		
CULA 125	Foundations of Professional Baking	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
FDSC 450	Food Microbiology	3.0
FDSC 451	Food Microbiology Laboratory	2.0
MKTG 301	Introduction to Marketing Management	4.0
Term Credits		15.0
Term 11		
CULA 410	Culture and Gastronomy II	3.0
FDSC 454	Microbiology & Chemistry of Food Safety	3.0
FDSC 461	Food Analysis	3.0
FDSC 491	Senior Project I	2.0
MKTG 347	New Product Development	4.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		19.0
Term 12		
COM 310 [WI]	Technical Communication	3.0
FDSC 490	Seminar in Food Science	1.0
FDSC 492	Senior Project II	2.0
STAT 202	Business Statistics II	4.0
Free Elective		3.0
Term Credits		13.0
Total Credit: 184.0		

BS in Culinary Arts: Minor in Entrepreneurship

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HRM 110	Introduction to the Hospitality Industry	3.0
HRM 200	Software for Hospitality Industry	3.0
MATH 181	Mathematical Analysis I	3.0
UNIV G101	The Drexel Experience	1.0
Term Credits		13.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
HRM 150	Food & Beverage Customer Service	3.0
MATH 182	Mathematical Analysis II	3.0
UNIV G101	The Drexel Experience	1.0
Term Credits		14.0
Term 3		
CULA 120	Techniques and Traditions I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HRM 120	Principles of Food-Service Management	3.0
HRM 160	Laws of the Hospitality Industry	3.0
MATH 183	Mathematical Analysis III	3.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
Term Credits		18.0
Term 4		
CULA 121	Techniques and Traditions II	3.0
CULA 125	Foundations of Professional Baking	3.0

HRM 220	Purchasing for the Hospitality Industry	3.0
MGMT 260	Introduction to Entrepreneurship	4.0
Free Elective		3.0
Term Credits		16.0
Term 5		
CULA 315	Fundamentals of American Cuisine	3.0
CULA 325	Garde Manger Laboratory	3.0
HRM 215	Commercial Food Production	4.0
MGMT 364	Technology Management	4.0
Arts and Humanities Elective		3.0
Term Credits		17.0
Term 6		
ACCT 120	Accounting Essentials for New Ventures	4.0
CULA 216	A la Carte	3.0
CULA 220	Patisserie I	2.0
CULA 235	Professional Dining Room Management	2.0
FDSC 154	Science of Food and Cooking	4.0
Term Credits		15.0
Term 7		
COOP 101	Career Management and Professional Development	0.0
CULA 300	Fundamentals of Vegetarian Cuisine	3.0
CULA 305	Fundamentals of Italian Cuisine	3.0
MGMT 365	Business Plan for Entrepreneurs	4.0
Arts and Humanities Elective		3.0
Free Elective		3.0
Term Credits		16.0
Term 8		
CULA 225	Patisserie II	2.0
CULA 310	Fundamentals of French Cuisine	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
CULA 415	Food Styling and Photography	3.0
Free Elective		3.0
Term Credits		14.0
Term 9		
CULA 410	Culture and Gastronomy II	3.0
HRM 225	Equipment Design and Layout	3.0
HRM 310	Hospitality Accounting Systems	3.0
HRM 360	Hospitality Industry Public Relations	3.0
Free Elective		3.0
Term Credits		15.0
Term 10		
CULA 316	Butchery Laboratory	2.0
Free Elective		2.0
Culinary Arts (CULA) Elective		2.0
Arts and Humanities Elective		3.0
Entrepreneurship Elective*		4.0
Social Science Elective		3.0
Term Credits		16.0
Term 11		
HRM 320	Hospitality Management Information Systems	3.0
HRM 335	Beverage Management	3.0
HRM 350	Cost Controls in Hospitality	3.0
Culinary Arts (CULA) Elective		3.0
Free Elective		3.0
Term Credits		15.0
Term 12		
CULA 420	Senior Design Project	3.0
HRM 455	Hospitality Human Resources Management	3.0
Culinary Arts (CULA) Elective		2.0
Social Science Elective		3.0

Entrepreneurship Elective*	4.0
Term Credits	15.0

Total Credit: 184.0

* See degree requirements (p.).

BS in Culinary Arts: Minor in Marketing

Term		Credits
Term 1		
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HRM 110	Introduction to the Hospitality Industry	3.0
HRM 200	Software for Hospitality Industry	3.0
MATH 181	Mathematical Analysis I	3.0
UNIV G101	The Drexel Experience	1.0
Term Credits		13.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
HRM 150	Food & Beverage Customer Service	3.0
MATH 182	Mathematical Analysis II	3.0
UNIV G101	The Drexel Experience	1.0
Term Credits		14.0
Term 3		
CULA 120	Techniques and Traditions I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HRM 120	Principles of Food-Service Management	3.0
HRM 160	Laws of the Hospitality Industry	3.0
MATH 183	Mathematical Analysis III	3.0
NFS 101	Introduction to Nutrition & Food	3.0
Term Credits		18.0
Term 4		
CULA 121	Techniques and Traditions II	3.0
CULA 125	Foundations of Professional Baking	3.0
HRM 220	Purchasing for the Hospitality Industry	3.0
Free Elective		3.0
Social Science Elective		3.0
Term Credits		15.0
Term 5		
CULA 315	Fundamentals of American Cuisine	3.0
CULA 325	Garde Manger Laboratory	3.0
HRM 215	Commercial Food Production	4.0
Social science Elective		3.0
Arts and Humanities Elective		3.0
Term Credits		16.0
Term 6		
CULA 216	A la Carte	3.0
CULA 220	Patisserie I	2.0
CULA 235	Professional Dining Room Management	2.0
FDSC 154	Science of Food and Cooking	4.0
Free Elective		3.0
Term Credits		14.0
Term 7		
COOP 101	Career Management and Professional Development	0.0
CULA 300	Fundamentals of Vegetarian Cuisine	3.0
CULA 305	Fundamentals of Italian Cuisine	3.0
MKTG 301	Introduction to Marketing Management	4.0
Free Elective		3.0
Arts and Humanities Elective		3.0
Term Credits		16.0
Term 8		
CULA 225	Patisserie II	2.0

CULA 310	Fundamentals of French Cuisine	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
CULA 415	Food Styling and Photography	3.0
Marketing (MKTG) Elective		4.0
Free Elective		3.0
Term Credits		18.0
Term 9		
CULA 410	Culture and Gastronomy II	3.0
HRM 225	Equipment Design and Layout	3.0
HRM 310	Hospitality Accounting Systems	3.0
HRM 360	Hospitality Industry Public Relations	3.0
Culinary Arts (CULA) Elective		2.0
Term Credits		14.0
Term 10		
CULA 316	Butchery Laboratory	2.0
Culinary Arts (CULA) Elective		2.0
Marketing (MKTG) Elective		4.0
Free Elective		2.0
Arts and Humanities Elective		3.0
Term Credits		13.0
Term 11		
HRM 320	Hospitality Management Information Systems	3.0
HRM 335	Beverage Management	3.0
HRM 350	Cost Controls in Hospitality	3.0
MKTG 380	Seminar in Marketing Strategy	4.0
Marketing (MKTG) Elective		4.0
Term Credits		17.0
Term 12		
CULA 420	Senior Design Project	3.0
HRM 455	Hospitality Human Resources Management	3.0
Marketing (MKTG) Elective		4.0
Culinary Arts (CULA) Elective		3.0
Free Elective		3.0
Term Credits		16.0

Total Credit: 184.0

Co-op/Career Opportunities

The hospitality industry employs 15 million people nationwide. According to the National Restaurant Association statistics, employment is growing at the rate of eleven percent each year, making this industry one of the fastest growing in the country. The Hospitality Management program enjoys close relationships with the finest hotels, restaurants and tourism partners in the greater Philadelphia area, as well as interaction with professional organizations that represent the industry on a regional, national and international level. These relationships result in over \$80,000 a year in scholarship funding for our students.

Typical career paths for graduates include the following:

- Restaurants and private clubs, which employ over 9 million people in the US
- Hotels Resorts & Casinos with almost 2.5 million employees
- Airlines, tour operating companies, travel agencies and tourism consulting
- Convention, special events, meeting planning, and tourism agencies
- Cruise lines, the fastest growing segment of the industry
- Retirement and life-care facilities
- Food service and beverage brokers, distributors, and suppliers to the industry

Co-Op Opportunities

Drexel University has long been known for its cooperative education/ internship programs, which allow students to mix periods of full-time, career-related employment with their studies. All traditional Hospitality Management students pursue the 6-month co-op employment. This six-month experience during the junior year is in a supervisory or managerial capacity. The following hotels, facilities, restaurants and clubs have recently offered co-op positions to Drexel's Hospitality Management students. Although many of these examples are located in the Philadelphia area, co-op jobs are not limited to any region.

- Four Seasons Hotel
- Jose Garces - Garces Group
- Mark Vetri - Vetri Family of Restaurants
- Marriott Hotels and Resorts
- Philadelphia Convention and Visitors Bureau
- America's Test Kitchen
- Philadelphia Chamber of Commerce
- Frog Commissary Catering
- Ritz-Carlton Hotel
- Sbraga Restaurant
- Restaurant Business Magazine
- Union League (private club)
- Walt Disney World

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Culinary Arts

The minor in culinary arts is designed for students pursuing a variety of majors who also have an interest in food and cuisine. The required courses introduce the major cuisines, and develop necessary culinary technical skills and fundamental knowledge of foods and food preparation. Students are able to select elective courses in various cuisines or can explore more theoretical areas of the field through topics including gastronomy, food history, and food writing.

Required Courses

CULA 115	Culinary Fundamentals	3.0
or CULA 120	Techniques and Traditions I	
CULA 305	Fundamentals of Italian Cuisine	3.0
CULA 310	Fundamentals of French Cuisine	3.0
CULA 315	Fundamentals of American Cuisine	3.0
HRM 215	Commercial Food Production	4.0
Select three of the following:		8.0

CULA 121	Techniques and Traditions II	
CULA 125	Foundations of Professional Baking	
CULA 216	A la Carte	
CULA 220	Patisserie I	
CULA 225	Patisserie II	
CULA 226	Patisserie III	
CULA 240	Fundamentals of Chinese Cuisine	
CULA 306	Advanced Italian Cuisine	
CULA 311	Advanced French Technique	
CULA 320	Advanced Culinary Studio	
CULA 325	Garde Manger Laboratory	
CULA 316	Butchery Laboratory	
CULA 330	Charcuterie	

CULA 335	Fundamentals of Indian Cuisine
CULA 400	Directed Studies with a Master Chef
CULA 405 [WI]	Culture and Gastronomy I
CULA 410	Culture and Gastronomy II
CULA 415	Food Styling and Photography
CULA 425	The Kitchen Garden
CULA 426	The Kitchen Garden: Summer
CULA 427	The Kitchen Garden: Fall
HRM 315	Continental, Ethnic, and Regional Cuisine
HRM 415	Fine Dining and Services
Total Credits	
24.0	

Facilities

The major facility of the Hospitality Management, Culinary Arts and Food Science programs is located on the sixth floor of the Academic Building. It is a 6,500 square foot space that includes three state-of-the-art commercial kitchens, bakery and laboratories, as well as the Academic Bistro (<http://drexel.edu/hsm/about/academic-bistro>), the student-run restaurant, bar and lounge. The facility also includes a sensory analysis lab, hospitality and gaming lab, conference room and the Les Dames d'Escoffier Library.

Philadelphia Location

A unique feature of the Hospitality Management program at Drexel is that it is located in Philadelphia, with close proximity to New York City, Baltimore, and Washington, as well as the resort centers on the Atlantic seacoast and in the Pocono Mountains. These regions include hundreds of hotels, restaurants, resorts, and casinos that are used for field trips and campus visits by hospitality resource professionals. Students also gain hands-on experience through faculty-directed field trips throughout the region.

Culinary Science

Major: Culinary Science

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Classification of Instructional Programs (CIP) code: 12-9999

Standard Occupational Classification (SOC) code: 19-1012

About the Program

The Bachelor of Science (BS) in Culinary Science program combines the creative spirit of culinary arts with the technical and scientific expertise of food science. Our program has the distinction of being the only Culinary Science program housed in the same department as a Culinary Arts & Science degree program in the USA. We are accredited as a Culinology Program through the Research Chefs Association. Because of our unique combination of disciplines, our students learn practical and applied knowledge and gain scientific expertise as it pertains to the food industry.

Culinary scientists learn to integrate and apply knowledge from the disciplines of chemistry, microbiology, culinary arts, nutrition and sensory science in order to create, process, and distribute foods that are safe, nutritious, and delicious. Students majoring in culinary science are prepared for careers in the food industry which includes product design and development, flavor technologists, laboratory management and quality assurance, sensory analysis and design, food sustainability and

solutions. In such positions, graduates can combine their creative and aesthetic talents with their technical expertise as food scientists.

The Culinary Science program is committed to providing a professional, comprehensive, and challenging college experience as it prepares students for a variety of rewarding careers in the culinary field and food science and manufacturing industries. In order to provide students with a well-rounded educational experience, the culinary science curriculum is composed of coursework in food chemistry, microbiology, nutrition, sensory science and culinary arts.

For more information, visit the Center for Hospitality and Sport Management (<http://www.drexel.edu/hsm>).

Program Delivery Options

Drexel's BS degrees include courses in the liberal arts, the humanities, sciences, and culinary arts. Three business minors are also offered. The BS degree can be completed on a full-time or part-time basis:

Traditional 4-year option, with one co-op experience:

This option includes one six-month period of full-time employment in the junior year.

Four plus One option BS/MBA combined degree, with co-op experience:

This option combines the four-year BS degree followed by the one-year Professional MBA to qualify freshmen applicants. Incoming freshmen will generally have a minimum of 1300 on the SAT, a GPA of 3.5 or higher, and be in the top 10% of their high school graduating class. For MBA requirements visit the LeBow College Professional MBA (<http://www.lebow.drexel.edu/academics/programs/mba/drexel-lebow-mba>) website.

Full-time Status Evening option without co-op experience:

To be eligible, students should have a minimum of two years full-time work experience related to students' majors, and a minimum of one year of college level work. Full-time students are eligible for full-time financial aid packages.

Part-time option without co-op experience:

Students work closely with academic advisors to develop a customized plan of study toward degree completion.

London option:

Students are invited to spend a term in their sophomore, junior or senior year in the Study Abroad Program (<http://www.drexel.edu/studyabroad>), Drexel in London, while earning up to 18.0 credits. The program's emphasis is on the global implications of and opportunities within the hospitality industry.

Study Abroad in Osnabruck Germany:

Students have the opportunity to participate in a two week interdisciplinary program which focuses on the practical application of state of the art food processing techniques.

Degree Requirements

Written Analysis and Communication

COM 230	Techniques of Speaking	3.0
COM 310 [WI]	Technical Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0

ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV G101	The Drexel Experience	2.0
Mathematical Analysis and Statistics		
MATH 101	Introduction to Analysis I *	4.0
MATH 102	Introduction to Analysis II *	4.0
MATH 239	Mathematics for the Life Sciences	4.0
STAT 201	Introduction to Business Statistics	4.0
STAT 202	Business Statistics II	4.0
Nutrition		
NFS 230	Intermediate Nutrition	4.0
NFS 365 [WI]	Nutrition Laboratory: Food and Nutrient Analysis	4.0
Humanities and Social Science		
ANTH 101	Introduction to Cultural Diversity	3.0
Biological Sciences		
BIO 122	Cells and Genetics	4.5
BIO 126	Physiology and Ecology	4.5
Chemistry		
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
NFS 215	Nutritional Chemistry	3.0
NFS 217	Nutrient Quality & Composition	1.0
Physics		
PHYS 103	General Physics I	4.0
PHYS 104	General Physics II	4.0
Food Science Requirements		
FDSC 154	Science of Food and Cooking	4.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
FDSC 350	Experimental Foods: Product Development	3.0
FDSC 450	Food Microbiology	3.0
FDSC 451	Food Microbiology Laboratory	2.0
FDSC 454	Microbiology & Chemistry of Food Safety	3.0
FDSC 456	Food Preservation Processes	3.0
FDSC 460	Food Chemistry	3.0
FDSC 461	Food Analysis	3.0
FDSC 468	Functional Foods	3.0
FDSC 490	Seminar in Food Science	1.0
FDSC 491	Senior Project I	2.0
FDSC 492	Senior Project II	2.0
Hospitality Management/Culinary Arts Requirements		
HRM 110	Introduction to the Hospitality Industry	3.0
HRM 120	Principles of Food-Service Management	3.0
HRM 215	Commercial Food Production	4.0
CULA 120	Techniques and Traditions I	3.0
CULA 125	Foundations of Professional Baking	3.0
CULA 291	Culinary Arts Practicum II	6.0
CULA 310	Fundamentals of French Cuisine	3.0
CULA 315	Fundamentals of American Cuisine	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
CULA 410	Culture and Gastronomy II	3.0
Business Minor or Science Requirements (See Options Below)		18.0-32.0
Hospitality Management/Culinary Arts Electives		
Two CULA or HRM electives		6.0
Free Electives		
		9.0
Total Credits		185.0-199.0

* Students may substitute MATH 181, MATH 182, and MATH 183 with permission from an advisor.

Concentration Requirements 18.0 - 32.0 Credits

Students have the option of either satisfying the requirements for a business minor or completing a science concentration.

Science Concentration Option Requirements

CHEM 230	Quantitative Analysis	4.0
CHEM 231 [WI]	Quantitative Analysis Laboratory	2.0
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
Select two of the following: *		5.0-10.0
BIO 221 & BIO 222	Microbiology and Microbiology Laboratory	
BIO 312	Genetically Modified Foods	
BIO 424	Microbial Physiology	
CHEM 243	Organic Chemistry III	
CHEM 256	Physical Chemistry for Biological Sciences	
CHEM 430	Analytical Chemistry I	
CHEM 431 [WI]	Analytical Chemistry II	
Total Credits		19.0-24.0

* BIO 221 + BIO 222 counts as one course.

Business Administration Minor Option

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
MKTG 301	Introduction to Marketing Management	4.0
MKTG 347	New Product Development	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Total Credits		20.0

Entrepreneurship Minor Option

ACCT 120	Accounting Essentials for New Ventures	4.0
MGMT 260	Introduction to Entrepreneurship	4.0
MGMT 364	Technology Management	4.0
MGMT 365	Business Plan for Entrepreneurs	4.0
MKTG 301	Introduction to Marketing Management	4.0
MKTG 347	New Product Development	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Total Credits		28.0

Marketing Minor Option

MKTG 301	Introduction to Marketing Management	4.0
MKTG 347	New Product Development	4.0
MKTG 380	Seminar in Marketing Strategy	4.0
Select three of the following:		12.0
MKTG 324	Marketing Channels and Distribution Systems	
MKTG 326	Marketing Insights	
MKTG 353	Business-to-Business Marketing	
MKTG 356	Consumer Behavior	
MKTG 357	Global Marketing	
MKTG 358	Transportation and Logistics	
Total Credits		24.0

Sample Plans of Study

BS in Culinary Science: Science concentration

(See below for the additional plans illustrating the other Business Minor options)

Term 1		Credits
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HRM 110	Introduction to the Hospitality Industry	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV G101	The Drexel Experience	1.0
Term Credits		14.5
Term 2		
ANTH 101	Introduction to Cultural Diversity	3.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV G101	The Drexel Experience	1.0
Term Credits		15.5
Term 3		
CHEM 103	General Chemistry III	5.0
CULA 120	Techniques and Traditions I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FDSC 154	Science of Food and Cooking	4.0
MATH 239	Mathematics for the Life Sciences	4.0
Term Credits		19.0
Term 4		
BIO 122	Cells and Genetics	4.5
HRM 120	Principles of Food-Service Management	3.0
NFS 215	Nutritional Chemistry	3.0
NFS 217	Nutrient Quality & Composition	1.0
NFS 230	Intermediate Nutrition	4.0
Term Credits		15.5
Term 5		
CULA 315	Fundamentals of American Cuisine	3.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
HRM 215	Commercial Food Production	4.0
Free Elective		3.0
Term Credits		14.0
Term 6		
BIO 126	Physiology and Ecology	4.5
CHEM 230	Quantitative Analysis	4.0
CHEM 231 [WI]	Quantitative Analysis Laboratory	2.0
CHEM 241	Organic Chemistry I	4.0
Culinary Arts (CULA) or HRM (Hospitality Management) elective		3.0
Term Credits		17.5
Term 7		
CHEM 242	Organic Chemistry II	4.0
COM 230	Techniques of Speaking	3.0
COOP 101	Career Management and Professional Development	0.0
CULA 291	Culinary Arts Practicum II	6.0
Culinary Arts (CULA) or HRM (Hospitality Management) elective		3.0
Term Credits		16.0
Term 8		
CULA 310	Fundamentals of French Cuisine	3.0
FDSC 350	Experimental Foods: Product Development	3.0
FDSC 456	Food Preservation Processes	3.0
PHYS 103	General Physics I	4.0

Science concentration elective*		4.0
Term Credits		17.0
Term 9		
FDSC 454	Microbiology & Chemistry of Food Safety	3.0
FDSC 461	Food Analysis	3.0
NFS 365 [WI]	Nutrition Laboratory: Food and Nutrient Analysis	4.0
PHYS 104	General Physics II	4.0
Term Credits		14.0
Term 10		
CULA 125	Foundations of Professional Baking	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
FDSC 450	Food Microbiology	3.0
FDSC 451	Food Microbiology Laboratory	2.0
Science concentration elective*		4.0
Term Credits		15.0
Term 11		
CULA 410	Culture and Gastronomy II	3.0
FDSC 460	Food Chemistry	3.0
FDSC 468	Functional Foods	3.0
FDSC 491	Senior Project I	2.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		15.0
Term 12		
COM 310 [WI]	Technical Communication	3.0
FDSC 490	Seminar in Food Science	1.0
FDSC 492	Senior Project II	2.0
STAT 202	Business Statistics II	4.0
Free Elective		3.0
Term Credits		13.0

Total Credit: 186.0

* See degree requirements (<http://catalog.drexel.edu/undergraduate/schooloftechnologyandprofessionalstudies/culinaryscience/#degreerequirementsbtext>).

BS in Culinary Science: Minor in Business Administration

Term 1		Credits
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HRM 110	Introduction to the Hospitality Industry	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV G101	The Drexel Experience	1.0
Term Credits		14.5
Term 2		
ANTH 101	Introduction to Cultural Diversity	3.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV G101	The Drexel Experience	1.0
Term Credits		15.5
Term 3		
CHEM 103	General Chemistry III	5.0
CULA 120	Techniques and Traditions I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FDSC 154	Science of Food and Cooking	4.0
MATH 239	Mathematics for the Life Sciences	4.0
Term Credits		19.0
Term 4		
BIO 122	Cells and Genetics	4.5

HRM 120	Principles of Food-Service Management	3.0
NFS 215	Nutritional Chemistry	3.0
NFS 217	Nutrient Quality & Composition	1.0
NFS 230	Intermediate Nutrition	4.0
Term Credits		15.5
Term 5		
CULA 315	Fundamentals of American Cuisine	3.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
HRM 215	Commercial Food Production	4.0
Culinary Arts (CULA) or HRM (Hospitality Management) elective		3.0
Term Credits		14.0
Term 6		
BIO 126	Physiology and Ecology	4.5
ECON 201	Principles of Microeconomics	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Free Elective		3.0
Term Credits		15.5
Term 7		
COM 230	Techniques of Speaking	3.0
COOP 101	Career Management and Professional Development	0.0
CULA 291	Culinary Arts Practicum II	6.0
ECON 202	Principles of Macroeconomics	4.0
Culinary Arts (CULA) or HRM (Hospitality Management) elective		3.0
Term Credits		16.0
Term 8		
CULA 310	Fundamentals of French Cuisine	3.0
FDSC 350	Experimental Foods: Product Development	3.0
FDSC 456	Food Preservation Processes	3.0
PHYS 103	General Physics I	4.0
Term Credits		13.0
Term 9		
FDSC 460	Food Chemistry	3.0
FDSC 468	Functional Foods	3.0
NFS 365 [WI]	Nutrition Laboratory: Food and Nutrient Analysis	4.0
PHYS 104	General Physics II	4.0
Term Credits		14.0
Term 10		
CULA 125	Foundations of Professional Baking	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
FDSC 450	Food Microbiology	3.0
FDSC 451	Food Microbiology Laboratory	2.0
MKTG 301	Introduction to Marketing Management	4.0
Term Credits		15.0
Term 11		
CULA 410	Culture and Gastronomy II	3.0
FDSC 454	Microbiology & Chemistry of Food Safety	3.0
FDSC 461	Food Analysis	3.0
FDSC 491	Senior Project I	2.0
MKTG 347	New Product Development	4.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		19.0
Term 12		
COM 310 [WI]	Technical Communication	3.0
FDSC 490	Seminar in Food Science	1.0
FDSC 492	Senior Project II	2.0
STAT 202	Business Statistics II	4.0
Free elective		4.0
Term Credits		14.0
Total Credit: 185.0		

BS in Culinary Science: Minor in Entrepreneurship

		Credits
Term 1		
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HRM 110	Introduction to the Hospitality Industry	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV G101	The Drexel Experience	1.0
Term Credits		14.5
Term 2		
ANTH 101	Introduction to Cultural Diversity	3.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV G101	The Drexel Experience	1.0
Term Credits		15.5
Term 3		
CHEM 103	General Chemistry III	5.0
CULA 120	Techniques and Traditions I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FDSC 154	Science of Food and Cooking	4.0
MATH 239	Mathematics for the Life Sciences	4.0
Term Credits		19.0
Term 4		
BIO 122	Cells and Genetics	4.5
HRM 120	Principles of Food-Service Management	3.0
NFS 215	Nutritional Chemistry	3.0
NFS 217	Nutrient Quality & Composition	1.0
NFS 230	Intermediate Nutrition	4.0
Term Credits		15.5
Term 5		
COM 230	Techniques of Speaking	3.0
CULA 315	Fundamentals of American Cuisine	3.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
HRM 215	Commercial Food Production	4.0
Term Credits		14.0
Term 6		
ACCT 120	Accounting Essentials for New Ventures	4.0
BIO 126	Physiology and Ecology	4.5
MGMT 260	Introduction to Entrepreneurship	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Term Credits		16.5
Term 7		
COOP 101	Career Management and Professional Development	0.0
CULA 291	Culinary Arts Practicum II	6.0
MGMT 365	Business Plan for Entrepreneurs	4.0
Culinary Arts (CULA) or HRM (Hospitality Management) elective		3.0
Term Credits		13.0
Term 8		
CULA 310	Fundamentals of French Cuisine	3.0
FDSC 350	Experimental Foods: Product Development	3.0
FDSC 456	Food Preservation Processes	3.0
PHYS 103	General Physics I	4.0
Term Credits		13.0
Term 9		
FDSC 454	Microbiology & Chemistry of Food Safety	3.0
FDSC 461	Food Analysis	3.0
MGMT 364	Technology Management	4.0
NFS 365 [WI]	Nutrition Laboratory: Food and Nutrient Analysis	4.0

PHYS 104	General Physics II	4.0
	Term Credits	18.0
Term 10		
CULA 125	Foundations of Professional Baking	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
FDSC 450	Food Microbiology	3.0
FDSC 451	Food Microbiology Laboratory	2.0
MKTG 301	Introduction to Marketing Management	4.0
	Term Credits	15.0
Term 11		
CULA 410	Culture and Gastronomy II	3.0
FDSC 460	Food Chemistry	3.0
FDSC 468	Functional Foods	3.0
FDSC 491	Senior Project I	2.0
MKTG 347	New Product Development	4.0
STAT 201	Introduction to Business Statistics	4.0
	Term Credits	19.0
Term 12		
COM 310 [WI]	Technical Communication	3.0
FDSC 490	Seminar in Food Science	1.0
FDSC 492	Senior Project II	2.0
STAT 202	Business Statistics II	4.0
	Culinary Arts (CULA) or HRM (Hospitality Management) elective	3.0
	Term Credits	13.0

Total Credit: 186.0

BS in Culinary Science: Minor in Marketing

Term 1		Credits
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HRM 110	Introduction to the Hospitality Industry	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV G101	The Drexel Experience	1.0
	Term Credits	14.5
Term 2		
ANTH 101	Introduction to Cultural Diversity	3.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV G101	The Drexel Experience	1.0
	Term Credits	15.5
Term 3		
CHEM 103	General Chemistry III	5.0
CULA 120	Techniques and Traditions I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FDSC 154	Science of Food and Cooking	4.0
MATH 239	Mathematics for the Life Sciences	4.0
	Term Credits	19.0
Term 4		
BIO 122	Cells and Genetics	4.5
HRM 120	Principles of Food-Service Management	3.0
NFS 215	Nutritional Chemistry	3.0
NFS 217	Nutrient Quality & Composition	1.0
NFS 230	Intermediate Nutrition	4.0
	Term Credits	15.5
Term 5		
COM 230	Techniques of Speaking	3.0
CULA 315	Fundamentals of American Cuisine	3.0
FDSC 270	Microbial Food Safety and Sanitation	4.0

	Culinary Arts (CULA) or HRM (Hospitality Management) elective	3.0
	Term Credits	13.0
Term 6		
BIO 126	Physiology and Ecology	4.5
HRM 215	Commercial Food Production	4.0
STAT 201	Introduction to Business Statistics	4.0
	Free Elective	3.0
	Term Credits	15.5
Term 7		
COOP 101	Career Management and Professional Development	0.0
CULA 291	Culinary Arts Practicum II	6.0
MKTG 301	Introduction to Marketing Management	4.0
STAT 202	Business Statistics II	4.0
	Culinary Arts (CULA) or HRM (Hospitality Management) elective	3.0
	Term Credits	17.0
Term 8		
CULA 310	Fundamentals of French Cuisine	3.0
FDSC 350	Experimental Foods: Product Development	3.0
FDSC 456	Food Preservation Processes	3.0
PHYS 103	General Physics I	4.0
	Marketing (MKTG) elective	4.0
	Term Credits	17.0
Term 9		
FDSC 454	Microbiology & Chemistry of Food Safety	3.0
FDSC 461	Food Analysis	3.0
NFS 365 [WI]	Nutrition Laboratory: Food and Nutrient Analysis	4.0
PHYS 104	General Physics II	4.0
	Term Credits	14.0
Term 10		
CULA 125	Foundations of Professional Baking	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
FDSC 450	Food Microbiology	3.0
FDSC 451	Food Microbiology Laboratory	2.0
	Marketing (MKTG) elective	4.0
	Term Credits	15.0
Term 11		
CULA 410	Culture and Gastronomy II	3.0
FDSC 460	Food Chemistry	3.0
FDSC 468	Functional Foods	3.0
FDSC 491	Senior Project I	2.0
MKTG 347	New Product Development	4.0
	Term Credits	15.0
Term 12		
COM 310 [WI]	Technical Communication	3.0
FDSC 490	Seminar in Food Science	1.0
FDSC 491	Senior Project I	2.0
MKTG 380	Seminar in Marketing Strategy	4.0
	Marketing (MKTG) elective	4.0
	Term Credits	14.0

Total Credit: 185.0

Co-op/Career Opportunities

Career Outlook

The food industry is one of the largest manufacturing segments of all industries in the US. Employment opportunities for college graduates in the food science industries are expected to remain strong over the next five years. In fact, an estimated 20,000 positions in food and agriculture are filled by people who have had training in an allied field. The Central Atlantic region is home to a number of food producers and processors, flavor companies, the USDA Agricultural Research Center, Eastern

Regional Research Center, and companies that supply ingredients to the food industry.

Typical career paths for culinary science graduates include the following:

- Food product development
- Flavor technician
- Manger of sustainability practices
- Research chef
- Ingredient marketing and sales
- Food quality assurance manager
- Food microbiologist
- Food chemist
- Research food scientist
- Sensory scientist

Co-op Opportunities

Drexel University has long been known for its co-operative education/ internship programs, which allow students to mix periods of full-time, career-related employment with their studies. All traditional Culinary Science students pursue the 6-month co-op employment. This six-month experience during the junior year can be completed locally, nationally, or internationally. The following employers have recently offered positions to Drexel's Culinary Science majors:

- Monell Chemical Senses Center
- Ashland Specialty Ingredients
- Colorcon
- Egglands Best
- Keystone Foods Corporation
- Campbell Soup Company
- IFF/Ottens Flavors
- Victory Brewing Company
- David Michael & Company
- Barry-Callebaut
- USDA ARS ERRC

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Facilities

Facilities for the Culinary Science department are mainly located on the sixth floor of the Academic Building. It is a 6,500 square foot space that includes three state-of-the-art commercial kitchens, bakery and laboratories, as well as the Academic Bistro (<http://drexel.edu/hsm/about/academic-bistro>), the student-run restaurant. The facility also includes a sensory analysis lab. In addition, students take Microbiology labs in the Papdakis Integrated Science Building, and Chemistry labs through our Department of Chemistry in Disque.

Philadelphia Location

The tri state area is home to hundreds of food companies which include processors, growers, experts in sustainable farming and agricultural practices, flavor companies and ingredient suppliers. We are also several blocks from Monell Chemical Senses Center, which is located on Market Street in Philadelphia.

Culinary Arts & Science Faculty

Jonathan Deutsch, PhD (*New York University*). Professor. Social and cultural aspects of food, culinary education, culinary improvisation, recipe and product development; food sustainability.

Jake Lahne, PhD (*University of Vermont*). Assistant Professor. Sensory perception and preference in foods; flavor chemistry and sensory properties of alcoholic beverages; artisan, traditional, and local foods; consumer food choice and taste; cooking practice and food agency

Brandy-Joe Milliron, PhD (*Arizona State University*). Assistant Professor. The development and evaluation of modifications in the natural environment to promote healthier living; farm to table school initiatives;

Michael Traud, JD (*Villanova University*) *Program Director, Hospitality and Tourism Management*. Assistant Clinical Professor. Implementation of Korean Cuisine in the United States; hospitality law; Italian cuisine.

Rosemary Trout, MS (*Drexel University*) *Interim Program Director, Culinary Arts and Food Science*. Instructor. Food labeling and regulations; food safety and sanitation in food service and food manufacturing; food processing; sensory evaluation.

Charles Ziccardi, MS (*Drexel University*). Assistant Teaching Professor. Classic Italian cuisine, Italian culture, gardening for the kitchen, food sustainability, and professional hospitality management.

Emeritus Faculty

A. Philip Handel, PhD (*University of Massachusetts*). Professor Emeritus. Food science, especially lipid chemistry; food composition and functionality; evaluation and analysis of frying fats and fried foods.

Hospitality Management

Major: Hospitality Management

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 182.0

Co-op Options: Three Co-op (Five years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.0904

Standard Occupational Classification (SOC) code: 11-9051; 11-9071; 11-9081

About the Program

The hospitality management major at Drexel University prepares students for leadership positions in the lodging, food service, and tourism and gaming industries. It also provides the necessary foundation for graduate school.

The hospitality management program recognizes the critical importance of an interdisciplinary education with a global perspective for tomorrow's leaders and managers. Committed to building student knowledge across functional areas and contributing disciplines, the program allows for increased specialization with elective coursework in the following areas:

- Food and Beverage Management
- Gaming and Resort Management
- Travel and Tourism
- Hotel Administration
- Meeting and Event Planning

Home to one of the top hospitality programs in the region, Drexel prides itself on its reputation for progressive, high-quality education. The thriving metropolis of Philadelphia serves as the learning lab for these unique programs. As the sixth largest city in the United States, Philadelphia is in the midst of a restaurant renaissance featuring world-class cuisine and entertainment. Student-focused faculty members are recognized for their professional affiliations, research, published work, and above all, teaching.

Students also receive a business administration minor and have 24.0 credits of free elective to pursue a second minor option.

For more information, visit the Hospitality Management Program's (<http://www.drexel.edu/hsm>) website.

Program Delivery Options

Drexel's BS in Hospitality Management degree includes courses in the liberal arts, the humanities, language, sciences, hospitality management and culinary arts. A business administration minor is also included. The BS degree can be completed on a full-time or part-time basis:

Four plus One option BS/MBA combined degree, with co-op experience:

This option combines the four-year BS degree followed by the one-year Professional MBA to qualify freshmen applicants. Incoming freshmen will generally have a minimum of 1300 on the SAT, a GPA of 3.5 or higher, and be in the top 10% of their high school graduating class. For MBA requirements visit the LeBow College Professional MBA (<http://www.lebow.drexel.edu/academics/programs/mba>) website.

Five-year option, with three co-op experiences:

This option allows students to pursue a variety of professional experiences in the industry including the option to co-op abroad.

Full-time Status Evening option without co-op experience:

To be eligible, students should have a minimum of two years full-time work experience related to students' majors, and a minimum of one year of college level work. Full-time students are eligible for full-time financial aid packages.

Part-time option without co-op experience:

Students work closely with academic advisors to develop a customized plan of study toward degree completion.

American University in Rome:

Every three years, the Drexel hospitality management faculty participate in a study and teach abroad experience. Students are invited to spend the fall semester abroad in Rome, Italy and earn 18.0 credits. Students take two Hospitality related courses taught by a Drexel professor and two additional courses at AUR of their choosing. All course instruction is in English, but a term of Italian 101 is a pre-requisite for the experience. More information can be found on the Study Abroad website.

London option:

Students are invited to spend a term in their sophomore, junior or senior year in the Study Abroad Program (<http://www.drexel.edu/studyabroad>), Drexel in London, while earning up to 18.0 credits. The program's

emphasis is on the global implications of and opportunities within the hospitality industry.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 181	Public Relations Principles and Theory	3.0
COM 230	Techniques of Speaking	3.0
COM 270 [WI]	Business Communication	3.0
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
INFO 101	Introduction to Information Technology	3.0
MATH 107	Probability and Statistics for Liberal Arts	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
NFS 101	Introduction to Nutrition & Food	1.0
NFS 100	Nutrition, Foods, and Health	2.0
UNIV SH101	The Drexel Experience	1.0

Arts and Humanities Electives * 15.0

Social Science Electives ** 9.0

Hospitality Major Requirements

CULA 115	Culinary Fundamentals	3.0
FDSC 100	ServSafe	1.0
HRM 110	Introduction to the Hospitality Industry	3.0
HRM 120	Principles of Food-Service Management	3.0
HRM 125	Hotel Operations Management	3.0
HRM 130	Introduction to Tourism	3.0
HRM 131	Tourism Geography	3.0
HRM 150	Food & Beverage Customer Service	3.0
HRM 155	Hotel Customer Service	3.0
HRM 160	Laws of the Hospitality Industry	3.0
HRM 165	Introduction to the Events Industry	3.0
HRM 215	Commercial Food Production	4.0
HRM 330	Hospitality Marketing and Branding	3.0
HRM 335	Beverage Management	3.0
HRM 355	Resort Management	3.0
HRM 370	Gaming and Casino Management I	3.0
HRM 371	Gaming and Casino Management II	3.0
HRM 425	Hospitality Industry Administration	3.0
HRM 450	Hospitality Leadership Seminar	3.0
HRM 455	Hospitality Human Resources Management	3.0

Industry Hours Requirements

HRM 190	Industry Hours I	1.0
HRM 290	Industry Hours II	1.0
HRM 390	Industry Hours III	1.0
HRM 490	Industry Hours IV	1.0
HRM 495	Industry Hours V	1.0

Program Electives *** 12.0

Business Administration Minor Requirement

ACCT 110	Accounting for Professionals	4.0
ECON 201	Principles of Microeconomics	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Complete one of the following courses to complete the BA minor:		
BLAW 201	Business Law I	4.0
or ECON 202	Principles of Macroeconomics	
or OPM 200	Operations Management	

or STAT 201	Introduction to Business Statistics	
Free Electives		24.0
Total Credits		183.0

* Three language courses are required from: ARBC, CHIN, FREN, GER, GREC, ITAL, JAPN, KOR, RUSS, or SPAN and then one additional arts & humanities course from any of the above as well as ENGL, GST, HIST, HUM, JUDA, LANG, LING, PHIL, WGST, or WRIT areas.

** Students may choose from ANTH, CJS, PSCI, PSY, and SOC courses.

*** Choose additional Hospitality courses or courses from CULA or SMT.

Sample Plan of Study

5 YR UG Co-op Concentration

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HRM 110	Introduction to the Hospitality Industry	3.0
HRM 130	Introduction to Tourism	3.0
HRM 190	Industry Hours I	1.0
MATH 181	Mathematical Analysis I	3.0
UNIV SH101	The Drexel Experience	1.0
	Term Credits	14.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
HRM 131	Tourism Geography	3.0
HRM 150	Food & Beverage Customer Service	3.0
MATH 182	Mathematical Analysis II	3.0
Arts & Humanities Elective		4.0
	Term Credits	16.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HRM 165	Introduction to the Events Industry	3.0
HRM 125	Hotel Operations Management	3.0
MATH 107	Probability and Statistics for Liberal Arts	3.0
Arts & Humanities Elective		4.0
	Term Credits	17.0
Term 4		
CULA 115	Culinary Fundamentals	3.0
FDSC 100	ServSafe	1.0
HRM 120	Principles of Food-Service Management	3.0
HRM 220	Purchasing for the Hospitality Industry	3.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
Arts & Humanities		4.0
	Term Credits	17.0
Term 5		
COM 230	Techniques of Speaking	3.0
HRM 155	Hotel Customer Service	3.0
HRM 160	Laws of the Hospitality Industry	3.0
HRM 215	Commercial Food Production	4.0
HRM 290	Industry Hours II	1.0
Arts & Humanities Elective		3.0
	Term Credits	17.0
Term 6		
ACCT 110	Accounting for Professionals	4.0
HRM 370	Gaming and Casino Management I	3.0

HRM 390	Industry Hours III	1.0
MKTG 201	Introduction to Marketing Management	4.0
Free elective		3.0
	Term Credits	15.0
Term 7		
HRM 330	Hospitality Marketing and Branding	3.0
HRM 371	Gaming and Casino Management II	3.0
MIS 200	Management Information Systems	4.0
Free elective		3.0
Arts and Humanities elective		3.0
	Term Credits	16.0
Term 8		
HRM 355	Resort Management	3.0
INFO 101	Introduction to Information Technology	3.0
Program Elective		3.0
Social Science Elective		3.0
Free elective		3.0
	Term Credits	15.0
Term 9		
COM 181	Public Relations Principles and Theory	3.0
ECON 201	Principles of Microeconomics	4.0
HRM 335	Beverage Management	3.0
HRM 490	Industry Hours IV	1.0
Program elective		3.0
Free elective		3.0
	Term Credits	17.0
Term 10		
HRM 450	Hospitality Leadership Seminar	3.0
HRM 495	Industry Hours V	1.0
ORGB 300 [WI]	Organizational Behavior	4.0
Program elective		3.0
Free elective		3.0
	Term Credits	14.0
Term 11		
HRM 425	Hospitality Industry Administration	3.0
Free elective		3.0
Business elective		4.0
Social Science elective		3.0
	Term Credits	13.0
Term 12		
HRM 455	Hospitality Human Resources Management	3.0
Program elective		3.0
Social Science elective		3.0
Free elective		3.0
	Term Credits	12.0
Total Credit: 183.0		

Facilities

The major facility of the Hospitality Management, Culinary Arts and Food Science programs is located on the sixth floor of the Academic Building. It is a 6,500 square foot space that includes three state-of-the-art commercial kitchens, bakery and laboratories, as well as the Academic Bistro (<http://www.drexel.edu/hsm/about/academic-bistro>), the student-run restaurant, bar and lounge. The facility also includes a sensory analysis lab, hospitality and gaming lab, conference room and the Les Dames d'Escoffier Library.

Philadelphia Location

A unique feature of the Hospitality Management program at Drexel is that it is located in Philadelphia, with close proximity to New York City,

Baltimore, and Washington, as well as the resort centers on the Atlantic seacoast and in the Pocono Mountains. These regions include hundreds of hotels, restaurants, resorts, and casinos that are used for field trips and campus visits by hospitality resource professionals. Students also gain hands-on experience through faculty-directed field trips throughout the region.

Hospitality Management Faculty

Robert Ambrose, MS (*Fairleigh Dickinson University*). Instructor. Creative gaming floor applications, strategy development and implementation, executive decision making, the customer service experience within the casino/hospitality environment.

Linda Forristal, PhD (*Purdue University*). Associate Teaching Professor. Destination management, marketing, branding, communications, cultural heritage tourism including foodways, indigenous tourism.

Michael Traud, JD (*Villanova University*) Program Director, Hospitality and Tourism Management. Assistant Clinical Professor. Implementation of Korean Cuisine in the United States; hospitality law; Italian cuisine.

Sport Management

Major: Sport Management

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 31.0504

Standard Occupational Classification (SOC) code: 11-1021

About the Program

The Bachelor of Science in Sport Management (<http://drexel.edu/hsm>) program is designed for students who plan to pursue careers in the sport industry. The major draws on the strengths of its own core offerings which complement the University's academic programs, in particular business administration. Students may also augment their degrees with minors from the University's other schools and departments including entrepreneurship, communications, and media arts.

Students will master the knowledge and skills necessary for success in professional sports organizations, collegiate athletics, sport media companies, and businesses that service and are complimentary to the sport industry. The co-op option engages students with extensive experiential learning. Our Philadelphia location is optimal for accessing opportunities throughout the Northeast corridor and beyond.

The program offers options covering a wide range of areas of study; students are able to match their skills, abilities, and interests with a specific niche within the sport industry. Students may chose a minor or create their own particular specialization and area of expertise, in consultation with our department's academic advisors and faculty.

Coursework

The sport management major consists of 180.0 credits. All students enrolled in the program are required to take 46.0 credits of general education courses, 40.0 credits of general business, and a sport business core of 42.0 hours. These courses are supplemented by 36.0 hours

creating a specialization that may include a minor or concentration, and 16.0 hours of free electives.

Degree Completion Options

The Bachelor of Science degree in sport management can be completed in either four or five years:

Five-year option, with co-op experience

This option allows for the greatest amount of employment experience, with three distinct six-month periods of employment included with studies. After the start of the sophomore year, students study or work through all terms, including summers.

Four-year option, with internship experience

This option includes just one six-month period of full-time employment. After the start of the sophomore year, students study or work through all terms, including summers.

For more information about this major, visit the Center for Hospitality and Sport Management's Sport Management (<http://drexel.edu/hsm/academics/Sport-Management>) web page.

Degree Requirements

General Education Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
COM 270 [WI]	Business Communication	3.0
or COM 310	Technical Communication	
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
or MATH 121	Calculus I	
MATH 102	Introduction to Analysis II	4.0
or MATH 122	Calculus II	
PHIL 301	Business Ethics	3.0
or PHIL 325	Ethics in Sports Management	
UNIV SH101	The Drexel Experience	1.0
Select a minimum of 6.0 credits from: BIO, CHEM, ENVS, ENSS, GEO, PHYS, PHEV, NFS, ANAT		6.0
Select a minimum of 9.0 credits from AFAS, ANTH, CJS, ENGL, HIST, HUM, PHIL, PSY, SOC, WGST, WRIT or any language course		9.0

General Business Requirements

ACCT 110	Accounting for Professionals	4.0
BLAW 201	Business Law I	4.0
BUSN 111	Foundations for Business	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
or MIS 200	Management Information Systems	
MKTG 201	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0

Sport Business Core

SMT 110	The Business of Sport	4.0
SMT 152	Leadership in Sports & Society	3.0
SMT 201	Sports Marketing, Promotion, and Public Relations	4.0
SMT 205	Sport Media Relations	4.0

SMT 230	Sports and the Law	4.0
SMT 270	Sports Facility Planning & Management	3.0
SMT 275	Sports Event Management	3.0
SMT 285	Sport, Industry, and Society	4.0
SMT 290	Digital Media in Sport	3.0
SMT 320	Sport Economics	4.0
SMT 362	Sport Ticket Sales	3.0
SMT 401	Professional Portfolio	3.0
Program Electives: Three or Four SMT courses		12.0
Minor Option: Select a minor from a related program or create a specialization with 24 program electives*		24.0
Recommended Minors: Business Analytics, Legal Studies, Economics, Finance, International Economics, Marketing, Entrepreneurship, Sport Media Production		
SMT 227	Sport Entrepreneurship	
SMT 240	Olympic Games	
SMT 245	NCAA Compliance	
SMT 250 [WI]	Technology and Sport	
SMT 255	Legal Foundations of Title IX	
SMT 260	Sports Agents & Labor Relations	
SMT 262	Digital Sports Storytelling	
SMT 300	Quantitative Analysis and Statistics for Sports	
SMT 305	Fundraising in Sports	
SMT 307	Corporate Sponsorship in Sports	
SMT 335	Sport Governance & Policy	
SMT 340 [WI]	International Aspects of Sport	
SMT 347	Sport Tourism	
SMT 360	Sport Ticket Operations	
SMT 375	Sport Finance	
SMT 380	Sports Analytics	
SMT 382	Decision Making in Sport Business	
SMT 475	Sports Industry Practicum	
Free electives		16.0
Total Credits		180.0

* Consult with an advisor or faculty member.

Sample Plan of Study

5 YR UG Co-op Concentration

Term	Credits	
Term 1		
ANTH 101	Introduction to Cultural Diversity	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101 or 121	Introduction to Analysis I Calculus I	4.0
SMT 110	The Business of Sport	4.0
UNIV 101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		
BUSN 111	Foundations for Business	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102 or 122	Introduction to Analysis II Calculus II	4.0
SMT 152	Leadership in Sports & Society	3.0
Term Credits		15.0
Term 3		
ACCT 110	Accounting for Professionals	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
SMT 205	Sport Media Relations	4.0
Natural Science elective		3.0

Liberal Arts elective		3.0
Term Credits		17.0
Term 4		
COM 230	Techniques of Speaking	3.0
ECON 201	Principles of Microeconomics	4.0
MKTG 201	Introduction to Marketing Management	4.0
SMT 270	Sports Facility Planning & Management	3.0
Specialization elective*		3.0
Term Credits		17.0
Term 5		
COM 270 [WI] or 310 [WI]	Business Communication Technical Communication	3.0
SMT 275	Sports Event Management	3.0
SMT 290	Digital Media in Sport	3.0
STAT 201	Introduction to Business Statistics	4.0
Free elective		3.0
Term Credits		16.0
Term 6		
BLAW 201	Business Law I	4.0
SMT 285	Sport, Industry, and Society	4.0
Free elective		3.0
Specialization elective		3.0
Natural Science elective		3.0
Term Credits		17.0
Term 7		
ORGB 300 [WI]	Organizational Behavior	4.0
PHIL 301 or 325	Business Ethics Ethics in Sports Management	3.0
Two Specialization electives*		6.0
Liberal Arts elective		3.0
Term Credits		16.0
Term 8		
INTB 200 or MIS 200	International Business Management Information Systems	4.0
SMT 320	Sport Economics	4.0
SMT 362	Sport Ticket Sales	3.0
Specialization elective		3.0
Term Credits		14.0
Term 9		
ECON 202	Principles of Macroeconomics	4.0
SMT 201	Sports Marketing, Promotion, and Public Relations	4.0
Specialization elective*		3.0
Social Science or Liberal Arts elective		3.0
Term Credits		14.0
Term 10		
FIN 301	Introduction to Finance	4.0
SMT 230	Sports and the Law	4.0
Two Specialization electives*		6.0
Term Credits		14.0
Term 11		
SMT 401	Professional Portfolio	3.0
Three Specialization electives*		9.0
Term Credits		12.0
Term 12		
Specialization electives*		3.0
Free electives		10.0
Term Credits		13.0
Total Credit: 180.0		

* See degree requirements (p.).

Co-op/Career Opportunities

Co-op Opportunities

Drexel University has long been known for its co-operative education programs, through which students combine periods of full-time, career-related employment with their studies. Co-op employment is required for sport management students and is central to their experience.

Within the sport management major, co-operative education gives students experience in a range of sport related jobs and settings, from coaching to the business of sports to health-enhancing activities. Students may be placed with professional athletic teams, or with organizations aligned with sports (e.g., a sports agency). Co-op experiences are available with many of the region's sports, recreation, and health organizations, including professional sports teams, college athletic departments, sports media networks, non-profit organizations, law firms, youth fitness organizations, fitness centers, sports complexes, and others.

Career Opportunities

The multidisciplinary nature of the sport management program allows its graduates to be ready for a wide range of sport-related professions, including athletic management, sports and recreational activities at all levels (professional, semi-professional, collegiate, scholastic, and youth) within a range of organizations (public, private, community, recreation, scholastic, professional, and amateur), and for varying purposes (competitive, fitness, wellness, and rehabilitation).

Sports management graduates are uniquely qualified for leadership, support, or coaching positions in professional and amateur sports organizations, in recreation and community centers, in high schools and colleges, and in other sports venues, as well as in the health and wellness industry. The program also prepares students for graduate or professional study in a variety of fields including sport management, sports psychology, communication, law, education, business administration, and other fields.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more information on career opportunities.

Minor in Sport Management

The minor in sport business is designed to introduce students to the primary areas of study in the sport industry. Students will be exposed to a variety of perspectives for assessing the sports business.

SMT 110	The Business of Sport	4.0
SMT 201	Sports Marketing, Promotion, and Public Relations	4.0
SMT 285	Sport, Industry, and Society	4.0
SMT 230	Sports and the Law	4.0
SMT 320	Sport Economics	4.0
Choose a minimum of 4.0 credits from the following		4.0-6.0
SMT 205	Sport Media Relations	
SMT 270	Sports Facility Planning & Management	
SMT 275	Sports Event Management	
SMT 290	Digital Media in Sport	
SMT 335	Sport Governance & Policy	
SMT 340 [WI]	International Aspects of Sport	
SMT 380	Sports Analytics	
Total Credits		24.0-26.0

Sport Management Faculty

Lawrence Cohen, JD (*Temple University*). Assistant Teaching Professor. Sports and antitrust law; tickets sales data analytics; sport sponsorship trends.

Amy Giddings, PhD (*Temple University*) *Director, Sport Coaching Leadership*. Associate Teaching Professor. International aspects of sport and culture, principles of coaching, teambuilding, group dynamics, minority issues in sport including availability and accessibility concerns, character development.

Joel Maxcy, PhD (*Washington State University*) *Department Head, Sport Management*. Associate Professor. Economics of sport; labor economics & policy; economics of antitrust & regulation.

Jim Reese, EdD (*University of Northern Colorado*). Associate Professor. Sport ticket sales, strategies, and operations; quantitative analysis and statistics for sport; economic aspects of sport management.

Ellen Staurowsky, EdD (*Temple University*) *Interim Associate Director, Center for Hospitality and Sport Management*. Professor. Social justice issues in sport; gender equity in sport; Title IX pay equity and equal employment opportunity; athlete exploitation; college sport reform; and misappropriation of American Indian imagery in sport.

Karen Weaver, EdD (*University of Pennsylvania*). Associate Clinical Professor. Sport marketing & promotions, public relations, media, and leadership in sport.

Minor in Food Science

The minor in food science is designed for students interested in applying the basic sciences to the world's largest industry. The minor should be especially attractive to students in chemistry, chemical engineering, nutrition, and biological sciences, as it provides a background for excellent employment and post-baccalaureate study opportunities in areas closely allied to their basic disciplines.

The minor consists of 25.0 credits. Interested students should consult with a culinary science faculty member to schedule courses appropriate for their background and goals.

Required Courses		
FDSC 154	Science of Food and Cooking	4.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
FDSC 350	Experimental Foods: Product Development	3.0
FDSC 450	Food Microbiology	3.0
FDSC 451	Food Microbiology Laboratory	2.0
FDSC 456	Food Preservation Processes	3.0
FDSC 460	Food Chemistry	3.0
FDSC 461	Food Analysis	3.0
Total Credits		25.0

Minor in Food Studies

About the Program

Food is central to our existence and is touched upon in a variety of disciplines at the university. This minor seeks to capture and help students navigate the breadth of course offerings that touch upon food systems. Because food systems can be studied through many different lenses, students can adapt this food studies minor to their program of study. For example, students interested in public health policy issues can

create a minor of hands-on community-based culinary classes, public health, and nutrition classes. If a student is interested in food-related research and development, he or she might tailor the minor with business- or entrepreneurship-centered classes and practical experience in the Drexel Food Lab.

Required Courses

CULA 115	Culinary Fundamentals	3.0
CULA 405 [WI]	Culture and Gastronomy I	3.0
FDSC 120	Food and the Senses	3.0

Food Studies Electives

Select a minimum of 15.0 credits from the list below:		15.0
CULA 125	Foundations of Professional Baking	
CULA 410	Culture and Gastronomy II	
CULA 412	Food Writing	
ENTP 250	Ideation	
ENTP 270	Social Entrepreneurship	
ENTP 440	Launch It!: Early Stage	
HRM 160	Laws of the Hospitality Industry	
HRM 315	Continental, Ethnic, and Regional Cuisine	
HRM 395	Economics of Tourism	
NFS 100 & NFS 101	Nutrition, Foods, and Health and Introduction to Nutrition & Food	
NFS 215	Nutritional Chemistry	
NFS 217	Nutrient Quality & Composition	
NFS 230	Intermediate Nutrition	
NFS 345	Foods and Nutrition of World Cultures	
NFS 391	Community Nutrition	
PBHL 101	Public Health 101	
PBHL 306	Introduction to Community Health	
PSCI 369	The Politics of Food	

Total Credits 24.0

Minor in Gaming and Casino Operations

The minor in gaming and casino operations provides individuals interested in careers in the casino resort industries with an in depth understanding of the unique aspects of casino and resort operations and management.

This minor focuses on the knowledge, skills, and abilities necessary to become a competent manager in a casino resort. The program is designed for people interested in a career in the casino industry or for existing casino employees looking to advance to higher levels of management.

Required Courses

HRM 110	Introduction to the Hospitality Industry	3.0
HRM 325	Hotel Rooms Division Management	3.0
HRM 355	Resort Management	3.0
HRM 370	Gaming and Casino Management I	3.0
HRM 371	Gaming and Casino Management II	3.0
HRM 470	Gaming Legislation, Policy and Law	3.0
HRM 472	Gaming Information Systems	3.0
HRM 475	Current Issues in Gaming	3.0

Total Credits 24.0

Minor in Sport Coaching Leadership

The minor in sport coaching leadership, open to all undergraduate students across the University, provides the foundation for the effective coaching and managing of athletes at various levels.

On completion of the minor, students will have developed the ability to communicate and motivate athletes, enhance the social and emotional growth of athletes, develop sound physical training programs, use sport skills effectively, inform athletes about the principles of good nutrition, reduce injuries by managing roles better, effectively deal with equipment, facilities, scheduling and team logistics and understand the administrative facets of coaching.

PSY 245 [WI]	Sports Psychology	3.0
SCL 101	Principles of Coaching	3.0
SCL 102	Principles of Coaching II	3.0
SCL 203	Sports Conditioning	3.0
SCL 210	Prevention and Care of Athletic Injuries	3.0
SCL 314	Sport Performance and Energy Systems	3.0
SCL 495	Coaching Practicum I	3.0
or SCL 496	Coaching Practicum II	
SMT 152	Leadership in Sports & Society	3.0
Total Credits		24.0

The Close School of Entrepreneurship

Entrepreneurship is a central theme of the Drexel University Strategic Plan 2012-2017: Transforming the Modern University. The cultivation of entrepreneurship and innovation is the key to success in today's world. Drexel's strong entrepreneurial and innovative culture extends across academic programs through curricular and experiential activities, faculty and student research, and various partnerships with business, non-profits, and government.

The Close School of Entrepreneurship is the hub of such activities, working in alignment with all colleges and schools at Drexel. As a freestanding academic school it provides curricula and activities for students to learn and practice innovative behavior.

The Close School defines entrepreneurship as more than starting a company or sparking innovation within established organizations. For the Close School, entrepreneurship consists of three dimensions:

- A habit of mind and an attitude; a skill set applicable to pursuing innovation in business, personal, and career contexts.
- An approach to life built around innovative thinking, calculated daring and proactive behavior.
- The process through which an individual or team creates or recognizes opportunities to pursue something of value, regardless of the resources available.

The Close School's academic programs prepare students to face the challenges of self-employment and new venture creation in an evolving 21st century workforce. This pioneering approach to entrepreneurship education addresses a very real market need — an extremely competitive global workforce that increasingly values initiative, independence, and the intellectual dexterity to rethink old ways of doing things and invent new ones.

Majors

- Entrepreneurship and Innovation (BA) (p. 36)

Minors

- Energy Innovations (p. 39)
- Entrepreneurship and Innovation (p. 38)
- Health Innovations (p. 39)
- Social Entrepreneurship (p. 39)

Background

Charles D. Close was a groundbreaking entrepreneur who experienced success as founder, leader, and investor in a series of technology companies. He also was one of Drexel University's most distinguished alumni, graduating in 1936 with a degree in electrical engineering.

Mr. Close was the former Chairman of the Board of Expansion Seal Technologies Group, and former Chairman of the Board of CDS Analytical. Earlier in his career he was President of Continental Disc Corporation, Technical Investor at Kellet Corp, President and Chairman of Compudyne Corporation, and Founder and President of Fluid Controls Company. Over the years, he also published a number of technical articles on instrument controls and systems. Mr. Close was a Director at J.W. Microelectronics, Athena Controls, Kellet Corp., Chemical Data

Systems, Instrument Society of America, and General Components. In addition, he was a trustee for the privately-held CDC Fund.

In addition to the Drexel 100, Mr. Close was also inducted into the Alumni Circle of Distinction for the College of Engineering. As a student, he was President of the Chess Club and a member of the American Institute of Electrical Engineers.

He and his late wife, Barbara, established a philanthropic legacy that included a sizable anonymous gift in 1999 to Drexel University that helped launch and build the Baiada Institute for Entrepreneurship (<http://www2.lebow.drexel.edu/Baiada>).

In March 2009, the Charles and Barbara Close Foundation gave Drexel \$1.5 million to establish the A.J. Drexel Autism Institute, and in December 2012, the foundation's gift of \$12.5 million established the Charles D. Close School of Entrepreneurship.

Mr. Close, whom friends knew as "Charley," enjoyed skiing, music, science, and was an avid golfer and member of the Cedarbrook Country Club in Blue Bell, PA. Charles D. Close passed away on September 6, 2009, at the age of 94. His legacy lives on in the generations of future entrepreneurs being educated in the Charles D. Close School of Entrepreneurship.

In 2014, the Charles D. Close School of Entrepreneurship became the first freestanding school of entrepreneurship in the nation to offer degrees.

Goals and Objectives

- Infuse entrepreneurship as a way to think, learn, and succeed across the University in terms of values, behaviors, and process, regardless of major.
- Provide a coordinated approach to entrepreneurship education throughout Drexel University.
- Complement and enhance undergraduate and graduate education outcomes for all Drexel University students by developing entrepreneurial thinking within the curriculum and opportunities for entrepreneurial practice.
- Provide students with different paths to engage, learn, and live entrepreneurship, depending on their personal level of interest and career ambitions, having exposed all to introductory concepts and approaches.
- Integrate academic and campus life activities as they relate to entrepreneurship providing multiple paths that align with student aspirations.
- Encourage and create a supportive academic and physical environment to allow the pursuit of student and faculty passions, and big ideas.

School Offerings

The Close School of Entrepreneurship offers students various paths to becoming an "entrepreneur." The School is based on the premise that all students have the potential to be innovative: to take their ideas, in whatever context, and make their ideas a reality. The curricular and co-

curricular programs are formulated to accommodate students' potential paths to learning and living entrepreneurship.

The School's curricular initiatives emphasize interdisciplinary coursework in collaboration with other academic units. The School offers a BA in Entrepreneurship and Innovation, minors in Energy Innovations, Entrepreneurship and Innovation, Health Innovations, and Social Entrepreneurship. In addition, elective courses with minimal or no prerequisites are available to all Drexel students to integrate entrepreneurial education with all other academic disciplines at the University. The School collaborates with the Office of Research and Technology Commercialization in developing programs and activities focused on academic entrepreneurship. Through the appointment of joint interdisciplinary faculty, a core of clinical faculty (serial entrepreneurs and seasoned executives) and tenured/tenure-track faculty, the Close School will cultivate a research agenda, providing thought leadership to academics and practitioners. Finally, the Close School of Entrepreneurship collaborates with regional and national organizations and the entrepreneurial community to advance innovation and entrepreneurial initiatives.

Entrepreneurship Living-Learning Community

The Close School of Entrepreneurship has created a community of young entrepreneurs at Drexel. Students of all backgrounds and interests, united by dreams of starting companies and pursuing their entrepreneurial passions, participate in a unique residential program supported by dedicated faculty and staff. This close-knit community of enterprising students lives together and enjoys targeted training, fun activities, and field trips as well as experienced and connected mentors able to foster their innovative aspirations.

The Entrepreneurship Living-Learning Community hosts approximately twenty incoming freshmen annually and is comprised of students from different majors across the University. All full-time entering freshmen planning to live on campus with an interest in innovation and entrepreneurship are encouraged to apply regardless of undergraduate major. Students in this community all live on the same floor and wing of Myers Hall.

Entrepreneurship Co-Op

The co-op experience is the hallmark of a Drexel education. Drexel students intersperse one or three six-month periods of work within their academic plans of study. By weaving together scholarly and practical experiences, Drexel students graduate with a unique set of skills that open up a diverse array of professional opportunities upon graduation.

The Close School recognizes that many undergraduates have already started their own companies. To encourage this entrepreneurial spirit within our student body, the Close School, in collaboration with the Steinbright Career Development Center, offers to all Drexel undergraduate students the opportunity to use their own company as their co-op experience. Students who qualify for this opportunity receive a salary (\$15,000), like other co-op students who work for established companies and organizations. Most importantly, students participating in the entrepreneurship co-op receive weekly mentoring from Close School faculty.

Launch It!

During this ten-week capstone course, students work on the actual launching of a start-up and de-risking their business model. Students will talk to customers, partners, and competitors as they engage the iterative

process of how a start-up actually works. Students learn how to use the business model canvas to brainstorm each part of a company. Each week will bring a new adventure outside of the classroom as students test each part of their business models, and then share their hard-earned knowledge with the rest of the class.

Entrepreneurship and Innovation

Major: Entrepreneurship and Innovation

Degree Awarded: Bachelor of Arts Degree (BA)

Calendar Type: Quarter

Total Credit Hours: 181.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.0701

Standard Occupational Classification (SOC) code: 11-1011; 11-1021; 11-9199

About the Program

The BA in Entrepreneurship and Innovation is designed to prepare students to think and act entrepreneurially, in the context of established companies, in working for small and growing ventures, in starting a new venture or self-employment, and in an overall general approach to their personal and professional lives.

Within this innovative curriculum, students build entrepreneurial skills such as resilience, opportunity recognition, collaboration, negotiation and effective communication. Students will learn to manage the growth of their venture, secure funding, and how to run a franchise or family firm.

The program emphasizes interdisciplinary coursework in collaboration with other Drexel colleges and schools providing entrepreneurship students with the opportunity to take classes with future engineers, scientists, artists, and business leaders.

For additional information about the BA in Entrepreneurship and Innovation, please contact Jamuna Saha at js3599@drexel.edu.

Degree Requirements

- **Required Courses:**
 - **The Individual as Entrepreneur:** This is a suite of courses that addresses individual entrepreneurial skills such as resiliency, collaboration, innovative thinking and communication. These courses develop personal and interpersonal skills needed to be a successful "entrepreneur" in several contexts.
 - **The Process of Entrepreneurship:** This set of required courses covers a broad range of topics that immerse students in the entire landscape of entrepreneurship.
 - **A choice of three concentration areas:** Social Entrepreneurship, Energy Innovations, Health Innovations. These three areas are not only relevant for students as they begin their careers upon graduation, but they also reflect Drexel University's strategic research and outreach priorities.
- **Interdisciplinary electives:** Constitutes a group of courses from across the University that reflect the themes of innovation and entrepreneurship. These courses require few or no prerequisites.

- A capstone course for the Close School student, “Launch It,” provides seed funding for student ideas.
- Minors: The Close School offers four minors available to all undergraduate students.
 - Energy Innovations Minor (p. 39)
 - Entrepreneurship and Innovation (p. 38)
 - Health Innovations Minor (p. 39)
 - Social Entrepreneurship Minor (p. 39)

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 210	Theory and Models of Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 105	Critical Reasoning	3.0
UNIV C101	The Drexel Experience	1.0

Two Mathematics Courses (MATH) 6.0

Two Science Courses 6.0

Choose from Bioscience and Biotechnology (BIO), Chemistry (CHEM), Food Science (FDSC), Geoscience (GEO), Physics (PHYS), Physics-Environmental Science (PHEV)

Social/Behavioral Science

Social/Behavioral Science Electives 6.0

Choose 2 courses from Anthropology (ANTH), Communications (COM), Economics (ECON), History (HIST), Political Science (PSCI), Psychology (PSY), Sociology (SOC)

ECON 201 Principles of Microeconomics 4.0

Choose one of the following writing intensive courses: 3.0

COM 270 [WI] Business Communication

COM 310 [WI] Technical Communication

COM 317 [WI] Environmental Communication

COM 320 [WI] Science Writing

COM 375 [WI] Grant Writing

ECON 326 Economic Ideas

[WI]

PSY 240 [WI] Abnormal Psychology

PSY 245 [WI] Sports Psychology

PSY 250 [WI] Industrial Psychology

Three Humanities/Fine Arts Courses 9.0

Choose from African Studies (AFAS), English (ENGL), Humanities-General (HUM), Global Studies (GST), Judaic Studies (JUDA), Philosophy (PHIL), Women's & Gender Studies (WGST); Any course from the Westphal College of Media Arts and Design

Two Technology Courses 6.0

Choose from Computer Science (CS), Information Science & Systems (INFO), Management Information Systems (MIS), Software Engineering (SE)

Three Language Course (Language to completion of 103 level) 12.0

Arabic (ARBC), Chinese (CHIN), French (FREN), German (GER), Greek (GREC), Hebrew (HBRW), Italian (ITAL), Japanese (JAPN), Korean (KOR), Portuguese (PORT), Russian (RUSS), Spanish (SPAN)

Two Ethics Courses 6.0

Select two of the following:

PHIL 251 Ethics

PHIL 301 Business Ethics

PHIL 305 Ethics and the Media

PHIL 311 Ethics and Information Technology

PHIL 315 Engineering Ethics

PHIL 321 Biomedical Ethics

PHIL 323 Organizational Ethics

PHIL 335 Global Ethical Issues

Entrepreneurship Requirements

ACCT 110	Accounting for Professionals	4.0
CRTV 303	Creativity in the Workplace	3.0
ENTP 100	Innovation Neighborhood	1.0
ENTP 101	Life Strategies I	3.0
ENTP 102	Life Strategies II	3.0
ENTP 205	Ready, Set, Fail	3.0
ENTP 210	Leading Start-Ups	3.0
ENTP 215	Building Entrepreneurial Teams	3.0
ENTP 250	Ideation	3.0
ENTP 325	Early Stage Venture Funding	3.0
ENTP 329	Entrepreneurship & New Technologies	3.0
ENTP 340	Managing Entrepreneurial Growth	3.0
ENTP 350	Dynamics of the Family Firm	3.0
ENTP 385	Innovation in Established Companies	3.0
ENTP 410	Thought Leadership	3.0
ENTP 450	Launch It!	3.0

Concentration Requirements 12.0

Select a concentration from the following options:

Social Entrepreneurship

ENTP 270 Social Entrepreneurship

ENTP 275 Women and Minority Entrepreneurship

Select two of the following:

ENTP 390 Clean Tech Ventures

ENTP 370 Global Entrepreneurship

PBHL 101 Public Health 101 *

Energy Innovations

ECEP 380 Introduction to Renewable Energy

ENTP 270 Social Entrepreneurship

ENTP 390 Clean Tech Ventures

MEM 462 [WI] Introduction to Engineering Management

Health Innovations

BIO 112 Biotechnology for Society

BMES 340 Health Care Administration

BMES 409 Entrepreneurship for BMES

PBHL 101 Public Health 101 *

Entrepreneurship Electives ** 21.0

Select seven of the following:

BLAW 346 Entrepreneurial Law

BMES 409 Entrepreneurship for BMES

DIGM 223 Creative Concept Design

DSMR 231 Retail Principles

EAM 211 Strategic Management for Entertainment and Arts Management

ECON 202 Principles of Macroeconomics

ENTP 275 Women and Minority Entrepreneurship

ENTP 270 Social Entrepreneurship

ENTP 360 Franchising

ENTP 370 Global Entrepreneurship

ENTP 390 Clean Tech Ventures

MEM 462 [WI] Introduction to Engineering Management

MIS 200 Management Information Systems

MKTG 201 Introduction to Marketing Management

MKTG 347 New Product Development

MKTG 364 Marketing for New Ventures

PROD 210 Introduction to Product Design

PROD 345 Applied Human Centered Design

PSY 150 Introduction to Social Psychology

RETL 315 Power of Retail Brands

SOC 110 Sociology of the Future

Free Electives	26.0
Total Credits	181.0

- * Students may also take any 3 credit Health and Society (HLSO (p. 774)) course.
- ** BMES 409, ENTP 270, ENTP 275, ENTP 360, ENTP 370 and ENTP 390 cannot satisfy both a concentration requirement and an entrepreneurship elective requirement.

Sample Plan of Study

Term	Credits
Term 1	
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENTP 100 Innovation Neighborhood	1.0
ENTP 101 Life Strategies I	3.0
Mathematics Course	3.0
UNIV 101C The Drexel Experience	1.0
Social/Behavioral Science course	3.0
Term Credits	14.0
Term 2	
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENTP 102 Life Strategies II	3.0
Math Course	3.0
Language Course	4.0
Term Credits	14.0
Term 3	
CRTV 303 Creativity in the Workplace	3.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
ENTP 205 Ready, Set, Fail	3.0
PHIL 105 Critical Reasoning	3.0
Language Course	4.0
Term Credits	16.0
Term 4	
ACCT 110 Accounting for Professionals	4.0
ECON 201 Principles of Microeconomics	4.0
ENTP 210 Leading Start-Ups (WI)	3.0
Language Requirement	4.0
Term Credits	15.0
Term 5	
COM 210 Theory and Models of Communication	3.0
ENTP 215 Building Entrepreneurial Teams	3.0
ENTP 250 Ideation	3.0
Ethics Course	3.0
Science Course	3.0
Term Credits	15.0
Term 6	
ENTP 325 Early Stage Venture Funding	3.0
Entrepreneurship elective	3.0
Science Course	3.0
Technology Course	3.0
Fine Arts/Humanities course	3.0
Term Credits	15.0
Term 7	
ENTP 329 Entrepreneurship & New Technologies	3.0
ENTP 340 Managing Entrepreneurial Growth	3.0
Ethics Course	3.0
Social/Behavioral Science Course [WI]	3.0
Technology Course	3.0
Term Credits	15.0
Term 8	

ENTP 350 Dynamics of the Family Firm	3.0
ENTP 450 Launch It!	3.0
Fine Arts/Humanities Course	3.0
Social/Behavioral Science Course	3.0
Free elective	3.0
Term Credits	15.0
Term 9	
ENTP 385 Innovation in Established Companies	3.0
Concentration Requirement	3.0
Fine Arts/Humanities Course	3.0
Free electives	6.0
Term Credits	15.0
Term 10	
ENTP 410 Thought Leadership (WI)	3.0
Concentration Requirement	3.0
Entrepreneurship electives	6.0
Free elective	3.0
Term Credits	15.0
Term 11	
Concentration Requirement	3.0
Entrepreneurship electives	6.0
Free electives	7.0
Term Credits	16.0
Term 12	
Concentration Requirement	3.0
Entrepreneurship electives	6.0
Free electives	7.0
Term Credits	16.0

Total Credit: 181.0

Minor in Entrepreneurship and Innovation

The minor in entrepreneurship and innovation is designed for students from a range of backgrounds who are interested in starting their own ventures, working for start-up companies, or pursuing jobs within established corporations that embrace innovation. Students interested in launching a venture or innovate within a company will learn the process of how to test assumptions related to their new ideas using the lean startup model.

For additional information about the entrepreneurship minor, please contact Jamuna Saha at js3599@drexel.edu.

Required Courses

ACCT 110 Accounting for Professionals	4.0
ENTP 101 Life Strategies I	3.0
ENTP 325 Early Stage Venture Funding	3.0
ENTP 440 Launch It!: Early Stage	3.0
Select four of the following:	12.0
ENTP 205 Ready, Set, Fail	
ENTP 210 Leading Start-Ups	
ENTP 215 Building Entrepreneurial Teams	
ENTP 250 Ideation	
ENTP 270 Social Entrepreneurship	
ENTP 350 Dynamics of the Family Firm	

Total Credits 25.0

Entrepreneurship and Innovation Faculty

Roy Carriker, PhD (*University of Connecticut*) Director of Global Programs. Teaching Professor.

Troy Carter Visiting Professor. Founder and CEO of Atom Factory, a pioneering media and music management company.

Jonathan Corle Adjunct Instructor.

Donna De Carolis, PhD (*Temple University*) Dean; *Silverman Family Professor Entrepreneurial Leadership*.

Ozlem Ogutveren-Gonul Assistant Teaching Professor.

Charles Sacco, MBA (*Drexel University*) *Entrepreneur-In-Residence and Director of External Relations ;Director of the Baiada Institute for Entrepreneurship*.

Damian Salas, MBA (*Drexel University*) *Director, Entrepreneurship Living-Learning Community*. Assistant Teaching Professor.

Zahed Subhan, PhD, JD/LLB (Law) (*University of Leeds (UK); London University*). Teaching Professor.

Minor in Energy Innovations

The Energy Innovations minor is designed for students interested in learning about renewable energy and clean technologies and their impact on society. Students interested in launching energy-related ventures will learn the process of how to test assumptions related to their new venture idea using the lean startup model.

Required Courses

ENTP 101	Life Strategies I	3.0
ENTP 205	Ready, Set, Fail	3.0
or ENTP 210	Leading Start-Ups	
ENTP 250	Ideation	3.0
ENTP 270	Social Entrepreneurship	3.0
ENTP 390	Clean Tech Ventures	3.0
ENTP 440	Launch It!: Early Stage	3.0
ECEP 380	Introduction to Renewable Energy	3.0
MEM 462 [W]	Introduction to Engineering Management	3.0
Total Credits		24.0

For additional information about the Energy Innovations minor, please contact Jamuna Saha at js3599@drexel.edu.

Minor in Health Innovations

The Health Innovations minor is designed for students interested in how entrepreneurs can leverage their understanding of advancements in biotechnologies and health care to benefit society. Students interested in launching health-related ventures will learn the process of how to test assumptions related to their new venture idea using the lean startup model.

ENTP 101	Life Strategies I	3.0
ENTP 205	Ready, Set, Fail	3.0
or ENTP 210	Leading Start-Ups	
ENTP 250	Ideation	3.0
ENTP 440	Launch It!: Early Stage	3.0
BIO 112	Biotechnology for Society	3.0
BMES 340	Health Care Administration	3.0
BMES 409	Entrepreneurship for BMES	3.0
Select one of the following courses:		3.0
PBHL 101	Public Health 101	

Health and Society Elective *

Total Credits	24.0
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* Any Health and Society (HLSO) course from HLSO 301 to HLSO 470. See the Course Descriptions (p. 774) page for more information on individual courses.

For additional information about the Health Innovations minor, please contact Jamuna Saha at js3599@drexel.edu.

Minor in Social Entrepreneurship

The Social Entrepreneurship minor is designed for students interested in learning how to create and sustain social value through the pursuit of a new venture. Students interested in launching a social venture will learn the process of how to test assumptions related to their new venture idea using the lean startup model.

ENTP 101	Life Strategies I	3.0
ENTP 205	Ready, Set, Fail	3.0
or ENTP 210	Leading Start-Ups	
ENTP 250	Ideation	3.0
ENTP 270	Social Entrepreneurship	3.0
ENTP 275	Women and Minority Entrepreneurship	3.0
ENTP 440	Launch It!: Early Stage	3.0
Select two of the following:		6.0
ENTP 370	Global Entrepreneurship	
ENTP 390	Clean Tech Ventures	
PBHL 101	Public Health 101	
Health and Society (HLSO) Courses *		
Total Credits		24.0

* Any Health and Society (HLSO) course from HLSO 301 to HLSO 470. See the Course Descriptions (p. 774) page for more information on individual courses.

For additional information about the Social Entrepreneurship minor, please contact Jamuna Saha at js3599@drexel.edu.

The College of Arts and Sciences

About the College

Mission Statement

By pursuing excellence in research and scholarship, we educate our students to become ethical professionals and citizens with knowledge of and appreciation for the fundamental interactions among the humanities, social sciences and the sciences in a fast-changing, challenging, and diverse world.

About the College of Arts and Sciences

The College of Arts and Sciences (<http://drexel.edu/coas>) was established in 1990. The educational objectives encompass a wide range of goals: to provide interdisciplinary study in the arts and sciences for our Bachelor of Science and Bachelor of Arts majors; to offer Master of Science and Doctoral programs in selected areas of faculty and research strength; to promote research, scholarship, and creative activities which expand disciplinary boundaries and enhance faculty expertise and the quality of the University's instruction; to provide general educational courses for the University's undergraduates; and to improve the quality of life for the University's community through co-curricular programming in the arts and sciences.

Each major combines interdisciplinary study with hands-on, experiential learning to prepare students for a variety of careers, as well as graduate or professional school. All undergraduate majors in the College offer co-operative education program options, with special opportunities relating academic study to work experience, or internships. Additionally, students across the College are encouraged to work alongside faculty in research projects that relate to their academic and professional goals.

Majors

- Anthropology (BA) (p. 42)
- Biological Sciences (BS) (p. 45)
- Chemistry (BA, BS) (p. 55)
- Communication (BA, BS) (p. 62)
- Criminology and Justice Studies (BS) (p. 71)
- English (BA) (p. 80)
- Environmental Science (BS) (p. 87)
- Environmental Studies (BS) (p. 91)
- Environmental Studies and Sustainability (BA) (p. 93)
- Geoscience (BS) (p. 96)
- Global Studies (BA) (p. 101)
- History (BA) (p. 108)
- Mathematics (BA, BS) (p. 116)
- Philosophy (BA) (p. 121)
- Physics (BS) (p. 130)
- Political Science (BA) (p. 133)
- Psychology (BS) (p. 136)
- Sociology (BA) (p. 140)

Certificates

- Medical Humanities (p. 165)

- Philosophy in Science and Technology (p. 166)
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- Writing and Publishing (p. 171)

Minors

- Africana Studies (p. 146)
- Anthropology (p. 44)
- Arabic (p. 146)
- Astrophysics (p. 146)
- Bioinformatics (p. 146)
- Biological Sciences (p. 54)
- Biophysics (p. 147)
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- Chemistry (p. 60)
- Chinese (p. 148)
- Communication (p. 70)
- Computer Crime (p. 149)
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- Ecology (p. 150)
- English (p. 82)
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- French (p. 150)
- Geoscience (p. 98)
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- Global Studies (p. 107)
- History (p. 115)
- Human Factors and Ergonomics (p. 156)
- Italian (p. 156)
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- Mathematics (p. 120)
- Neuroscience (p. 162)
- Nonprofit Communication (p. 163)
- Philosophy (p. 124)
- Physics (p. 131)
- Politics (p. 163)
- Psychology (p. 138)
- Russian (p. 163)
- Science, Technology and Society (p. 163)
- Sociology (p. 142)
- Spanish (p. 164)
- Women's and Gender Studies (p. 164)
- Writing (p. 165)

About the Curriculum

The College of Arts and Sciences is committed to providing high-quality education in the humanities, social sciences and sciences.

Bachelor of Arts Degree Programs

The Bachelor of Arts degree provides a broad-based liberal education while allowing students the option to apply their studies through Drexel's well-established co-operative education program.

The BA degree continues the Drexel focus on critical reasoning, a strong grounding in arts and sciences, and effective development of communication skills. The degree is intended to provide a solid liberal arts background for graduate study as well as for professional degrees in such areas as law, public policy, international relations, education, psychology, social work, public health, and medicine.

While the BA degree requires more liberal arts courses than the Bachelor of Science degree, it also allows more varied choices in the fulfillment of math and science requirements and requires study of a foreign language. The BA degree prepares students for an ever-changing and culturally diverse world, and provides them with the tools needed to be leaders in industry, arts, government, and human services.

Bachelor of Science Degree Programs

The College offers Bachelor of Science degrees in many of its majors. The BS degree is similar to the Bachelor of Arts degree, but requires more focused coursework in the sciences than the BA.

In several majors, both a BS and a BA are available. Both degrees provide the same foundation in the discipline. The BS is a more structured approach, while the BA allows for greater flexibility. Drexel's strong advising program helps students learn more about the degree options and which option matches each student's long-term goals.

Science and Mathematics Curriculum

All students in biology, environmental science, geoscience, chemistry, mathematics, and physics study similar subjects during the freshman year. This recognizes the fundamental knowledge common to those disciplines; it also allows for transfer between majors at the end of the freshman year without loss of time. Upper-class students in those disciplines are given the opportunity to take related electives in liberal, scientific, and technical fields.

The flexibility available in the elective programs, and the opportunity to complete an academic minor, permit students to prepare for continuing studies in graduate or professional school, for work in government or industry, or for a change in educational goals.

Generally the basic requirements in each major are completed prior to the senior year. Thus, for science and mathematics majors, the technical electives in the last year may be selected in some advanced specialty within the specific major, and free electives may be used for enrichment or to prepare for a change of field. Each student's elective program must be approved by an advisor from his or her major department.

Humanities and Social Science Curriculum

Students majoring in the humanities and social sciences complete similar sets of courses in the first two years. Some of these courses may be identical (the freshmen year English sequence) while others will vary by discipline, such as major-specific freshmen courses or the math and science requirements in the BA and BS options.

Students in the communication major will take at least one course in their proposed concentration of public relations, journalism, or technical communication in each term during the freshman year. More intensive

work in the concentration begins in the sophomore year, as do elective options.

All humanities and social science students have a significant degree of flexibility, allowing them to complete disciplinary requirements, and, through free electives, to take a minor or perhaps another major to prepare for entry into graduate or professional school.

Secondary and Elementary Teacher Certification

The School of Education offers innovative curricula that combine academic majors with appropriate coursework to satisfy state requirements for certification in English, and sciences—including biology, chemistry, earth and space sciences, physics—as well as mathematics and elementary education. Students interested in the teacher education programs should contact the School of Education (<http://www.drexel.edu/soe>).

Accelerated Degree Program

The Accelerated Degree Program in the College of Arts and Sciences provides opportunities for highly talented and strongly motivated students to complete both an undergraduate degree and a master's degree in five years. Students generally enroll in a five year co-op program and replace the third co-op with courses to complete the graduate degree requirements; some majors require that students enroll for the four-year one co-op program. Students may be offered preliminary admission to such a program when they start at Drexel or can apply when they have completed 90 credits. In both instances, admission to the dual program must be approved before students complete 120 credits.

Accelerated Preprofessional Degree

The College accepts highly qualified and motivated students into accelerated BS/BA +MD and BS/BA +JD degrees. Students must apply to be admitted into these programs before starting at Drexel. For more information, students should contact the Office of Undergraduate Admissions (<http://www.drexel.edu/undergrad>).

Preprofessional Programs

Students wishing to prepare for admission to professional schools of medicine, veterinary medicine, dentistry, or public health may obtain preprofessional counseling and application assistance at the Steinbright Career Development Center (<http://www.drexel.edu/scdc>). For health profession application assistance, students may call 215.895.2437. For law school admission assistance, students may call 215.895.1632.

Degree Requirements

Certification for graduation is provided by the individual department or program according to the requirements for each major, which are set forth in subsequent pages. The minimum number of credits required for the degrees of Bachelor of Arts and Bachelor of Science varies from one department and program to another but in no case does it exceed 192 credits of academic work with two to six terms of co-operative experience.

Writing-Intensive Course Requirements

In order to graduate, all students must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic

advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog may indicate that this course can fulfill a writing-intensive requirement. For the most up-to-date list of writing-intensive courses being offered, students should check the Writing Intensive Course List (<http://drexel.edu/coas/academics/departments-centers/english-philosophy/university-writing-program/writing-intensive-course-list>) on the Drexel University Writing Center (<http://drexel.edu/coas/academics/departments-centers/english-philosophy/university-writing-program/drexel-writing-center>) page. Students scheduling their courses in Banner/DrexelOne can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term.

The Drexel Writing Center

The Drexel Writing Center (DWC) is dedicated to helping students, faculty, and staff, at all levels of experience and across all disciplines, in their development as writers.

- The DWC works with writers at all stages in the writing process, from brainstorming ideas to polishing final drafts.
- The DWC focus is on individual, one-on-one sessions that feature a conversational, collaborative relationship between the reader and the writer they work with.
- Interaction with the DWC will help writers develop not just writing but critical thinking and reading skills.
- While DWC readers do not perform copy-editing services, they will help students learn strategies for proofreading and editing their documents.

The DWC is located at 0032 MacAlister Hall and can be reached at 215.895.6633. Further information can be found at the Drexel Writing Center (<http://drexel.edu/writingcenter>) website.

English Language Center

As part of the College of Arts and Sciences, Drexel's English Language Center (<http://www.drexel.edu/elc>) offers an accredited intensive English program throughout the year. In addition to classes in academic skills such as essay writing and oral presentations, the Center offers the pre-MBA Global Business English program (GLOBE), English for academic purposes, TOEFL and IELTS preparation, and other subjects. Many graduate students begin their studies at Drexel in the English Language Center for a rigorous and supportive environment to develop or enhance their academic English language knowledge and skills. International teaching assistants are oriented through a summer course in the language, culture, and pedagogy of the U.S. classroom. Accepted graduate students have access to free oral communications courses, tutoring, and other academic skills workshops throughout the academic year.

Some graduate programs within the COAS may accept students who are academically admissible but need further English language study. For more information, see the ELC website or contact the Center at:

English Language Center
229 N. 33rd Street
Philadelphia, PA 19104

Phone: 215-895-2022
Fax: 215-895-6775

E-mail: elc@drexel.edu

Anthropology

Major: Anthropology

Degree Awarded: Bachelor of Arts (BA)

Calendar Type: Quarter

Total Credit Hours: 182.0

Co-op Options: One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 45.0201

Standard Occupational Classification (SOC) code: 19-3091

About the Program

Anthropology is the study of human beings — past and present. Students majoring in anthropology broaden their understanding of the ways of life on planet Earth through courses that explore the diversity of human cultures, courses that explore the range of theoretical ideas about culture and human organization, and specialized courses in field techniques and methodology.

The anthropology major is a small, highly specialized program. The program has emphases in digital and media anthropology, symbolic communication, and community organization. Students are provided with an exceptional background in theory, and methodology, and fieldwork that will open doors to various career paths or lead to graduate training.

Two options exist in the anthropology bachelor of arts degree program. The first option is a four-year program with a single six month co-op in the junior year. For the majority of anthropology majors, the co-op will provide a fieldwork experience for students. Students who select to undertake a co-op are guided by interaction with faculty both inside and outside the classroom. The second option is a four-year non-co-op option. The core of the major in this option is the seminar in ethnography which majors are required to take each fall term for a total of 12.0 credits.

Additional Information

Dr. Wesley Shumar
Anthropology Department Head
Room 117, PSA Bldg #47
215-895-2060
shumarw@drexel.edu

Caroline Chmielewski
Department Administrator
Anthropology Department
Room 118, PSA Bldg #47
215- 895-2455
chmielcm@drexel.edu (chmielcm@drexel.edu)

For more details about the Anthropology major, visit the A (<http://www.drexel.edu/culturecomm/academics/undergraduate/anthropology>) anthropology (<http://www.drexel.edu/coas/academics/departments-centers/anthropology>) web site.

Degree Requirements

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV H101	The Drexel Experience	1.0

UNIV H201	Looking Forward: Academics and Careers	1.0
Two Mathematics Courses		6.0-8.0
Two Science Courses		6.0-8.0
Foreign Language Courses		
A minimum of two consecutive language courses *		7.0-8.0
Humanities and Fine Arts		
Humanities and Fine Arts Courses		12.0
Social and Behavioral Sciences		
Social and Behavioral Sciences Courses		12.0
International Studies		
Two International Studies Electives		6.0
Studies in Diversity		
ANTH 215	Anthropology of Gender	3.0
One studies in Diversity Course		3.0
Anthropology Requirements		
Sub-disciplinary Core		
ANTH 101	Introduction to Cultural Diversity	3.0
ANTH 110	Human Past: Anthropology and Prehistoric Archeology	3.0
ANTH 111	Introduction to Biological Anthropology	3.0
ANTH 112	Language, Culture & Cognition	3.0
Community/Medical		
ANTH 265	Health & Healing Practices in Cross-Cultural Perspective	3.0
ANTH 385	Community Engaged Anthropology	3.0
ANTH 390	Seminar in Ethnography (2-credit course taken 4 terms)	8.0
Methods Sequence		
ANTH 370	Ethnographic Methods	3.0
ANTH 375	Digital Ethnography	3.0
SOC 250	Research Methods I	4.0
Theory Sequence		
ANTH 410	Cultural Theory I	3.0
ANTH 411	Cultural Theory II	3.0
Anthropology Program Requirements		
Select a minimum of 30 credits from the list below:		30.0
ANTH 120	Biblical Archaeology: The Archaeology of Israel and Jordan	
ANTH 140	Anthropology of Food	
ANTH 150	Anthropology of Water	
ANTH 210 [WI]	Worldview: Science, Religion and Magic	
ANTH 212 [WI]	Topics in World Ethnography	
ANTH 220	Aging In Cross-Cultural Perspective	
ANTH 225	Anthropology of Youth	
ANTH 240	Urban Anthropology	
ANTH 245	Reflecting on Work Identity	
ANTH 250	Anthropology of Immigration	
ANTH 255	Psychological Anthropology	
ANTH 310	Societies In Transition: The Impact of Modernization and the Third World	
ANTH 312	Approaches to Intercultural Behavior	
ANTH 325	DIY Culture	
ANTH 330	Media Anthropology	
ANTH 335	Anthropology of Education	
ANTH 345	Visual Anthropology	
ANTH 350	Anthropology of Language	
ANTH 355	Anthropology of Cyberspace	
ANTH 360	Culture and the Environment	
ANTH 363	Sacred Traditions of the East	
ANTH 365	Family and Kinship	
ANTH T180	Special Topics in Anthropology	
ANTH T280	Special Topics in Anthropology	
ANTH T380	Special Topics in Anthropology	
ANTH T480	Special Topics in Anthropology	
COM 355	Ethnography of Communication	
GST 225	Women and Human Rights Worldwide	

GST 320	Building Global Bridges	
HIST 218	Race and Film in United States History	
HIST 264	East Asia in Modern Times	
HIST 270 [WI]	Introduction to Latin American History	
HIST 283	Technology and Identity	
HIST 290	Technology and the World Community	
HIST 296	Research Methods in History I	
HIST 340	History of Bodies in Science, Technology, and Medicine	
HIST 380	Advanced History Seminar	
HIST 385	Transnational History of Science, Technology and Environment	
PBHL 303	Overview of Issues in Global Health	
PBHL 305	Women and Children: Health & Society	
PBHL 316	Drugs, Society, and Public Health	
PSCI 223	Comparative Political Thought	
PSCI 252	Global Governance	
PSCI 255	International Political Economy	
PSCI 260 [WI]	Power in Protest: Social Movements in Comparative Perspective	
SOC 210	Race, Ethnicity and Social Inequality	
SOC 220	Wealth and Power	
SOC 260	Classical Social Theory	
WGST 240	Women and Society in a Global Context	
WGST 255	Gender and Black Popular Culture	
WGST 260	Gender and Judaism	
WGST 275	Women's Health and Human Rights	
WGST 301	Sex, Gender, Feminism: A Seminar in Feminist Theories	
WGST 308	Queer Theory	
WGST 320	Masculinities	
Electives		
Free Electives		42.0-38.0
Total Credits		181.0-182.0

* At least one foreign language course must be at the 200-level.

Sample Plan of Study

Term 1		Credits
ANTH 101	Introduction to Cultural Diversity	3.0
ANTH 390	Seminar in Ethnography	2.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV H101	The Drexel Experience	1.0
Foreign Language course		4.0
Math elective		3.0-4.0
Term Credits		16.0-17.0
Term 2		
ANTH 110	Human Past: Anthropology and Prehistoric Archeology	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Foreign Language course		3.0-4.0
Math elective		3.0-4.0
Term Credits		13.0-15.0
Term 3		
ANTH 111	Introduction to Biological Anthropology	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Social Behavior Science elective		3.0-4.0
Humanities/Fine Arts elective		3.0
International Studies elective		3.0
Term Credits		15.0-16.0
Term 4		

ANTH 112	Language, Culture & Cognition	3.0
ANTH 215	Anthropology of Gender	3.0
ANTH 390	Seminar in Ethnography	2.0
Lab Science elective		3.0-4.0
Humanities/Fine Arts elective		3.0
Term Credits		14.0-15.0
Term 5		
ANTH 265	Health & Healing Practices in Cross-Cultural Perspective	3.0
ANTH 370	Ethnographic Methods	3.0
SOC 250	Research Methods I	4.0
Lab Science elective		3.0-4.0
Humanities/Fine Arts elective		3.0
Term Credits		16.0-17.0
Term 6		
ANTH 375	Digital Ethnography	3.0
ANTH 385	Community Engaged Anthropology	3.0
Humanities/Fine Arts elective		3.0
Social and Behavior Science elective		3.0-4.0
Free electives		2.0
Term Credits		14.0-15.0
Term 7		
ANTH 390	Seminar in Ethnography	2.0
Anthropology program requirements		3.0
Social Behavior Science elective		3.0
Free elective		3.0
International Studies course		3.0
Term Credits		14.0
Term 8		
UNIV H201	Looking Forward: Academics and Careers	1.0
Anthropology program requirements*		6.0
Social Behavior Science elective		3.0
Diversity Studies course		3.0
Free elective		3.0
Term Credits		16.0
Term 9		
ANTH 390	Seminar in Ethnography	2.0
Anthropology program requirements*		6.0
Free electives		9.0
Term Credits		17.0
Term 10		
ANTH 410	Cultural Theory I	3.0
Anthropology program requirements*		6.0
Free electives		6.0
Term Credits		15.0
Term 11		
ANTH 411	Cultural Theory II	3.0
Anthropology program requirements*		6.0
Free electives		7.0
Term Credits		16.0
Term 12		
Anthropology program requirement*		3.0
Free electives		12.0
Term Credits		15.0
Total Credit: 181.0-188.0		

* See degree requirements (p. 42).

Co-op/Career Opportunities

Co-Op Opportunities

In order for majors to take the required seminar in ethnography, all anthropology co-ops are scheduled for the fall/winter cycle. Anthropology co-ops are student initiated and developed through discussions with faculty, rather than being selected from an existing list. Co-op ideas frequently emerge from discussions in the seminar in ethnography as students who have undertaken co-ops report on their experiences. Past co-ops have included: teaching English in Costa Rica; working on an archeological dig in the Yucatan; studying agricultural practices in Hawaii; working with an arts program in Oaxaca. In addition, several majors have collaborated on faculty research, while others have been engaged in community outreach projects.

Post-Graduate Opportunities

Many corporations, schools and health-care institutions are using ethnographic field techniques and qualitative methods in order to understand their markets and clientele, or for that matter, their own organizational structure. The Anthropology major prepares students for employment in these areas, as well as for further graduate work in anthropology, public policy, law and other social and behavioral sciences.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) web page for more detailed information on post-graduate opportunities.

Minor in Anthropology

The anthropology minor provides students in other fields with a cross-cultural awareness that will enable them to interact with a variety of people in a wide range of situations. By giving students a respect for and understanding of the basis of cultural variation, the minor can facilitate working in international settings. Even for students working within the United States, anthropology offers increased sensitivity to ethnic and population diversity. Medicine, law, counseling, nursing, and nutrition are only a few of the fields in which clients and professionals may come from different parts of our heterogeneous society.

Please note: No more than three courses that are required for a student's major can count towards fulfilling requirements for the minor.

Required (Core) Courses

ANTH 101	Introduction to Cultural Diversity	3.0
ANTH 110	Human Past: Anthropology and Prehistoric Archeology	3.0
ANTH 210 [WI]	Worldview: Science, Religion and Magic	3.0
ANTH 370	Ethnographic Methods	3.0
ANTH 410	Cultural Theory I	3.0
Select three of the following:		9.0
ANTH 215	Anthropology of Gender	
ANTH 330	Media Anthropology	
ANTH 120	Biblical Archaeology: The Archaeology of Israel and Jordan	
ANTH 212 [WI]	Topics in World Ethnography	
ANTH 220	Aging In Cross-Cultural Perspective	
ANTH 240	Urban Anthropology	
ANTH 310	Societies In Transition: The Impact of Modernization and the Third World	
ANTH 312	Approaches to Intercultural Behavior	
ANTH 355	Anthropology of Cyberspace	
ANTH 360	Culture and the Environment	
ANTH 365	Family and Kinship	

Anthropology Faculty

Barbara Hornum, PhD (*Bryn Mawr College*) *Director of Center for Academic Excellence (DCAE)*. Associate Professor. Comparative gerontology, planned communities, continuing care communities, retirement, faculty development.

David Kutzik, PhD (*Temple University*). Professor. Sociology and philosophy of science; applied gerontological research; political economy of health care; microprocessor-based assistive technologies to improve case management and increase independent living among frail populations.

Brent Luvaas, PhD (*UCLA*). Associate Professor. DIY and independent media production; transnational consumer culture; popular music; new media and mediated subjectivities; youth culture in the US and Indonesia.

Usha Menon, PhD (*University of Chicago*). Professor. Self, identity & personhood, emotional functioning, Hindu morality, gender relations in Hindu society, adult development, popular Hinduism, post-colonial feminism, Hindu religious nationalism and Islamic radicalism.

Rakhmiel Peltz, PhD (*Columbia University, Linguistics; University of Pennsylvania, Biological Sciences*) *Director of Judaic Studies Program*. Professor. Sociolinguistics, ethnography of communication, social history of Yiddish language and culture, Yiddish culture of Eastern Europe, language planning, language and ethnic identity, language and group memory, aging and ethnicity, history of urban neighbors.

Douglas V. Porpora, PhD (*Temple University*). Professor. International political economy, culture, social theory, and philosophy of social science.

Robert Powell, PhD (*Temple University*). Assistant Teaching Professor. Early and Middle Bronze Age Crete; archaeoastronomy; early state formation; archaeology and anthropology of frontiers; mass communication.

Amber R. Reed, PhD (*UCLA*). Visiting Assistant Professor. Democracy, Apartheid, Nostalgia, Race, Postcolonial Theory, Childhood/Youth Studies, Politics of Culture

Rachel R. Reynolds, PhD (*University of Illinois at Chicago*). Associate Professor. Sociolinguistics, ethnography of communication, intercultural communication, globalization and the rhetoric of community, political economy of immigration, race and ethnicity, new African immigrants in the United States, Igbo studies.

Wesley Shumar, PhD (*Temple University*) *Department Head, Anthropology*. Professor. Ethnography of cyberspace, online learning communities, political economy of higher education, globalization, activity theory, semiotics, critical realism, psychoanalysis, identity and the self.

Judith Storniolo, PhD (*University of Pennsylvania*). Teaching Professor. Historical and comparative linguistics, Mesoamerican languages and culture, applied anthropology, public policy, oral traditions and narratives, ideology and ritual, Mesoamerican ethnohistory; and pre-Columbian literature.

Emeritus Faculty

Anthony Glascock, PhD (*University of Pittsburgh*) *Coordinator of the Anthropology Program*. Professor Emeritus. Aging and health, definitions

of functionality and impairment, technology and aging, social organization, Ireland, East Africa.

Biological Sciences

Major: Biological Sciences

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 183.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 26.0101

Standard Occupational Classification (SOC) code: 19-1029

About the Program

The curricular choices are designed to provide a sound basis for careers in the private sector, government and research laboratories, and for advanced study in graduate and professional programs in medicine, other health related areas, or in teaching.

The biological sciences encompass many areas of study. Biologists study the structure and functions of living organisms from the individual cell to the full organism, and collectively to the community level. Discoveries in the biological sciences influence many aspects of our daily lives and have become the foundation of most new developments of the new century. In the past two decades, advances in molecular biology and genetics have been rapid, opening many new, exciting career opportunities in the fields of biotechnology and genetic engineering. Biologists can pursue a variety of options including careers in medicine, dentistry, veterinary medicine or other health-related areas; in research or commercial laboratories at pharmaceutical companies, medical research laboratories, biotechnology companies or in government agencies; and in teaching. In fact, more than 100 different occupations have been listed for biologists. Graduates in the biological sciences are in demand and enjoy a high placement rate with competitive salaries.

The biological sciences major resides in the Department of Biology (<http://drexel.edu/coas/academics/departments-centers/biology>). Students earn a bachelor's degree in the biological sciences and are prepared for technical careers in research or commercial laboratories, or for professional schools or graduate study.

The course requirements identifies required support courses in chemistry, physics, mathematics, humanities, and science and human affairs. With proper selection of electives, students can meet teacher certification requirements or complete a minor in another field. Students are encouraged to consult frequently with their academic advisor for curriculum planning.

In addition to the core requirements, students select one of five concentrations in a field of interest:

- Cell/Molecular Biology/Genetics/Biochemistry
- Organismal Biology/Physiology
- Ecology/Evolution/Genomics
- Pathobiology
- General Biology

Program Options

Co-op employment is an option for biological science students. The major offers three distinct plans:

Five-year option with co-op experience

This option allows for the greatest amount of employment experience, with three distinct six-month periods of employment included with studies. After the start of the sophomore year, students study or work through all terms, including summer.

Four-year option with co-op experience

The degree includes just one six-month period of employment. After the start of sophomore year, students study or work through all terms, including summer.

Four-year option without co-op experience

The degree can be completed in four years without co-op/internship employment. Students are not required to pursue studies during any of the summer terms.

Degree Requirements

The Biological Sciences curriculum is designed to provide students with both depth and flexibility within the field of biology. In addition to the core requirements, students select one of five concentrations in a field of interest.

- Cell/Molecular Biology/Genetics/Biochemistry
- Organismal Biology/Physiology
- Ecology/Evolution/Genomics
- Pathobiology
- General Biology

Concentration requirements and elective options are outlined below. Within each concentration, students are able to further specialize in a focus area by taking recommended electives.

Requirements

Humanities and Social Sciences

CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
COM 310 [WI]	Technical Communication	3.0
or COM 320	Science Writing	
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 251	Ethics	3.0
UNIV S101	The Drexel Experience	1.0
UNIV S201	Looking Forward: Academics and Careers	1.0

Humanities and Social Science Electives

Science, Technology, Health and Human Affairs Elective

Mathematics and Statistics

Select one of the following sequences:		12.0
Intro to Analysis		
MATH 101	Introduction to Analysis I	
& MATH 102	and Introduction to Analysis II	
& MATH 239	and Mathematics for the Life Sciences	
Calculus		
MATH 121	Calculus I	
& MATH 122	and Calculus II	
& MATH 123	and Calculus III	
MATH 410	Scientific Data Analysis I	3.0
MATH 411	Scientific Data Analysis II	3.0

Physical Sciences

BIO 311	Biochemistry	4.0
or CHEM 243	Organic Chemistry III	
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
PHYS 152	Introductory Physics I	4.0
PHYS 153	Introductory Physics II	4.0
PHYS 154	Introductory Physics III	4.0

Core Biology Courses

BIO 122	Cells and Genetics	4.5
BIO 124	Evolution & Organismal Diversity	4.5
BIO 126	Physiology and Ecology	4.5
BIO 207	Applications in Biology I	1.0
BIO 208	Applications in Biology II	1.0
BIO 209	Cell, Molecular & Developmental Biology I	4.0
BIO 211	Cell, Molecular & Developmental Biology II	4.0
BIO 219 [WI]	Techniques in Molecular Biology	3.0
BIO 224	Form, Function & Evolution of Vertebrates	4.0
BIO 225	Vertebrate Biology and Evolution Laboratory	2.0
BIO 471	Seminar in Biological Sciences	2.0
BIO 472	Seminar in Biological Sciences	2.0
BIO 473 [WI]	Seminar in Biological Sciences	2.0
ENVS 212	Evolution	4.0

Concentration Courses 28.0-30.0

Free electives 24.0

Total Credits 183.5

Students select one of five concentration and fulfill the requirements, as outlined below.

1. The Cell/Molecular/Genetics/Biochemistry (CMGB) Concentration

This concentration provides exposure to several vital disciplines within Biology, and will prepare students for a diversity of careers in research, medicine, and industry. Students interested in tailoring their studies more specifically may follow the suggested "focus areas" when selecting their two CMGB Concentration electives.

Cell/Molecular/Genetics/Biochemistry (CMGB) Concentration Requirements

BIO 244	Genetics I	3.0
or BIO 444	Human Genetics	
BIO 314	Pharmacology	3.0
or BIO 404	Structure and Function of Biomolecules	
BIO 318	Biology of Cancer	3.0
or BIO 430	Cell Biology of Disease	
BIO 410	Advanced Molecular Biology	3.0

Cell/Molecular/Genetics/Biochemistry (CMGB) Concentration Electives (See Lists Below)

Two Cell/Molecular/Genetics/Biochemistry (CMGB) Electives (see list below)	6.0
Organismal/Physiology Elective (see list below)	3.0
Ecology/Evolution/Genomics Elective (see list below)	3.0

Concentration Laboratory Courses

Two Laboratory Electives (see list below) 4.0

Total Credits 28.0

- * Students interested in pursuing a focus area in Neurobiology, Pharmaceuticals, Cell Biology, Biochemistry, Molecular Biology or Genetics should contact the academic advisor in the Biology Department for specific focus recommendations.

Cell/Molecular/Genetics/Biochemistry (CMGB) Electives		
BIO 231	Cell Physiology	3.0
BIO 244	Genetics I	3.0
BIO 285	Forensic Biology	3.0
BIO 311	Biochemistry	4.0
BIO 314	Pharmacology	3.0
BIO 318	Biology of Cancer	3.0
BIO 346	Stem Cell Research	3.0
BIO 348	Neuroscience: From Cells to Circuits	3.0
BIO 404	Structure and Function of Biomolecules	4.0
BIO 414	Behavioral Genetics	3.0
BIO 415	Proteins	3.0
BIO 416	Biochemistry of Major Diseases	3.0
BIO 421	Biomembranes	3.0
BIO 430	Cell Biology of Disease	3.0
BIO 433	Advanced Cell Biology	3.0
BIO 444	Human Genetics	3.0
BIO 445	Microbial Genetics	3.0
BIO 447	Advanced Genetics and Molecular Biology	3.0
BIO 451	Genetic Reg Development	3.0
BIO 453	Protein Dysfunction in Disease	3.0
BIO 462	Biology of Neuron Function	3.0
BIO 463	Molecular Mechanisms of Neurodegeneration	3.0
BIO 465	Neurobiology of Disease	3.0
ENVS 326	Molecular Ecology	3.0
Organismal/Physiology Electives		
BIO 201	Human Physiology I	4.0
BIO 221	Microbiology	3.0
BIO 223	Parasitology	3.0
BIO 256	Vertebrate Morphology and Physiology	3.0
BIO 270	Development Biology	3.0
BIO 284	Biology of Stress	3.0
BIO 286	Forensic Toxicology	3.0
BIO 310	Comparative Physiology	3.0
BIO 322	Mycology	4.5
BIO 368	Embryology	4.0
BIO 370	Teratology	3.0
BIO 372	Histology	4.0
BIO 386	Gross Anatomy I	2.0
BIO 412	Biology of Aging	3.0
BIO 420	Virology	3.0
BIO 426	Immunology	3.0
BIO 349	Behavioral Neuroscience	3.0
BIO 461	Neurobiology of Autism Disorders	3.0
ENVS 254	Invertebrate Morphology and Physiology	3.0
ENVS 392	Ichthyology and Herpetology	3.0
ENVS 393	Entomology	3.0
Ecology/Evolution/Genomics Electives		
BIO 228	Evolutionary Biology & Human Health	3.0
BIO 331	Bioinformatics I	3.0
BIO 413	Genomics	3.0
BIO 436	Human Population Genetics	4.0
ENVS 230	General Ecology	3.0
ENVS 247	Native Plants and Sustainability	3.0
ENVS 323	Tropical Field Studies	3.0
ENVS 328	Conservation Biology	3.0
ENVS 343	Equatorial Guinea: Field Methods	3.0
ENVS 360	Evolutionary Developmental Biology	3.0
ENVS 364	Animal Behavior	3.0
ENVS 382	Field Botany of the New Jersey Pine Barrens	4.0
ENVS 383	Ecology of the New Jersey Pine Barrens	4.0
ENVS 391	Freshwater and Marine Algae	3.0

ENVS 470	Advanced Topics in Evolution	3.0
Laboratory Electives		
BIO 202	Human Physiology Laboratory	2.0
BIO 213	Drosophila Neural Research	3.0
BIO 215 [WI]	Techniques in Cell Biology	3.0
BIO 222	Microbiology Laboratory	2.0
BIO 229	Dictyostelium Research	3.0
BIO 232	Discovering Antibiotics	3.0
BIO 257	Vertebrate Morphology & Physiology Lab	2.0
BIO 271	Developmental Biology Laboratory	2.0
BIO 306	Biochemistry Laboratory	2.0
BIO 313	Comparative Physiology Laboratory	2.0
BIO 387	Gross Anatomy I Laboratory	2.0
BIO 389	Gross Anatomy II Lab	2.0
BIO 406	Computational Biochemistry Laboratory	2.0
BIO 427	Immunology Laboratory	2.0
BIO 497	Research	0.5-12.0
ENVS 255	Invertebrate Morphology and Physiology Lab	2.0
ENVS 344	Equatorial Guinea: Field Research	6.0
ENVS 365	Animal Behavior Laboratory	2.0
ENVS 394	Entomology Laboratory	2.0

2. The Organismal Biology/Physiology Concentration

This concentration combines courses in organismal biology and physiology with an opportunity to focus on human physiology. The concentration is designed to appeal to students interested in health and medicine, but also accommodates students seeking a wider breadth of knowledge in organismal diversity. Students can focus their electives in human physiology or can choose courses that study non-human organisms.

Organismal Biology/Physiology Concentration Requirements

BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
or BIO 256	Vertebrate Morphology and Physiology	
BIO 270	Development Biology	3.0
Select one of the following:		
BIO 412	Biology of Aging	3.0
or BIO 284	Biology of Stress	
or BIO 466	Endocrinology	

Organismal Biology/Physiology Concentration Electives (See List Below)

Cell/Molecular/Genetics/Biochemistry (CMGB) Elective			3.0
Two Organismal/Physiology Electives			6.0
Ecology/Evolution/Genomics Elective			3.0
Concentration Laboratory Courses			
Two Laboratory Electives			4.0
Total Credits			30.0

* Students interesting in pursuing a focus area in Human Physiology or Organismal Biology should contact the academic advisor in the Biology Department for specific focus recommendations.

*Cell/Molecular/Genetics/Biochemistry (CMGB) Electives

BIO 244	Genetics I	3.0
BIO 285	Forensic Biology	3.0
BIO 311	Biochemistry	4.0
BIO 314	Pharmacology	3.0
BIO 318	Biology of Cancer	3.0

BIO 346	Stem Cell Research	3.0
BIO 348	Neuroscience: From Cells to Circuits	3.0
BIO 404	Structure and Function of Biomolecules	4.0
BIO 410	Advanced Molecular Biology	3.0
BIO 414	Behavioral Genetics	3.0
BIO 416	Biochemistry of Major Diseases	3.0
BIO 430	Cell Biology of Disease	3.0
BIO 444	Human Genetics	3.0
BIO 449	Recombinant DNA Laboratory	5.0
BIO 453	Protein Dysfunction in Disease	3.0
BIO 462	Biology of Neuron Function	3.0
BIO 463	Molecular Mechanisms of Neurodegeneration	3.0
ENVS 326	Molecular Ecology	3.0

****Organismal/Physiology electives**

BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BIO 221	Microbiology	3.0
BIO 223	Parasitology	3.0
BIO 256	Vertebrate Morphology and Physiology	3.0
BIO 264	Ethnobotany	3.0
BIO 284	Biology of Stress	3.0
BIO 286	Forensic Toxicology	3.0
BIO 310	Comparative Physiology	3.0
BIO 320	Microbial Pathogenesis	3.0
BIO 322	Mycology	4.5
BIO 349	Behavioral Neuroscience	3.0
BIO 368	Embryology	4.0
BIO 370	Teratology	3.0
BIO 372	Histology	4.0
BIO 386	Gross Anatomy I	2.0
BIO 388	Gross Anatomy II	2.0
BIO 412	Biology of Aging	3.0
BIO 420	Virology	3.0
BIO 424	Microbial Physiology	3.0
BIO 426	Immunology	3.0
BIO 435	Immunobiology of Disease	3.0
BIO 461	Neurobiology of Autism Disorders	3.0
BIO 466	Endocrinology	4.0
BIO 468	Pathophysiology	4.0
ENVS 254	Invertebrate Morphology and Physiology	3.0
ENVS 392	Ichthyology and Herpetology	3.0
ENVS 393	Entomology	3.0

***** Ecology/Evolution/Genomics electives**

BIO 228	Evolutionary Biology & Human Health	3.0
BIO 331	Bioinformatics I	3.0
BIO 413	Genomics	3.0
BIO 436	Human Population Genetics	4.0
ENVS 230	General Ecology	3.0
ENVS 247	Native Plants and Sustainability	3.0
ENVS 323	Tropical Field Studies	3.0
ENVS 328	Conservation Biology	3.0
ENVS 343	Equatorial Guinea: Field Methods	3.0
ENVS 360	Evolutionary Developmental Biology	3.0
ENVS 364	Animal Behavior	3.0
ENVS 382	Field Botany of the New Jersey Pine Barrens	4.0
ENVS 383	Ecology of the New Jersey Pine Barrens	4.0
ENVS 388	Marine Field Methods	4.0
ENVS 391	Freshwater and Marine Algae	3.0
ENVS 438	Biodiversity	3.0

ENVS 470	Advanced Topics in Evolution	3.0
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+Laboratory electives

BIO 202	Human Physiology Laboratory	2.0
BIO 213	Drosophila Neural Research	3.0
BIO 215 [WI]	Techniques in Cell Biology	3.0
BIO 222	Microbiology Laboratory	2.0
BIO 229	Dictyostelium Research	3.0
BIO 232	Discovering Antibiotics	3.0
BIO 257	Vertebrate Morphology & Physiology Lab	2.0
BIO 271	Developmental Biology Laboratory	2.0
BIO 306	Biochemistry Laboratory	2.0
BIO 313	Comparative Physiology Laboratory	2.0
BIO 333	Bioinformatics Laboratory	2.0
BIO 387	Gross Anatomy I Laboratory	2.0
BIO 389	Gross Anatomy II Lab	2.0
BIO 406	Computational Biochemistry Laboratory	2.0
BIO 427	Immunology Laboratory	2.0
BIO 434 [WI]	Advanced Cell Biology Laboratory	2.0
BIO 449	Recombinant DNA Laboratory	5.0
ENVS 255	Invertebrate Morphology and Physiology Lab	2.0
ENVS 344	Equatorial Guinea: Field Research	6.0
ENVS 365	Animal Behavior Laboratory	2.0
ENVS 394	Entomology Laboratory	2.0

3. The Ecology/Evolution/Genomics Concentration

This concentration focuses on ecological and evolutionary aspects of biology for biology majors who also have specific interests in ecology, evolution or genomics. This concentration is designed to maintain a breadth of knowledge in biology, but also allows students to tailor their course work more specifically to reflect their specific area of interest.

Ecology/Evolution/Genomics Concentration requirements

ENVS 326	Molecular Ecology	3.0
BIO 228	Evolutionary Biology & Human Health	3.0
or BIO 331	Bioinformatics I	
BIO 436	Human Population Genetics	3.0-4.0
or ENVS 230	General Ecology	

Select one of the following: 3.0-5.0

BIO 221	Microbiology	
BIO 223	Parasitology	
BIO 256	Vertebrate Morphology and Physiology	
BIO 413	Genomics	
BIO 420	Virology	
ENVS 254	Invertebrate Morphology and Physiology	
ENVS 360	Evolutionary Developmental Biology	
ENVS 382	Field Botany of the New Jersey Pine Barrens	
ENVS 391	Freshwater and Marine Algae	
ENVS 392	Ichthyology and Herpetology	
ENVS 393	Entomology	
ENVS 438	Biodiversity	

Ecology/Evolution/Genomics concentration electives

Select one Cell/Molecular/Genetics/Biochemistry (CMGB) elective (see list below) 3.0

Select one Organismal/Physiology elective (see list below) 3.0

Select two Ecology/Evolution/Genomics electives (see list below) 6.0

Concentration Laboratory Courses

Select two Laboratory electives (see list below) 4.0

Total Credits 28.0-31.0

* Students interested in pursuing a focus area in Ecology, Evolutionary Biology or Genomics should contact the academic advisor in the Biology Department for specific focus recommendations.

Cell/Molecular/Genetics/Biochemistry (CMGB) electives

BIO 244	Genetics I	3.0
BIO 285	Forensic Biology	3.0
BIO 311	Biochemistry	4.0
BIO 314	Pharmacology	3.0
BIO 318	Biology of Cancer	3.0
BIO 346	Stem Cell Research	3.0
BIO 348	Neuroscience: From Cells to Circuits	3.0
BIO 404	Structure and Function of Biomolecules	4.0
BIO 410	Advanced Molecular Biology	3.0
BIO 414	Behavioral Genetics	3.0
BIO 415	Proteins	3.0
BIO 416	Biochemistry of Major Diseases	3.0
BIO 421	Biomembranes	3.0
BIO 430	Cell Biology of Disease	3.0
BIO 433	Advanced Cell Biology	3.0
BIO 444	Human Genetics	3.0
BIO 449	Recombinant DNA Laboratory	5.0
BIO 453	Protein Dysfunction in Disease	3.0
BIO 462	Biology of Neuron Function	3.0
BIO 463	Molecular Mechanisms of Neurodegeneration	3.0

Organismal/Physiology electives

BIO 201	Human Physiology I	4.0
BIO 221	Microbiology	3.0
BIO 223	Parasitology	3.0
BIO 256	Vertebrate Morphology and Physiology	3.0
BIO 284	Biology of Stress	3.0
BIO 286	Forensic Toxicology	3.0
BIO 310	Comparative Physiology	3.0
BIO 322	Mycology	4.5
BIO 349	Behavioral Neuroscience	3.0
BIO 368	Embryology	4.0
BIO 372	Histology	4.0
BIO 386	Gross Anatomy I	2.0
BIO 388	Gross Anatomy II	2.0
BIO 412	Biology of Aging	3.0
BIO 420	Virology	3.0
BIO 426	Immunology	3.0
BIO 461	Neurobiology of Autism Disorders	3.0
ENVS 254	Invertebrate Morphology and Physiology	3.0
ENVS 392	Ichthyology and Herpetology	3.0
ENVS 393	Entomology	3.0

Ecology/Evolution/Genomics electives

BIO 228	Evolutionary Biology & Human Health	3.0
BIO 331	Bioinformatics I	3.0
BIO 332	Bioinformatics II	3.0
BIO 413	Genomics	3.0
BIO 436	Human Population Genetics	4.0
ENVS 230	General Ecology	3.0
ENVS 247	Native Plants and Sustainability	3.0
ENVS 284	Physiological and Population Ecology	3.0
ENVS 286	Community and Ecosystem Ecology	3.0
ENVS 315	Plant Animal Interactions	3.0
ENVS 322	Tropical Ecology	3.0

ENVS 328	Conservation Biology	3.0
ENVS 330	Aquatic Ecology	3.0
ENVS 336	Terrestrial Ecology	5.0
ENVS 343	Equatorial Guinea: Field Methods	3.0
ENVS 360	Evolutionary Developmental Biology	3.0
ENVS 364	Animal Behavior	3.0
ENVS 382	Field Botany of the New Jersey Pine Barrens	4.0
ENVS 383	Ecology of the New Jersey Pine Barrens	4.0
ENVS 390	Marine Ecology	3.0
ENVS 391	Freshwater and Marine Algae	3.0
ENVS 410	Physiological Ecology	3.0
ENVS 412	Biophysical Ecology	3.0
ENVS 413	Advanced Population Ecology	3.0
ENVS 414	Advanced Community Ecology	3.0
ENVS 438	Biodiversity	3.0
ENVS 470	Advanced Topics in Evolution	3.0

Laboratory electives

BIO 202	Human Physiology Laboratory	2.0
BIO 213	Drosophila Neural Research	3.0
BIO 215 [WI]	Techniques in Cell Biology	3.0
BIO 222	Microbiology Laboratory	2.0
BIO 229	Dictyostelium Research	3.0
BIO 232	Discovering Antibiotics	3.0
BIO 257	Vertebrate Morphology & Physiology Lab	2.0
BIO 271	Developmental Biology Laboratory	2.0
BIO 306	Biochemistry Laboratory	2.0
BIO 313	Comparative Physiology Laboratory	2.0
BIO 333	Bioinformatics Laboratory	2.0
BIO 387	Gross Anatomy I Laboratory	2.0
BIO 389	Gross Anatomy II Lab	2.0
BIO 406	Computational Biochemistry Laboratory	2.0
BIO 427	Immunology Laboratory	2.0
BIO 449	Recombinant DNA Laboratory	5.0
BIO 497	Research (by permission of the department)	0.5-12.0
ENVS 255	Invertebrate Morphology and Physiology Lab	2.0
ENVS 285 [WI]	Population Ecology Laboratory	2.0
ENVS 287	Community Ecology Laboratory	2.0
ENVS 327	Molecular Ecology Laboratory	2.0
ENVS 336	Terrestrial Ecology	5.0
ENVS 344	Equatorial Guinea: Field Research	6.0
ENVS 365	Animal Behavior Laboratory	2.0
ENVS 382	Field Botany of the New Jersey Pine Barrens	4.0
ENVS 383	Ecology of the New Jersey Pine Barrens	4.0
ENVS 388	Marine Field Methods	4.0
ENVS 394	Entomology Laboratory	2.0

4. The Pathobiology Concentration

The Pathobiology concentration focuses on pathogenesis, and provides a unique option for students that differs from the more traditional disciplines in cell/molecular/genetics/biochemistry. This concentration is designed to appeal to students with an interest in pursuing careers in areas of public and allied health.

BIO 221	Microbiology	3.0
BIO 223	Parasitology	3.0
or BIO 420	Virology	
or BIO 435	Immunobiology of Disease	
BIO 320	Microbial Pathogenesis	3.0
BIO 426	Immunology	3.0
Select one Cell/Molecular/Genetics/Biochemistry (CMGB) elective (see list below)		3.0

Select two Organismal/Physiology electives (see list below)	6.0
Select one Evolutionary Bio/Ecology elective (see list below)	3.0
Concentration Laboratory Courses	
Two Laboratory electives (see list below)	4.0
Total Credits	28.0

Cell/Molecular/Genetics/Biochemistry (CMGB) electives:

BIO 244	Genetics I	3.0
BIO 285	Forensic Biology	3.0
BIO 311	Biochemistry	4.0
BIO 314	Pharmacology	3.0
BIO 318	Biology of Cancer	3.0
BIO 346	Stem Cell Research	3.0
BIO 348	Neuroscience: From Cells to Circuits	3.0
BIO 404	Structure and Function of Biomolecules	4.0
BIO 410	Advanced Molecular Biology	3.0
BIO 414	Behavioral Genetics	3.0
BIO 415	Proteins	3.0
BIO 421	Biomembranes	3.0
BIO 430	Cell Biology of Disease	3.0
BIO 433	Advanced Cell Biology	3.0
BIO 444	Human Genetics	3.0
BIO 449	Recombinant DNA Laboratory	5.0
BIO 453	Protein Dysfunction in Disease	3.0
BIO 462	Biology of Neuron Function	3.0
BIO 463	Molecular Mechanisms of Neurodegeneration	3.0
ENVS 326	Molecular Ecology	3.0

Organismal/Physiology electives

BIO 201	Human Physiology I	4.0
BIO 221	Microbiology	3.0
BIO 223	Parasitology	3.0
BIO 256	Vertebrate Morphology and Physiology	3.0
BIO 270	Development Biology	3.0
BIO 284	Biology of Stress	3.0
BIO 286	Forensic Toxicology	3.0
BIO 310	Comparative Physiology	3.0
BIO 322	Mycology	4.5
BIO 349	Behavioral Neuroscience	3.0
BIO 368	Embryology	4.0
BIO 370	Teratology	3.0
BIO 372	Histology	4.0
BIO 386	Gross Anatomy I	2.0
BIO 388	Gross Anatomy II	2.0
BIO 412	Biology of Aging	3.0
BIO 420	Virology	3.0
BIO 424	Microbial Physiology	3.0
BIO 435	Immunobiology of Disease	3.0
BIO 461	Neurobiology of Autism Disorders	3.0
BIO 466	Endocrinology	4.0
BIO 468	Pathophysiology	4.0
ENVS 254	Invertebrate Morphology and Physiology	3.0

Ecology/Evolution/Genomics electives

BIO 228	Evolutionary Biology & Human Health	3.0
BIO 331	Bioinformatics I	3.0
BIO 413	Genomics	3.0
BIO 436	Human Population Genetics	4.0
ENVS 230	General Ecology	3.0
ENVS 247	Native Plants and Sustainability	3.0

ENVS 323	Tropical Field Studies	3.0
ENVS 328	Conservation Biology	3.0
ENVS 343	Equatorial Guinea: Field Methods	3.0
ENVS 360	Evolutionary Developmental Biology	3.0
ENVS 364	Animal Behavior	3.0
ENVS 382	Field Botany of the New Jersey Pine Barrens	4.0
ENVS 383	Ecology of the New Jersey Pine Barrens	4.0
ENVS 391	Freshwater and Marine Algae	3.0
ENVS 438	Biodiversity	3.0
ENVS 470	Advanced Topics in Evolution	3.0

Laboratory electives

BIO 202	Human Physiology Laboratory	2.0
BIO 213	Drosophila Neural Research	3.0
BIO 215 [WI]	Techniques in Cell Biology	3.0
BIO 222	Microbiology Laboratory	2.0
BIO 229	Dictyostelium Research	3.0
BIO 232	Discovering Antibiotics	3.0
BIO 257	Vertebrate Morphology & Physiology Lab	2.0
BIO 271	Developmental Biology Laboratory	2.0
BIO 306	Biochemistry Laboratory	2.0
BIO 313	Comparative Physiology Laboratory	2.0
BIO 333	Bioinformatics Laboratory	2.0
BIO 387	Gross Anatomy I Laboratory	2.0
BIO 389	Gross Anatomy II Lab	2.0
BIO 406	Computational Biochemistry Laboratory	2.0
BIO 427	Immunology Laboratory	2.0
BIO 449	Recombinant DNA Laboratory	5.0
BIO 497	Research (by permission of the department)	0.5-12.0
ENVS 255	Invertebrate Morphology and Physiology Lab	2.0
ENVS 344	Equatorial Guinea: Field Research	6.0
ENVS 365	Animal Behavior Laboratory	2.0

5. The General Biology Concentration

This concentration will allow maximum flexibility for students who want to develop their own unique plan of study. The concentration is designed for students who may not have one specific area of interest, but who are looking to be well-rounded in the biological sciences. Students pursuing careers in education, where a wider breadth of knowledge in biology is desirable, may choose to select this concentration.

General Biology Concentration Electives	24.0
2 or 3 Cell/Molecular/Genetics/Biochemistry (CMGB) electives (see list below)	
2 or 3 Organismal/Physiology electives (see list below)	
2 or 3 Ecology/Evolution/Genomics electives (see list below)	
Concentration Laboratory Courses	
Two Laboratory electives (see list below)	4.0
Total Credits	28.0

Cell/Molecular/Genetics/Biochemistry (CMGB) electives

BIO 231	Cell Physiology	3.0
BIO 244	Genetics I	3.0
BIO 285	Forensic Biology	3.0
BIO 311	Biochemistry	4.0
BIO 314	Pharmacology	3.0
BIO 318	Biology of Cancer	3.0
BIO 331	Bioinformatics I	3.0
BIO 332	Bioinformatics II	3.0
BIO 346	Stem Cell Research	3.0
BIO 348	Neuroscience: From Cells to Circuits	3.0

BIO 404	Structure and Function of Biomolecules	4.0
BIO 413	Genomics	3.0
BIO 415	Proteins	3.0
BIO 421	Biomembranes	3.0
BIO 430	Cell Biology of Disease	3.0
BIO 433	Advanced Cell Biology	3.0
BIO 444	Human Genetics	3.0
BIO 445	Microbial Genetics	3.0
BIO 447	Advanced Genetics and Molecular Biology	3.0
BIO 449	Recombinant DNA Laboratory	5.0
BIO 451	Genetic Reg Development	3.0
BIO 453	Protein Dysfunction in Disease	3.0
BIO 462	Biology of Neuron Function	3.0
BIO 465	Neurobiology of Disease	3.0
ENVS 326	Molecular Ecology	3.0

Organismal/Physiology electives

BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BIO 221	Microbiology	3.0
BIO 223	Parasitology	3.0
BIO 256	Vertebrate Morphology and Physiology	3.0
BIO 264	Ethnobotany	3.0
BIO 270	Development Biology	3.0
BIO 284	Biology of Stress	3.0
BIO 286	Forensic Toxicology	3.0
BIO 310	Comparative Physiology	3.0
BIO 320	Microbial Pathogenesis	3.0
BIO 322	Mycology	4.5
BIO 349	Behavioral Neuroscience	3.0
BIO 368	Embryology	4.0
BIO 370	Teratology	3.0
BIO 372	Histology	4.0
BIO 386	Gross Anatomy I	2.0
BIO 388	Gross Anatomy II	2.0
BIO 412	Biology of Aging	3.0
BIO 420	Virology	3.0
BIO 424	Microbial Physiology	3.0
BIO 426	Immunology	3.0
BIO 435	Immunobiology of Disease	3.0
BIO 461	Neurobiology of Autism Disorders	3.0
BIO 466	Endocrinology	4.0
BIO 468	Pathophysiology	4.0
ENVS 254	Invertebrate Morphology and Physiology	3.0
ENVS 392	Ichthyology and Herpetology	3.0
ENVS 393	Entomology	3.0

Ecology/Evolution/Genomics electives

BIO 228	Evolutionary Biology & Human Health	3.0
BIO 331	Bioinformatics I	3.0
BIO 332	Bioinformatics II	3.0
BIO 413	Genomics	3.0
ENVS 230	General Ecology	3.0
ENVS 247	Native Plants and Sustainability	3.0
ENVS 284	Physiological and Population Ecology	3.0
ENVS 286	Community and Ecosystem Ecology	3.0
ENVS 315	Plant Animal Interactions	3.0
ENVS 322	Tropical Ecology	3.0
ENVS 323	Tropical Field Studies	3.0
ENVS 324	Microbial Ecology	3.0
ENVS 328	Conservation Biology	3.0

ENVS 330	Aquatic Ecology	3.0
ENVS 336	Terrestrial Ecology	5.0
ENVS 343	Equatorial Guinea: Field Methods	3.0
ENVS 360	Evolutionary Developmental Biology	3.0
ENVS 364	Animal Behavior	3.0
ENVS 382	Field Botany of the New Jersey Pine Barrens	4.0
ENVS 383	Ecology of the New Jersey Pine Barrens	4.0
ENVS 388	Marine Field Methods	4.0
ENVS 390	Marine Ecology	3.0
ENVS 391	Freshwater and Marine Algae	3.0
ENVS 410	Physiological Ecology	3.0
ENVS 412	Biophysical Ecology	3.0
ENVS 413	Advanced Population Ecology	3.0
ENVS 414	Advanced Community Ecology	3.0
ENVS 438	Biodiversity	3.0
ENVS 470	Advanced Topics in Evolution	3.0

Laboratory electives

BIO 202	Human Physiology Laboratory	2.0
BIO 213	Drosophila Neural Research	3.0
BIO 215 [WI]	Techniques in Cell Biology	3.0
BIO 222	Microbiology Laboratory	2.0
BIO 229	Dictyostelium Research	3.0
BIO 232	Discovering Antibiotics	3.0
BIO 257	Vertebrate Morphology & Physiology Lab	2.0
BIO 271	Developmental Biology Laboratory	2.0
BIO 306	Biochemistry Laboratory	2.0
BIO 313	Comparative Physiology Laboratory	2.0
BIO 333	Bioinformatics Laboratory	2.0
BIO 387	Gross Anatomy I Laboratory	2.0
BIO 389	Gross Anatomy II Lab	2.0
BIO 406	Computational Biochemistry Laboratory	2.0
BIO 427	Immunology Laboratory	2.0
BIO 449	Recombinant DNA Laboratory	5.0
BIO 497	Research (by permission of the department)	0.5-12.0
ENVS 255	Invertebrate Morphology and Physiology Lab	2.0
ENVS 285 [WI]	Population Ecology Laboratory	2.0
ENVS 287	Community Ecology Laboratory	2.0
ENVS 327	Molecular Ecology Laboratory	2.0
ENVS 344	Equatorial Guinea: Field Research	6.0
ENVS 365	Animal Behavior Laboratory	2.0
ENVS 382	Field Botany of the New Jersey Pine Barrens	4.0
ENVS 383	Ecology of the New Jersey Pine Barrens	4.0
ENVS 388	Marine Field Methods	4.0
ENVS 394	Entomology Laboratory	2.0

Note about laboratory credits: BIO 449, ENVS 336, ENVS 382 and ENVS 388 have both a lecture and laboratory component.

Sample Plans of Study

Biological Sciences Major: Four-year Co-op

(Additional sample plans for other co-op options can be viewed below.)

Term 1		Credits
BIO 122	Cells and Genetics	4.5
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121 or 101	Calculus I Introduction to Analysis I	4.0
UNIV S101	The Drexel Experience	1.0
Term Credits		16.0

Term 2		
BIO 124	Evolution & Organismal Diversity	4.5
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122 or 102	Calculus II Introduction to Analysis II	4.0
Term Credits		17.0
Term 3		
BIO 126	Physiology and Ecology	4.5
CHEM 103	General Chemistry III	5.0
COOP 101	Career Management and Professional Development	0.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 239 or 123	Mathematics for the Life Sciences Calculus III	4.0
Term Credits		16.5
Term 4		
BIO 207	Applications in Biology I	1.0
BIO 209	Cell, Molecular & Developmental Biology I	4.0
BIO 219 [WI]	Techniques in Molecular Biology	3.0
CHEM 241	Organic Chemistry I	4.0
PHYS 152	Introductory Physics I	4.0
Term Credits		16.0
Term 5		
BIO 208	Applications in Biology II	1.0
BIO 211	Cell, Molecular & Developmental Biology II	4.0
Biology Laboratory Requirement*		2.0
CHEM 242	Organic Chemistry II	4.0
PHYS 153	Introductory Physics II	4.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Term Credits		16.0
Term 6		
BIO 311	Biochemistry	4.0
or CHEM 243	Organic Chemistry III	
ENVS 212	Evolution	4.0
PHIL 251	Ethics	3.0
PHYS 154	Introductory Physics III	4.0
Term Credits		15.0
Term 7		
BIO 224	Form, Function & Evolution of Vertebrates	4.0
BIO 225	Vertebrate Biology and Evolution Laboratory	2.0
Sci, tech, health & human affairs elective		3.0
BIO/ENVS Elective		3.0
Biology Laboratory Requirement		2.0
Term Credits		14.0
Term 8		
COM 230	Techniques of Speaking	3.0
MATH 410	Scientific Data Analysis I	3.0
BIO/ENVS Elective		3.0
Free Electives		6.0
Term Credits		15.0
Term 9		
COM 310 [WI]	Technical Communication	3.0
MATH 411	Scientific Data Analysis II	3.0
Humanities/Social Science Elective		3.0
BIO/ENVS Elective		3.0
Free Elective		3.0
Term Credits		15.0
Term 10		
BIO 471	Seminar in Biological Sciences	2.0
BIO/ENVS Electives		6.0

Free Electives		6.0
Term Credits		14.0
Term 11		
BIO 472	Seminar in Biological Sciences	2.0
BIO/ENVS Electives		6.0
Humanities/Social Science Elective		3.0
Free Elective		3.0
Term Credits		14.0
Term 12		
BIO 473 [WI]	Seminar in Biological Sciences	2.0
BIO/ENVS Elective		3.0
Humanities/Social Science Elective		3.0
Free Electives		6.0
Term Credits		14.0

Total Credit: 182.5

* See degree requirements (p. 46).

Biological Sciences Major: Five-year Co-op

		Credits
Term 1		
BIO 122	Cells and Genetics	4.5
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121 or 101	Calculus I Introduction to Analysis I	4.0
UNIV S101	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
BIO 124	Evolution & Organismal Diversity	4.5
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122 or 102	Calculus II Introduction to Analysis II	4.0
Term Credits		17.0
Term 3		
BIO 126	Physiology and Ecology	4.5
CHEM 103	General Chemistry III	5.0
COOP 101	Career Management and Professional Development	0.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 239 or 123	Mathematics for the Life Sciences Calculus III	4.0
Term Credits		16.5
Term 4		
BIO 207	Applications in Biology I	1.0
BIO 209	Cell, Molecular & Developmental Biology I	4.0
BIO 219 [WI]	Techniques in Molecular Biology	3.0
CHEM 241	Organic Chemistry I	4.0
PHYS 152	Introductory Physics I	4.0
Term Credits		16.0
Term 5		
BIO 208	Applications in Biology II	1.0
BIO 211	Cell, Molecular & Developmental Biology II	4.0
Biology Laboratory Requirement		2.0
CHEM 242	Organic Chemistry II	4.0
PHYS 153	Introductory Physics II	4.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Term Credits		16.0
Term 6		
BIO 311	Biochemistry	4.0
or CHEM 243	Organic Chemistry III	

ENVS 212	Evolution	4.0
PHIL 251	Ethics	3.0
PHYS 154	Introductory Physics III	4.0
Term Credits		15.0
Term 7		
BIO 224	Form, Function & Evolution of Vertebrates	4.0
BIO 225	Vertebrate Biology and Evolution Laboratory	2.0
BIO/ENVS Elective		3.0
Humanities/Social Science Elective		3.0
Sci, tech, health & human affairs elective		3.0
Term Credits		15.0
Term 8		
COM 230	Techniques of Speaking	3.0
MATH 410	Scientific Data Analysis I	3.0
BIO/ENVS Elective		3.0
Free Elective		6.0
Term Credits		15.0
Term 9		
COM 310 [WI]	Technical Communication	3.0
MATH 411	Scientific Data Analysis II	3.0
Biology Laboratory Requirement Course*		2.0
BIO/ENVS Elective		3.0
Free Elective		3.0
Term Credits		14.0
Term 10		
BIO 471	Seminar in Biological Sciences	2.0
BIO/ENVS Electives		6.0
Free Electives		6.0
Term Credits		14.0
Term 11		
BIO 472	Seminar in Biological Sciences	2.0
Free Elective		3.0
Humanities/Social Science Elective		3.0
BIO/ENVS Electives		6.0
Term Credits		14.0
Term 12		
BIO 473 [WI]	Seminar in Biological Sciences	2.0
Free Electives		6.0
Humanities/Social Science Elective		3.0
BIO/ENVS Elective		3.0
Term Credits		14.0

Total Credit: 182.5

* See degree requirements (p. 46).

Biological Sciences Major: Four-year Non-co-op

		Credits
Term 1		
BIO 122	Cells and Genetics	4.5
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121 or 101	Calculus I Introduction to Analysis I	4.0
UNIV S101	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
BIO 124	Evolution & Organismal Diversity	4.5
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0

MATH 122 or 102	Calculus II Introduction to Analysis II	4.0
Term Credits		17.0
Term 3		
BIO 126	Physiology and Ecology	4.5
CHEM 103	General Chemistry III	5.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 239 or 123	Mathematics for the Life Sciences Calculus III	4.0
Term Credits		16.5
Term 4		
BIO 207	Applications in Biology I	1.0
BIO 209	Cell, Molecular & Developmental Biology I	4.0
BIO 219 [WI]	Techniques in Molecular Biology	3.0
CHEM 241	Organic Chemistry I	4.0
PHYS 152	Introductory Physics I	4.0
Term Credits		16.0
Term 5		
BIO 208	Applications in Biology II	1.0
BIO 211	Cell, Molecular & Developmental Biology II	4.0
Biology Laboratory Requirement		2.0
CHEM 242	Organic Chemistry II	4.0
PHYS 153	Introductory Physics II	4.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Term Credits		16.0
Term 6		
BIO 224	Form, Function & Evolution of Vertebrates	4.0
BIO 225	Vertebrate Biology and Evolution Laboratory	2.0
BIO 311 or CHEM 243	Biochemistry Organic Chemistry III	4.0
PHIL 251	Ethics	3.0
PHYS 154	Introductory Physics III	4.0
Term Credits		17.0
Term 7		
MATH 410	Scientific Data Analysis I	3.0
ENVS 212	Evolution	4.0
BIO/ENVS Elective		3.0
Humanities/Social Science Elective		3.0
Sci, tech, health & human affairs elective		3.0
Term Credits		16.0
Term 8		
COM 310 [WI]	Technical Communication	3.0
MATH 411	Scientific Data Analysis II	3.0
BIO/ENVS Elective		3.0
Humanities/Social Science Elective		3.0
Term Credits		12.0
Term 9		
COM 230	Techniques of Speaking	3.0
BIO/ENVS Elective		3.0
Biology Laboratory Requirement Course*		2.0
Humanities/Social Science Elective		3.0
Free Elective		3.0
Term Credits		14.0
Term 10		
BIO 471	Seminar in Biological Sciences	2.0
BIO/ENVS Electives		6.0
Free Electives		6.0
Term Credits		14.0
Term 11		
BIO 472	Seminar in Biological Sciences	2.0
Free Elective		6.0

BIO/ENVS Electives		6.0
Term Credits		14.0
Term 12		
BIO 473 [WI]	Seminar in Biological Sciences	2.0
Free Electives		9.0
BIO/ENVS Elective		3.0
Term Credits		14.0
Total Credit: 182.5		

* See degree requirements (p. 46).

Co-op/Career Opportunities

Students earn a bachelor's degree in the biological sciences and are prepared for technical careers in research or commercial laboratories or for professional schools.

Graduates typically work for pharmaceutical companies, medical research laboratories, biotechnology companies, or in government laboratories. Many graduates also choose to pursue an advanced degree in the field.

Co-op Opportunities

Past co-op employers of biosciences majors have included:

- GlaxoSmithKline
- AstraZeneca Pharmaceuticals
- Wistar Institute
- Moss Rehab
- ViroPharma, Inc.
- NovaFlora, Inc.
- Wyeth

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Dual/Accelerated Degree

Combined Bachelors/Masters Degree

Qualified students can take graduate courses in their junior and senior years for undergraduate or graduate credit. They can also complete a combined BS /MS degree in five years. Further questions about the BS / MS degree program should be directed to the departmental graduate advisor:

Kate Pelusi
Graduate Program Manager
Department of Biology
215.895.6374
kp475@drexel.edu

Minor in Biological Sciences

The minor in biological sciences is designed for students who wish to become acquainted with the life sciences while pursuing a major in another area. This option should be particularly useful for students majoring in areas such as chemistry, engineering, physics, or psychology who are interested in admission to medical schools or graduate programs. Students interested in the minor should consult with an academic advisor in the department for help with course selections.

Required Courses *

BIO 122	Cells and Genetics	4.5
BIO 124	Evolution & Organismal Diversity	4.5
BIO 126	Physiology and Ecology	4.5
BIO 218	Principles of Molecular Biology	4.0
BIO 224	Form, Function & Evolution of Vertebrates	4.0
BIO ELECTIVE OR ENVS 212 **		3.0
Total Credits		24.5

* A grade of "C" or better must be earned for each course in this minor for the course to meet the requirement.

** The Biology Elective can be selected from any of the regularly offered Biology department lecture courses 200-level and above according to your specific interests. Note that existing course pre-requisites may affect which courses may be selected.

Facilities

The Department of Biology has well-equipped teaching laboratories with networked computers and advanced digital image analysis capability. Both teaching and research laboratories contain a range of modern equipment including microscopes, centrifuges, chromatographs, spectrophotometers, scintillation counters, culture chambers, and densitometers.

Visit the Research in Biology (<http://www.drexel.edu/coas/academics/departments-centers/biology/research>) web page for more information.

Biological Sciences Faculty

Michael Akins, PhD (*Yale University*). Assistant Professor. The neural mechanisms underlying how organisms interact with the environment; circuit formation, particularly of sensory circuits, and neural diseases including autism and Fragile X syndrome (FXS).

Shivanthi Anandan, PhD (*University of California, Los Angeles*). Associate Professor. Microbial genetics, in particular the analysis of light-regulated signal transduction pathways and the regulation of gene expression in photosynthesizing organisms.

Joseph Bentz, PhD (*State University of New York (SUNY) at Buffalo*). Professor. Biophysics, biochemistry and biopharmaceutics, focused on the molecular basis of biological membrane transport and fusion.

John R. Bethea, PhD (*University of Alabama at Birmingham*) *Department Head*. Professor. Neuroscience and immunology.

Valerie Bracchi-Ricard, PhD (*University Joseph Fourier, Grenoble, France*). Research Assistant Professor. Role of TNF and TNF receptors in neuroinflammation and remyelination following spinal cord injury.

Laura Duwel, PhD (*University of Cincinnati*) *Assistant Department Head, Department of Biology*. Teaching Professor. Immunology and microbiology.

Felice Elephant, PhD (*Temple University*). Associate Professor. Understanding the roles of two classes of chromatin regulatory proteins termed histone acetyltransferases (HATs) and histone de-methylases.

Denise Garcia, PhD (*UCLA*). Assistant Professor. Neuroscience, the role of astrocytes in the central nervous system.

Tali Gidalevitz, PhD (*University of Chicago*). Assistant Professor. Genetic and molecular pathways regulating protein folding homeostasis, and their role in protein conformation diseases, aging, and development.

Mary Katherine Gonder, PhD (*The City University of New York*) *Director, Bioko Biodiversity Protection Program Co-Founder, Central African Biodiversity Alliance*. Associate Professor. Deciphering spatial patterns of biodiversity across the Gulf of Guinea and Congo Basin region; Conservation measures to mitigate the effects of habitat loss and climate change in western equatorial Africa.

Susan Gurney, PhD (*Westfälische Wilhelms-Universität Münster (Germany)*). Assistant Teaching Professor. Evolutionary genetics (human and equids); stem cell biology; forensic science

Meshagae Hunte-Brown, PhD (*Drexel University*). Associate Teaching Professor. Stable isotopes in aquatic food webs, ecosystem ecology, STEM education.

Jiu Jiang, MD, PhD (*Shanghai Second Medical University*). Research Associate Professor. T cell immune response to virus infection in aged mice.

Karen Kabnick, PhD (*Massachusetts Institute of Technology*). Associate Teaching Professor. Molecular and genetic mechanisms of cellular biology, human disease, host/parasite interactions.

Joy Little, PhD (*Wake Forest University*). Assistant Teaching Professor. Stem education, cancer cell biology.

Robert Loudon, PhD (*Thomas Jefferson University*). Associate Teaching Professor. Rho GTPases, regulation of actin cytoskeleton, Regulation of G protein-coupled receptors by receptor kinases and arrestins.

Daniel Marena, PhD (*Syracuse University*) *Director of the Biology Graduate Program, Co-Director of the Cell Imaging Center*. Associate Professor. Developmental neurobiology and behavior; CHARGE syndrome; Pitt-Hopkins syndrome; Alzheimer's disease.

Donna Murasko, PhD (*Penn State Hershey Medical Center*) *Dean, College of Arts and Sciences*. Professor. The effects of aging on the adaptive immune response to influenza virus and retrovirus latency and reactivation.

Michael O'Connor, MD, PhD (*MD, Johns Hopkins University; PhD, Colorado State*). Associate Professor. Biophysical and physiological ecology, thermoregulation of vertebrates, ecological modeling.

Ryan Petrie, PhD (*McGill University*). Assistant Professor. Mechanisms of cell movement through three-dimensional extracellular matrix.

Jerome Ricard, PhD (*University Joseph Fourier, Grenoble, France*). Research Assistant Professor. Inflammation and cell death after spinal cord injury. Regulation of cell death by Eph receptors.

Jacob Russell, PhD (*University of Arizona*). Associate Professor. Microbiomes and metagenomics; ecology and evolution of symbiosis.

Nianli Sang, MB, PhD (*M.B., Fudan University Shanghai Medical College; Ph.D., Thomas Jefferson University*) *Co-Director of the Cell Imaging Center*. Associate Professor. Molecular and cellular biology of cancer; posttranslational modification, folding and quality control of proteins and their implication in cell physiology and human diseases.

Aleister Saunders, PhD (*University of North Carolina, Chapel Hill*) *Senior Vice Provost for Research, Director of the RNAi Resource Center*.

Associate Professor. Identification and characterization of genes and proteins involved in Alzheimer's disease.

Kevin P.W. Smith, PhD (*Drexel University*). Assistant Teaching Professor. Linking behavioral ecology and organismal diversity, neonate behavior in herpetological models, STEM education.

Elias T. Spiliotis, PhD (*The Johns Hopkins University*) *Director of the Cell Imaging Center*. Associate Professor. Cell polarity and cell division: regulation of cytoskeleton-dependent motility.

Jennifer Stanford, PhD (*Harvard University*). Assistant Professor. Evaluating and improving approaches to teach STEM content in higher education environments to promote student learning, engagement in STEM courses, and STEM student retention.

Monica M. Togna, PhD (*New Jersey Institute of Technology*). Assistant Teaching Professor. Examination of the structure and function of living organisms from the cellular to the organismal level in order to better understand common physiological processes.

Emeritus Faculty

Cecilie Goodrich, PhD (*Harvard University*). Professor Emeritus. Neuroscience and systems physiology, postnatal maturation of physiology and behavior in relation to brain immunocytochemistry.

Chemistry

Major: Chemistry

Degree Awarded: Bachelor of Arts (BA) or Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: BA -184.5; BS - 190.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 40.0501

Standard Occupational Classification (SOC) code: 19-2031

About the Program

Drexel's Department of Chemistry offers both a BA and a BS degree in chemistry. The BA is offered as a 4-year non-co-op program for those interested in following their undergraduate education in chemistry with professional school, such as law or medicine. The BS degree, offered in three formats (a 5-year three co-op, 4-year one co-op and a 4-year non-co-op), is certified by the American Chemical Society. In addition, a minor in chemistry is available for students in other majors who desire a strong physical science background.

Each student plans a course of study and selects electives in consultation with an advisor in the Department of Chemistry (<http://www.drexel.edu/coas/academics/departments-centers/chemistry>). Students who show initiative and laboratory ability are encouraged to participate in undergraduate research by selecting a research problem in collaboration with one of the departmental faculty members. Students in the BS program are required to participate in undergraduate research through the Senior Research courses.

Most graduate courses in chemistry are open to qualified seniors. Prerequisites and descriptions of available graduate courses appear in the graduate catalog.

About the Accelerated Bachelor's/Master's Dual Degree Program in Chemistry

The Bachelor's/Master's (BS/MS) dual degree program is an accelerated program providing the academically qualified student with an opportunity to earn both a BS and an MS degree (two diplomas are awarded) in five years, the time normally required to finish the co-op option BS degree alone.

This is an academically demanding program, but there are several allowances built in to enable the program to be completed in the time allotted. For instance, only 180 rather than 190.5 undergraduate quarter credits are required. The co-op experience may be adjusted; the student may take two rather than three co-op cycles, enabling two additional quarters of on-campus study. If needed, the student may also take evening courses while on co-op.

Eligibility

Exceptional students with a cumulative grade point average of at least 3.0 and who are enrolled in the five-year co-op option program are eligible for the BS/MS program. Students formally apply to the program after they have completed 90 credits but before they have completed 120 credits. Students are strongly encouraged to begin planning for the program as early as their freshman year. Students who have more than 120 credits are not eligible.

Transfer students are eligible to join the BS/MS program, but they must be able to complete the program in the time it would take to complete the BS degree alone. International transfer students must be able to meet the required minimum TOEFL score for the department graduate program (currently 550) in order to be admitted to the BS/MS program.

Application Process

Interested applicants need to formally apply to the program. Applications are available in the Office of Graduate Admissions or in the College of Arts & Sciences advisor's office. Applications must be accompanied by a Plan of Study prepared in consultation with the undergraduate and graduate advisor in the department and approved by both the Department Head and the Dean. Entry into the program must be officially approved by both the Department Head and Academic Dean.

BS/MS Requirements

Students enrolled in the BS/MS dual degree program must complete 180 undergraduate quarter credits for the BS degree and at least 45 graduate quarter credits for the MS degree. All graduate departmental requirements must be satisfied in full, including producing a thesis, if the thesis-option Master's program is elected. Master's thesis requirements may be completed in the summer term of the final year with prior approval of the department. Students in the BS/MS program must maintain a cumulative GPA of 3.0 in their undergraduate and graduate coursework to remain in the program. Further questions about the BS/MS degree program should be directed to the departmental graduate advisor.

Additional Information

For more information about the major in chemistry, contact:

Daniel King, PhD
Undergraduate Affairs Committee Chair
Department of Chemistry
Drexel University
dk68@drexel.edu

Degree Requirements (BA)

General Education Requirements *

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV S101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Humanities and Arts electives		6.0
International Studies electives		6.0
Social and Behavioral Studies electives		6.0
Studies in Diversity electives		6.0
Language Requirements courses		8.0
CHEM 121	Majors Chemistry I	5.0
CHEM 122	Majors Chemistry II	5.0
CHEM 123	Majors Chemistry III	5.5
CHEM 230	Quantitative Analysis	4.0
CHEM 231 [WI]	Quantitative Analysis Laboratory	2.0
CHEM 246	Organic Chemistry for Majors I	6.5
CHEM 248	Organic Chemistry for Majors II	6.5
CHEM 249	Organic Chemistry for Majors III	7.0
CHEM 253	Thermodynamics and Kinetics	4.0
CHEM 270	Software Skills for Chemists	3.0
CHEM 357 [WI]	Physical Chemistry Laboratory I	2.5
CHEM 367	Chemical Information Retrieval	3.0
CHEM 421	Inorganic Chemistry I	3.0

Chemistry Electives **

Select two Chemistry Electives **	6.0
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Biology Requirements

BIO 122	Cells and Genetics	4.5
BIO 124	Evolution & Organismal Diversity	4.5
BIO 126	Physiology and Ecology	4.5

Mathematics Requirements

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0

Physics Requirements

PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0

Free Electives

Free electives	36.0
Total Credits	184.5

* Categories of Electives:

- **Humanities and Arts Electives**
Designated courses in art, art history, communication studies, foreign languages (300-level or above), history, literature, music, philosophy, religion, and theatre arts.
- **International Electives**
Designated courses in anthropology, art history, history, literature, music, politics and sociology. Courses with an international focus may be used to fulfill requirements in other categories as well.
- **Social and Behavioral Studies Electives**
Designated courses in anthropology, criminal justice, economics, international relations, history, politics, psychology and sociology.
- **Studies in Diversity Electives**
Africana studies, women's studies or designated cross-listed courses in anthropology, art, art history, history, literature, music, philosophy, politics and sociology.
- **Language Requirement**
Students may satisfy the language course requirements in two ways: (1) taking two terms of sequential study of a foreign language (or placement at the exit level of 103 or above); or (2) taking two terms of a computer language or placement out as determined by the Department of Computer Science.

** Courses with CHEM prefix, although ENVS chemistry courses can also fulfill this requirement.

Sample Plan of Study (BA)

Four-year Non-Co-op

Term 1		Credits
BIO 122	Cells and Genetics	4.5
CHEM 121	Majors Chemistry I	5.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV S101	The Drexel Experience	1.0
Term Credits		17.5
Term 2		
BIO 124	Evolution & Organismal Diversity	4.5
CHEM 122	Majors Chemistry II	5.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
CIVC 101	Introduction to Civic Engagement	1.0
Term Credits		17.5
Term 3		
BIO 126	Physiology and Ecology	4.5
CHEM 123	Majors Chemistry III	5.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
Term Credits		17.0
Term 4		
CHEM 230 *	Quantitative Analysis	4.0
CHEM 231 [WI] *	Quantitative Analysis Laboratory	2.0
CHEM 246	Organic Chemistry for Majors I	6.5
Free elective		3.0
Term Credits		15.5
Term 5		
CHEM 248	Organic Chemistry for Majors II	6.5
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		14.5
Term 6		
CHEM 249	Organic Chemistry for Majors III	7.0
PHYS 102	Fundamentals of Physics II	4.0

Humanities electives		6.0
Term Credits		17.0
Term 7		
CHEM 253	Thermodynamics and Kinetics	4.0
CHEM 367	Chemical Information Retrieval	3.0
CHEM 421	Inorganic Chemistry I	3.0
PHYS 201	Fundamentals of Physics III	4.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Term Credits		15.0
Term 8		
CHEM 270	Software Skills for Chemists	3.0
CHEM 357 [WI]	Physical Chemistry Laboratory I	2.5
International Studies elective		3.0
Diversity Studies elective		3.0
Language course		4.0
Term Credits		15.5
Term 9		
Diversity Studies elective		3.0
Social and Behavioral Sciences elective		3.0
International Studies elective		3.0
Language course		4.0
Term Credits		13.0
Term 10		
Social and Behavioral Sciences elective		3.0
Free electives		12.0
Term Credits		15.0
Term 11		
Chemistry elective		3.0
Free elective		12.0
Term Credits		15.0
Term 12		
Free electives		12.0
Term Credits		12.0
Total Credit: 184.5		

* CHEM 230 and CHEM 231 must be taken concurrently.

Degree Requirements (BS)

General Education Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV S101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Technical electives *		6.0
Liberal Studies electives *		6.0

Chemistry Requirements

CHEM 121	Majors Chemistry I	5.0
CHEM 122	Majors Chemistry II	5.0
CHEM 123	Majors Chemistry III	5.5
CHEM 230	Quantitative Analysis	4.0
CHEM 231 [WI]	Quantitative Analysis Laboratory	2.0
CHEM 246	Organic Chemistry for Majors I	6.5
CHEM 248	Organic Chemistry for Majors II	6.5
CHEM 249	Organic Chemistry for Majors III	7.0
CHEM 253	Thermodynamics and Kinetics	4.0
CHEM 270	Software Skills for Chemists	3.0
CHEM 346	Qualitative Organic Chemistry	5.5
CHEM 355	Physical Chemistry IV	3.0

CHEM 357 [WI]	Physical Chemistry Laboratory I	2.5
CHEM 358	Physical Chemistry Laboratory II	2.5
CHEM 359	Atomic and Molecular Spectroscopy	3.0
CHEM 367	Chemical Information Retrieval	3.0
CHEM 420	Molecular Symmetry and Group Theory Applied Chemistry	3.0
CHEM 421	Inorganic Chemistry I	3.0
CHEM 422	Inorganic Chemistry II	3.0
CHEM 425	Inorganic Chemistry Laboratory	4.0
CHEM 430	Analytical Chemistry I	3.0
CHEM 431 [WI]	Analytical Chemistry II	4.0
CHEM 493	Senior Research Project	9.0
Biology Requirements		
BIO 122	Cells and Genetics	4.5
BIO 214	Principles of Cell Biology	3.0
Biochemistry Requirements **		
BIO 311	Biochemistry	4.0
or BIO 404	Structure and Function of Biomolecules	
BIO 306	Biochemistry Laboratory	2.0
Computer/Mathematics Requirements		
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	4.0
or MATH 210	Differential Equations	
Physics Requirements		
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
Free Electives		
Free electives		24.0
Total Credits		190.5

Footnotes

* Technical electives are defined as 200+ level courses from Science, Mathematics, Business, Engineering or Information Studies. Liberal studies electives are defined as courses (at any level) from all other areas.

** The American Chemical Society requires ACS-certified students to take a specified number of biochemistry courses. To fulfill this requirement in the BS curriculum, you should take a combination of one lecture and one lab course from the choice of: BIO 311, BIO 306 or BIO 404 to fulfill the biochemistry requirement. Students may also choose to take the two lecture courses (BIO 404 and BIO 311) rather than a lecture/laboratory combination.

Sample Plans of Study (BS)**Five-year Co-op**

(See below this plan for Four-year Non-Co-op and One-Co-op options)

Term 1		Credits
BIO 122	Cells and Genetics	4.5
CHEM 121	Majors Chemistry I	5.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV S101	The Drexel Experience	1.0
	Term Credits	17.5
Term 2		
CHEM 122	Majors Chemistry II	5.0

ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
	Term Credits	17.0
Term 3		
CHEM 123	Majors Chemistry III	5.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
PHYS 102	Fundamentals of Physics II	4.0
	Term Credits	16.5
Term 4		
CHEM 230 *	Quantitative Analysis	4.0
CHEM 231 [WI] *	Quantitative Analysis Laboratory	2.0
CHEM 246	Organic Chemistry for Majors I	6.5
PHYS 201	Fundamentals of Physics III	4.0
	Term Credits	16.5
Term 5		
CHEM 248	Organic Chemistry for Majors II	6.5
MATH 200	Multivariate Calculus	4.0
Free elective		3.0
	Term Credits	13.5
Term 6		
BIO 214	Principles of Cell Biology	3.0
CHEM 249	Organic Chemistry for Majors III	7.0
CHEM 253	Thermodynamics and Kinetics	4.0
MATH 210	Differential Equations	4.0
or 201	Linear Algebra	
	Term Credits	18.0
Term 7		
CHEM 270	Software Skills for Chemists	3.0
CHEM 357 [WI]	Physical Chemistry Laboratory I	2.5
Technical elective ***		3.0
Free electives		6.0
	Term Credits	14.5
Term 8		
CHEM 355	Physical Chemistry IV	3.0
CHEM 367	Chemical Information Retrieval	3.0
CHEM 421	Inorganic Chemistry I	3.0
CHEM 430	Analytical Chemistry I	3.0
UNIV S201	Looking Forward: Academics and Careers	1.0
	Term Credits	13.0
Term 9		
CHEM 359	Atomic and Molecular Spectroscopy	3.0
CHEM 420	Molecular Symmetry and Group Theory Applied Chemistry	3.0
CHEM 431 [WI]	Analytical Chemistry II	4.0
Technical elective ***		3.0
Free elective		3.0
	Term Credits	16.0
Term 10		
BIO 311	Biochemistry	4.0
or 404	Structure and Function of Biomolecules	
CHEM 346	Qualitative Organic Chemistry	5.5
CHEM 493	Senior Research Project	3.0
CHEM 358	Physical Chemistry Laboratory II	2.5
	Term Credits	15.0
Term 11		
BIO 306	Biochemistry Laboratory	2.0
CHEM 493	Senior Research Project	3.0
Liberal Studies electives		6.0

Free electives		6.0
	Term Credits	17.0
Term 12		
CHEM 422	Inorganic Chemistry II	3.0
CHEM 425	Inorganic Chemistry Laboratory	4.0
CHEM 493	Senior Research Project	3.0
Free electives		6.0
	Term Credits	16.0

Total Credit: 190.5

BS in Chemistry: Four-year Non-Co-op

Term 1		Credits
BIO 122	Cells and Genetics	4.5
CHEM 121	Majors Chemistry I	5.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV S101	The Drexel Experience	1.0
	Term Credits	17.5

Term 2		Credits
CHEM 122	Majors Chemistry II	5.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
	Term Credits	17.0

Term 3		Credits
CHEM 123	Majors Chemistry III	5.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
PHYS 102	Fundamentals of Physics II	4.0
	Term Credits	16.5

Term 4		Credits
CHEM 230*	Quantitative Analysis	4.0
CHEM 231 [WI]*	Quantitative Analysis Laboratory	2.0
CHEM 246	Organic Chemistry for Majors I	6.5
PHYS 201	Fundamentals of Physics III	4.0
	Term Credits	16.5

Term 5		Credits
CHEM 248	Organic Chemistry for Majors II	6.5
MATH 200	Multivariate Calculus	4.0
Free elective		6.0
	Term Credits	16.5

Term 6		Credits
BIO 214	Principles of Cell Biology	3.0
CHEM 249	Organic Chemistry for Majors III	7.0
MATH 210	Differential Equations or 201 Linear Algebra	4.0
Technical elective***		3.0
	Term Credits	17.0

Term 7		Credits
CHEM 253	Thermodynamics and Kinetics	4.0
CHEM 367	Chemical Information Retrieval	3.0
CHEM 421	Inorganic Chemistry I	3.0
CHEM 430	Analytical Chemistry I	3.0
UNIV S201	Looking Forward: Academics and Careers	1.0
	Term Credits	14.0

Term 8		Credits
CHEM 270	Software Skills for Chemists	3.0
CHEM 357 [WI]	Physical Chemistry Laboratory I	2.5
CHEM 420	Molecular Symmetry and Group Theory Applied Chemistry	3.0

CHEM 431 [WI]	Analytical Chemistry II	4.0
Free elective		3.0
	Term Credits	15.5

Term 9		Credits
Liberal Studies elective		3.0
Technical elective***		3.0
Free electives		9.0
	Term Credits	15.0

Term 10		Credits
BIO 311 or 404	Biochemistry Structure and Function of Biomolecules	4.0
CHEM 346	Qualitative Organic Chemistry	5.5
CHEM 355	Physical Chemistry IV	3.0
CHEM 493	Senior Research Project	3.0
	Term Credits	15.5

Term 11		Credits
BIO 306	Biochemistry Laboratory	2.0
CHEM 359	Atomic and Molecular Spectroscopy	3.0
CHEM 493	Senior Research Project	3.0
Liberal Studies elective		3.0
Free elective		3.0
	Term Credits	14.0

Term 12		Credits
CHEM 358	Physical Chemistry Laboratory II	2.5
CHEM 422	Inorganic Chemistry II	3.0
CHEM 425	Inorganic Chemistry Laboratory	4.0
CHEM 493	Senior Research Project	3.0
Free elective		3.0
	Term Credits	15.5

Total Credit: 190.5

BS in Chemistry: Four-year One Co-op

Term 1		Credits
BIO 122	Cells and Genetics	4.5
CHEM 121	Majors Chemistry I	5.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV S101	The Drexel Experience	1.0
	Term Credits	17.5

Term 2		Credits
CHEM 122	Majors Chemistry II	5.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
	Term Credits	17.0

Term 3		Credits
CHEM 123	Majors Chemistry III	5.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
PHYS 102	Fundamentals of Physics II	4.0
	Term Credits	16.5

Term 4		Credits
CHEM 230*	Quantitative Analysis	4.0
CHEM 231 [WI]*	Quantitative Analysis Laboratory	2.0
CHEM 246	Organic Chemistry for Majors I	6.5
PHYS 201	Fundamentals of Physics III	4.0
	Term Credits	16.5

Term 5		Credits
CHEM 248	Organic Chemistry for Majors II	6.5

MATH 200	Multivariate Calculus	4.0
Electives		6.0
Term Credits		16.5
Term 6		
BIO 214	Principles of Cell Biology	3.0
CHEM 249	Organic Chemistry for Majors III	7.0
MATH 210 or 201	Differential Equations Linear Algebra	4.0
Technical Elective ***		3.0
Term Credits		17.0
Term 7		
Free Electives		9.0
Liberal Studies Elective		3.0
Technical Elective ***		3.0
Term Credits		15.0
Term 8		
CHEM 253	Thermodynamics and Kinetics	4.0
CHEM 367	Chemical Information Retrieval	3.0
CHEM 421	Inorganic Chemistry I	3.0
CHEM 430	Analytical Chemistry I	3.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Term Credits		14.0
Term 9		
CHEM 270	Software Skills for Chemists	3.0
CHEM 357 [WI]	Physical Chemistry Laboratory I	2.5
CHEM 420	Molecular Symmetry and Group Theory Applied Chemistry	3.0
CHEM 431 [WI]	Analytical Chemistry II	4.0
Elective		3.0
Term Credits		15.5
Term 10		
BIO 311 or 404	Biochemistry Structure and Function of Biomolecules	4.0
CHEM 346	Qualitative Organic Chemistry	5.5
CHEM 355	Physical Chemistry IV	3.0
CHEM 493	Senior Research Project	3.0
Term Credits		15.5
Term 11		
BIO 306	Biochemistry Laboratory	2.0
CHEM 359	Atomic and Molecular Spectroscopy	3.0
CHEM 493	Senior Research Project	3.0
Free Elective		3.0
Liberal Studies Elective		3.0
Term Credits		14.0
Term 12		
CHEM 358	Physical Chemistry Laboratory II	2.5
CHEM 422	Inorganic Chemistry II	3.0
CHEM 425	Inorganic Chemistry Laboratory	4.0
CHEM 493	Senior Research Project	3.0
Free Elective		3.0
Term Credits		15.5
Total Credit: 190.5		

* CHEM 230 and CHEM 231 must be taken concurrently.

** *Biochemistry Requirement:* The American Chemical Society requires ACS-certified students to take a specified number of biochemistry courses. To fulfill this requirement in the BS curriculum, you should take a combination of one lecture and one lab course from the choice of: BIO 311, BIO 306 or BIO 404 to fulfill the biochemistry requirement. Students may also choose to take the two lecture courses (BIO 404 and BIO 311) rather than a lecture/laboratory combination. Note that the courses BIO 122 and BIO 214 are required in order to provide adequate background in biology for taking these upper-level biochemistry courses.

*** Must be at a 200+ level. See Degree Requirements for more information on acceptable classes.

Co-op/Career Opportunities

Opportunities for chemistry majors include working in research and development in corporate and government laboratories in the chemical, pharmaceutical and agricultural (e.g., U.S. Department of Agriculture) sectors. There is a remarkably high concentration of chemical and pharmaceutical companies in the Philadelphia region. Other options include entering medical, dental, law, or other professional schools.

The major in chemistry is sufficiently flexible to allow students to prepare to teach at the secondary level. With proper selection of electives, students can meet teacher certification requirements.

Sample Co-op Opportunities

A five-year co-op degree is offered. When students complete their co-op jobs, they are asked to write an overview of their experiences. These brief quotes are taken from some recent student reports:

Assistant chemist, pharmaceuticals manufacturer: "My position involved the synthesis and characterization of target compounds in the endothelium project. Involved the development of synthetic routes to the prescribed target. This would include the investigation of reactions which were going to be used. . . .the position was very independent. . .great working environment. "

Co-op chemist, petroleum refiner: "Performed synthesis of ligands and metal complexes. Operated FT-IR spectrometer for sample analysis. Submitted samples for analysis by mass spectrometer and NMR. . . .The position allowed me to develop the skills necessary for independent research in organic synthesis. "

Assistant lab technician, pharmaceuticals manufacturer: "I was an assistant technician in a mass spectrometry lab. . . . I was responsible for the development of SDS-gel electrophoresis techniques for gels and gel membranes. . . . I developed the methods independently and my employer encouraged me to be an expert on the technique and explore any method I found that would benefit the lab. "

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Chemistry

The academic minor program in chemistry is designed to expose students to each of the major sub-disciplines of chemistry (analytical, inorganic, organic, and physical). In order to accomplish this students take a total of at least 27.5 credits of chemistry past the freshman year (100 level courses).

As chemistry is an experimental science at least two laboratory courses must be included in the group of courses taken for the minor. Students should note that their academic major may require certain chemistry courses that can also be used to fulfill the requirements for a minor in chemistry.

Required Courses

CHEM 241	Organic Chemistry I	4.0
CHEM 230	Quantitative Analysis	4.0
CHEM 253	Thermodynamics and Kinetics *	4.0
CHEM 421	Inorganic Chemistry I	3.0
CHEM 244	Organic Chemistry Laboratory I	3.0
Chemistry Electives **		9.5
Total Credits		27.5

* May substitute CHEC 352 Physical Chemistry and Applications II (4 credits) or CHEC 353 Physical Chemistry and Applications III (4 credits) for the CHEM 253 Thermodynamics and Kinetics requirement.

** The 9.5 credits of chemistry electives must include at least one additional laboratory course. These electives are selected from any of the regularly offered chemistry department lecture or laboratory courses 200-level and above according to your specific interests. Note that existing course pre-requisites may affect which courses may be selected. The variable credit courses CHEM 493 Senior Research Project or CHEM 497 Research (Undergraduate) may also be used to fulfill either the lecture or laboratory requirements for the minor.

Additional Information

For more information about the minor in chemistry, contact:

Daniel King, PhD
Undergraduate Affairs Committee Chair
Department of Chemistry
Drexel University
dk68@drexel.edu

Facilities

There are nine undergraduate teaching laboratories in the department: three freshman Chemistry labs, three Organic Chemistry labs, a Physical Chemistry lab, an Analytical Instrumentation Laboratory and a combined Analytical/Inorganic Chemistry lab.

Mass Spectrometry Laboratory

The department maintains a professionally staffed mass spectrometry facility available to all members of the university community. Currently available instrumentation consists of a Waters Autospec M high resolution magnetic-sector mass spectrometer, a Bruker Autoflex III MALDI Time-of-Flight Mass Spectrometer, a Thermo LTQ-FT Fourier Transform Mass Spectrometer, a Sciex API-3000 triple-quadrupole mass spectrometer, and a Varian Saturn 2000 Gas Chromatograph/Ion-trap mass spectrometer system.

Nuclear Magnetic Resonance Laboratory

The professionally staffed Chemistry Department NMR facility is equipped with 300MHz and 500MHz Varian Unity INNOVA NMR systems; both instruments have multi-nuclear capability. The probe on the 500MHz instrument is a cryogenically cooled triple resonance model (1H {13C/15N}) suitable for protein analysis. A Varian X-band 12" EPR spectrometer is also available.

Analytical Instrumentation Laboratory

The open-access departmental Analytical Instrumentation Laboratory includes two Perkin-Elmer (PE) Spectrum One Fourier-transform infrared absorption spectrometers each with a universal diamond ATR accessory, a PE Lambda-35 UV/visible spectrometer, a PE Lambda-950 UV/visible/NIR spectrometer with a 60-mm-diameter diffuse reflectance integrating sphere, a PE model 343 polarimeter, a PE LS55B luminescence spectrometer, a PE Clarus 500 capillary-column GC with dual FID detectors, a Clarus 500 capillary-column GC/MS system (with electron impact capability), a PE Series 200 Quaternary HPLC development system with UV/visible photodiode array detector, a PE Series 200 binary HPLC system interfaced to a Sciex 2000 triple-quadrupole mass spectrometer, a PE Series 2000 binary Gel Permeation Chromatography system with refractive index detector, and a Varian AA240FS flame atomic absorption spectrometer equipped with a GTA 120 Graphite Furnace Accessory.

Organic Instrumentation Laboratory

The Organic Instrumentation Laboratory (co-located with the organic synthesis teaching laboratories in the Papdakis Integrated Sciences Building) is equipped with two Perkin-Elmer (PE) Spectrum Two Fourier-transform infrared absorption spectrometers each with a universal diamond ATR accessory, a PE Clarus 500 capillary-column GC with one FID and one TCD detector, and an Anasazi EFT-90 FT-NMR system.

Other Departmental Facilities

The department has a VEECO INNOVA N3 Multimode Scanning Probe Microscope and also maintains a computational chemistry laboratory equipped with nine Dell Optiplex 790 computers running Hyperchem v 8.0. Research laboratories for each of the department faculty members are located in Disque and Stratton Halls. Instrumentation available in the research laboratories is described on individual faculty web pages. Full-time professional support includes an electronic instrument specialist (for NMR and MS- Chemistry Department), a glassblower (Chemistry Department), two electronics specialists (College of Arts & Sciences Electronics Shop), and four machinists (Drexel University Machine Shop).

Chemistry Faculty

Anthony W. Addison, PhD (*University of Kent at Canterbury, England*). Professor. Design and synthesis of novel biomimetic and oligonuclear chelates of copper, nickel, iron, ruthenium and vanadium; their interpretation by magnetochemical, electrochemical and spectroscopic methods, including electron spin resonance; CD and ESR spectroscopy and kinetics for elucidation of molecular architecture of derivatives (including NO) of oxygen-binding and electron-transfer heme- and non-heme iron metalloproteins of vertebrate and invertebrate origins; energy-transfer by Ru, Ir and lanthanide-containing molecules and assemblies.

Jason Cross, PhD (*University of Surrey (UK)*). Assistant Teaching Professor. Luminescent lanthanide complexes

Peter DeCarlo, PhD (*University of Colorado*). Assistant Professor. Outdoor air quality, particulate matter size and composition instrumentation and measurements, source apportionment of ambient particulate matter, climate impacts of particulate matter.

Aaron Fafarman, PhD (*Stanford University*). Assistant Professor. Photovoltaic energy conversion; solution-based synthesis of semiconductor thin films; colloidal nanocrystals; electromodulation and photomodulation spectroscopy.

Fraser Fleming, PhD (*University of British Columbia (Canada)*)
Department Head, Chemistry. Professor. Nitriles, Isonitriles,
 Stereochemistry, Organometallics

Joe P. Foley, PhD (*University of Florida*) *Associate Department Head*.
 Professor. Separation science, especially the fundamentals and
 biomedical/pharmaceutical applications of the following voltage- or
 pressure-driven separation techniques: capillary electrophoresis (CE),
 electrokinetic chromatography, supercritical fluid chromatography, and
 high-performance and two-dimensional liquid chromatography (LC).
 Within these techniques, we explore novel separation modes (e.g.,
 dual-opposite-injection CE and sequential elution LC), novel surfactant
 aggregate pseudophases, and chiral separations.

Lee Hoffman, PhD (*Flinders University, Adelaide, South Australia*).
 Assistant Teaching Professor. Interfacial studies on the self-assembly of
 natural organic materials, understanding the nature of each component,
 and development of a mechanism describing this process; Dendrimer/
 metal nanocomposite design and synthesis hosting metal nanoparticles,
 utilizing the multivalent dendritic polymer architecture for further
 exploitation with other molecules such as antibodies and other targeting
 species.

Monica Ilies, PhD (*Polytechnic University of Bucharest*). Assistant
 Teaching Professor.

Haifeng Frank Ji, PhD (*Chinese Academy of Sciences*). Professor.
 Chemistry Micromechanical sensors for biological and
 environmental applications; Nanomechanical drug screening technology.

Daniel B. King, PhD (*University of Miami*). Associate Professor.
 Assessment of active learning methods and technology in chemistry
 courses; incorporation of environmental data into chemistry classroom
 modules; development of hands-on activities and laboratory experiments.

Daniel A. Kleier, PhD (*University of Notre Dame*). Associate Teaching
 Professor.

Molly O'Connor, PhD (*Drexel University*). Assistant Teaching Professor.
 Synthesis and characterization of chiral and achiral metal complexes with
 novel multidentate ligands.

Kevin G. Owens, PhD (*Indiana University*). Associate Professor. Mass
 spectrometry research, including the development of sample preparation
 techniques for quantitative analysis and mass spectrometric imaging
 using matrix-assisted laser desorption/ionization (MALDI) time-of-flight
 mass spectrometry (TOFMS) techniques for both biological and synthetic
 polymer systems, the development of laser spectroscopic techniques
 for combustion analysis, and the development of correlation analysis
 and other chemometric techniques for automating the analysis of mass
 spectral information.

Lynn S. Penn, PhD (*Bryn Mawr College*). Professor. Surface modification
 for specific applications: chemically derivatize metal and ceramic solid
 surfaces; designing and executing sequential chemical processes,
 building complex and layered structures on surfaces, with specific focus
 on behavior of polymer brushes (investigating the fundamental transport-
 selective behavior of polymer brushes because of potential in drug
 delivery, biomedical devices and as an explanation of some biological
 processes).

Reinhard Schweitzer-Stenner, PhD (*Universitat Bremen (Germany)*).
 Professor. Exploring conformational ensembles of unfolded or partially
 folded peptides and proteins; determining the parameters governing

peptide self-aggregation; structure and function of heme proteins;
 investigating protein-membrane interactions; use of IR, VCD, Raman,
 NMR and absorption spectroscopy for structure analysis.

Karl Sohlberg, PhD (*University of Delaware*). Associate Professor.
 Chemistry Computational and theoretical materials-related
 chemistry: (1) complex catalytic materials; (2) mechanical and electrical
 molecular devices.

Peter A. Wade, PhD (*Purdue University*). Associate Professor. Exploration
 of a newly discovered [3,3]-sigmatropic rearrangement in which O-
 allyl nitronic esters are thermally converted to α,β -unsaturated nitro
 compounds; development and exploitation of a carbon-based hemiacetal
 mimic; and exploration of cycloaddition reactions involving nitroethylene
 derivatives and novel nitrile oxides.

Anthony Wambsgans, PhD (*Rice University*). Associate Teaching
 Professor.

Jun Xi, PhD (*Cornell University*). Associate Teaching Professor.
 Biomacromolecular interactions both in solution and in confined
 environment; mechanisms of DNA replication and DNA repair; structure
 and function of molecular chaperones; drug target identification and new
 therapeutic development; single molecule enzymology; DNA directed
 organic synthesis.

Emeritus Faculty

Amar Nath, PhD (*Moscow State University, Moscow USSR*). Professor
 Emeritus.

Communication

Major: Communication

Degree Awarded: Bachelor of Science (BS) or Bachelor of Arts (BA)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No

Co-op (Four years)

*Classification of Instructional Programs (CIP) code: 09.0401; 09.0900;
 09.0908; 09.9999; 23.1303*

*Standard Occupational Classification (SOC) code: 11-2011; 11-2031;
 27-3022; 27-3041; 27-3042; 27-3043*

About the Program

The Communication department offers a major in communication, with
 concentrations in public relations, journalism, technical and science
 communication, and an open, flexible track.

The department is committed to helping students become broadly
 educated and professionally competent individuals. Students are
 exposed to a variety of media and are guided in the development of their
 interpretive and expressive skills.

All communication majors take a common core of courses that emphasize
 communication theory and methods. They then specialize in one of
 three concentrations. Students in the public relations concentration
 pursue careers in public relations, event planning, media relations, and
 corporate communication. Those who choose the technical and science
 communication concentration go on to work in technical writing, science
 writing, publishing, and software and hardware documentation. Journalism
 students pursue careers in journalism and news. Many communication

graduates also go on to law school, to business school for an MBA, or to graduate school.

Students who elect the public relations concentration have the option of pursuing either a bachelor of arts degree or a bachelor of science degree. Students who elect the technical and science communication concentration must pursue the bachelor of science degree. Students in journalism must complete the requirements for the bachelor of arts degree. Students in the open track complete the requirements for the bachelor of arts degree.

Degree Requirements: Journalism (BA)

Journalism provides students with the skills and theoretical perspective they need to be a journalist in today's swiftly changing media environment. An extension of the program's core curriculum, the concentration hones the student's ability to write, edit, and produce audiovisual content while at the same time exposing the student to new and evolving aspects of the field.

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Two mathematics courses		6.0-8.0
Two science courses		6.0-8.0
Foreign language courses *		7.0-15.0
Humanities and fine arts		12.0
Social and behavioral sciences		9.0
International studies		6.0
Studies in diversity		6.0

Communication Core Requirements

Theory Sequence

COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0
COM 210	Theory and Models of Communication	3.0
COM 400	Seminar in Communication	3.0
LING 101	Introduction to Linguistics	3.0
or LING 102	Language and Society	

Methods Sequence

COM 220	Qualitative Research Methods	3.0
COM 221	Quantitative Research Methods in Communication	3.0

Additional Core Requirements

COM 230	Techniques of Speaking	3.0
COM 240	New Technologies In Communication	3.0
COM 491	Senior Project in Communication I	3.0
COM 492	Senior Project in Communication II	3.0
PHIL 305	Ethics and the Media	3.0

Journalism Concentration Requirements

COM 160	Introduction to Journalism	3.0
COM 181	Public Relations Principles and Theory	3.0
COM 261	Advanced Journalism	3.0
COM 266	Copy Editing for the Media	3.0
COM 315	Investigative Journalism	3.0
COM 365	Journalists, the Courts, and the Law	3.0
TVPR 220	TV News Writing	3.0

Additional Electives

Communication electives		18.0
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Free Electives	38.0
Total Credits	180.0-192.0

* At least one foreign language course must be at the 200-level.

Sample Plan of Study

Term 1		Credits
COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSY 101	General Psychology I	3.0
UNIV H101	The Drexel Experience	1.0
Foreign language course *		4.0
Term Credits		17.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Foreign language course *		3.0-4.0
Math course		3.0
Social science elective		3.0-4.0
Term Credits		13.0-15.0
Term 3		
COM 160	Introduction to Journalism	3.0
COM 230	Techniques of Speaking	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Humanities elective		3.0
Math course		3.0
Term Credits		15.0
Term 4		
COM 181	Public Relations Principles and Theory	3.0
COM 210	Theory and Models of Communication	3.0
COM 261	Advanced Journalism	3.0
Humanities elective		3.0
Science course		3.0
Term Credits		15.0
Term 5		
COM 220	Qualitative Research Methods	3.0
COM 365	Journalists, the Courts, and the Law	3.0
LING 101	Introduction to Linguistics	3.0
or 102	Language and Society	
Free elective		3.0
Science course		3.0
Term Credits		15.0
Term 6		
COM 221	Quantitative Research Methods in Communication	3.0
TVPR 220	TV News Writing	3.0
International or diversity elective		3.0
Free electives		6.0
Term Credits		15.0
Term 7		
COM 266	Copy Editing for the Media	3.0
PHIL 305	Ethics and the Media	3.0
COM elective		3.0
International or diversity elective		3.0
Free elective		3.0
Term Credits		15.0
Term 8		
COM 240	New Technologies In Communication	3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
COM elective		3.0

Humanities elective		3.0
Free electives		6.0
Term Credits		16.0
Term 9		
COM 315	Investigative Journalism	3.0
Free electives		6.0
COM elective		3.0
Social science elective		3.0-4.0
Term Credits		15.0-16.0
Term 10		
COM 400	Seminar in Communication	3.0
COM elective		3.0
International or diversity elective		3.0
Free electives		6.0
Term Credits		15.0
Term 11		
COM 491	Senior Project in Communication I	3.0
COM elective		3.0
Social science elective		3.0-4.0
Humanities elective		3.0
Free electives		3.0
Term Credits		15.0-16.0
Term 12		
COM 492	Senior Project in Communication II	3.0
Free electives		5.0
COM elective		3.0
International or diversity elective		3.0
Term Credits		14.0

Total Credit: 180.0-184.0

* See degree requirements (p. 63).

Degree Requirements: Open Concentration (BA)

Students who select the open track take courses in all of the existing tracks, as well as other communication courses to prepare them for any communication-related career, or professional post-graduate options.

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Two mathematics courses		6.0
Two science courses		6.0
Foreign language courses *		8.0
Humanities/ fine arts		12.0
Social/behavioral science		9.0
International studies		6.0
Studies in diversity		6.0

Communication Core Requirements

Theory Sequence

COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0
COM 210	Theory and Models of Communication	3.0
COM 400	Seminar in Communication	3.0
LING 101	Introduction to Linguistics	3.0

or LING 102 Language and Society

Methods Sequence

COM 220	Qualitative Research Methods	3.0
COM 221	Quantitative Research Methods in Communication	3.0

Additional Core Requirements

COM 230	Techniques of Speaking	3.0
COM 240	New Technologies In Communication	3.0
COM 491	Senior Project in Communication I	3.0
COM 492	Senior Project in Communication II	3.0
PHIL 305	Ethics and the Media	3.0

Additional Breadth in COM

COM 160	Introduction to Journalism	3.0
COM 181	Public Relations Principles and Theory	3.0
COM 310 [WI]	Technical Communication	3.0
Two additional COM classes at 300 level or higher		6.0

Additional Electives

COM electives		24.0
Free electives		37.0
Total Credits		180.0

* At least one course must be at the 200 level or beyond.

Sample Plan of Study: Open Concentration (BA)

Term		Credits
Term 1		
COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSY 101	General Psychology I	3.0
UNIV H101	The Drexel Experience	1.0
Foreign language course		4.0
Term Credits		17.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Math course		3.0
Social science elective		3.0
Foreign language course *		4.0
Term Credits		14.0
Term 3		
COM 160	Introduction to Journalism	3.0
or 181	Public Relations Principles and Theory	
COM 230	Techniques of Speaking	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Humanities elective		3.0
Math course		3.0
Term Credits		15.0
Term 4		
COM 181	Public Relations Principles and Theory	3.0
or 160	Introduction to Journalism	
COM 210	Theory and Models of Communication	3.0
Science course		3.0
Free electives		6.0
Humanities elective		3.0
Term Credits		18.0
Term 5		
COM 220	Qualitative Research Methods	3.0
LING 102	Language and Society	3.0
Science course		3.0
Free elective		3.0

COM elective		3.0
Term Credits		15.0
Term 6		
COM 221	Quantitative Research Methods in Communication	3.0
COM 310 [WI]	Technical Communication	3.0
Free elective		3.0
COM elective		3.0
International or diversity elective		3.0
Term Credits		15.0
Term 7		
PHIL 305	Ethics and the Media	3.0
COM electives		6.0
Free elective		3.0
International or diversity elective		3.0
Term Credits		15.0
Term 8		
COM 240	New Technologies In Communication	3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Humanities elective		3.0
Free elective		3.0
COM electives		6.0
Term Credits		16.0
Term 9		
COM elective (above 300 level)		3.0
Free electives		6.0
Social science elective		3.0
International or diversity elective		3.0
Term Credits		15.0
Term 10		
COM 400	Seminar in Communication	3.0
Communication elective (above 300 level)		3.0
International or diversity elective		3.0
Free electives		7.0
Term Credits		16.0
Term 11		
COM 491	Senior Project in Communication I	3.0
Communication elective		3.0
Humanities elective		3.0
Social science elective		3.0
Free elective		3.0
Term Credits		15.0
Term 12		
COM 492	Senior Project in Communication II	3.0
Free electives		6.0
COM elective		3.0
Term Credits		12.0
Total Credit: 183.0		

* See degree requirements (p.).

Degree Requirements: Public Relations (BA)

The concentration in public relations covers a broad range of activities that help an organization and its public communicate with one another. The field includes public relations, media relations, event planning, publication design, employee and customer communication, and government relations.

Skills in this field include written, oral, and visual communication. A public relations specialist might be called on to write articles for an in-house newsletter, to research and write an annual report to shareholders, to

publicize a special event, to write a speech for an executive, to plan a press conference, to develop a media plan for an organization, or to script a video for an employee orientation session.

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Two mathematics courses		6.0-8.0
Two science courses		6.0-8.0
Foreign language courses *		8.0
Humanities/ fine arts		12.0
Social/behavioral sciences		9.0
International studies		6.0
Studies in diversity electives		6.0

Communication Core Requirements

Theory Sequence

COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0
COM 210	Theory and Models of Communication	3.0
COM 400	Seminar in Communication	3.0
LING 101	Introduction to Linguistics	3.0
or LING 102	Language and Society	

Methods Sequence

COM 220	Qualitative Research Methods	3.0
COM 221	Quantitative Research Methods in Communication	3.0

Additional Core Requirements

COM 230	Techniques of Speaking	3.0
COM 240	New Technologies In Communication	3.0
COM 491	Senior Project in Communication I	3.0
COM 492	Senior Project in Communication II	3.0
PHIL 305	Ethics and the Media	3.0

Public Relations Concentration Requirements

COM 160	Introduction to Journalism	3.0
COM 181	Public Relations Principles and Theory	3.0
COM 282 [WI]	Public Relations Writing	3.0
COM 284	Public Relations Research, Measurement and Evaluation	3.0
COM 286	Public Relations Strategies and Tactics	3.0
COM 386	Public Relations Campaign Planning	3.0
MKTG 201	Introduction to Marketing Management	4.0
Select one of the following Visual Communication courses:		3.0

COM 335 Electronic Publishing

COM 340 Desktop Publishing

Additional Electives

COM electives		15.0
Free electives		36.0

Total Credits 180.0-184.0

* At least one foreign language course must be at the 200-level or above.

Sample Plan of Study: Public Relations (BA)

Term 1		Credits
COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSY 101	General Psychology I	3.0
UNIV H101	The Drexel Experience	1.0
Foreign language course*		4.0
Term Credits		17.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Social science elective		3.0-4.0
Foreign language course*		3.0-4.0
Math course		3.0
Term Credits		13.0-15.0
Term 3		
COM 181	Public Relations Principles and Theory	3.0
COM 230	Techniques of Speaking	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Humanities elective		3.0
Math course		3.0
Term Credits		15.0
Term 4		
COM 160	Introduction to Journalism	3.0
COM 210	Theory and Models of Communication	3.0
Humanities elective		3.0
Science elective		3.0
Free elective		3.0
Term Credits		15.0
Term 5		
COM 220	Qualitative Research Methods	3.0
COM 282 [WI]	Public Relations Writing	3.0
LING 102	Language and Society	3.0
Science course		3.0
Free elective		3.0
Term Credits		15.0
Term 6		
COM 221	Quantitative Research Methods in Communication	3.0
COM 284	Public Relations Research, Measurement and Evaluation	3.0
International or diversity elective		3.0
Free electives		6.0
Term Credits		15.0
Term 7		
MKTG 201	Introduction to Marketing Management	4.0
PHIL 305	Ethics and the Media	3.0
COM elective		3.0
International or diversity elective		3.0
Free elective		3.0
Term Credits		16.0
Term 8		
COM 240	New Technologies In Communication	3.0
COM 286	Public Relations Strategies and Tactics	3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
COM elective		3.0
Humanities elective		3.0
Free elective		3.0
Term Credits		16.0
Term 9		
COM 340 or 335	Desktop Publishing Electronic Publishing	3.0
Free electives		6.0
COM elective		3.0
Social science elective		3.0-4.0
Term Credits		15.0-16.0

Term 10		
COM 386	Public Relations Campaign Planning	3.0
COM 400	Seminar in Communication	3.0
International or diversity elective		3.0
Free electives		6.0
Term Credits		15.0
Term 11		
COM 491	Senior Project in Communication I	3.0
COM elective		3.0
Social science elective		3.0-4.0
Humanities elective		3.0
Free elective		3.0
Term Credits		15.0-16.0
Term 12		
COM 492	Senior Project in Communication II	3.0
COM elective		3.0
International or diversity elective		3.0
Free elective		4.0
Term Credits		13.0
Total Credit: 180.0-184.0		

* See degree requirements (p.).

Degree Requirements: Public Relations (BS)

The concentration public relations covers a broad range of activities that help an organization and its publics communicate with one another. The field includes public relations, media relations, event planning, publication design, employee and customer communication, and government relations.

Skills in this field include written, oral, and visual communication. A public relations specialist might be called on to write articles for an in-house newsletter, to research and write an annual report to shareholders, to publicize a special event, to write a speech for an executive, to plan a press conference, to develop a media plan for an organization, or to script a video for an employee orientation session.

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Humanities and fine arts		12.0
Social science		9.0
International studies		6.0
Studies in diversity		6.0
Select one of the following Science Sequences:		8.0

Biology Sequence

BIO 107 Cells, Genetics & Physiology

BIO 108 Cells, Genetics and Physiology Laboratory

BIO 109 Biological Diversity, Ecology & Evolution

BIO 110 Biological Diversity, Ecology and Evolution Laboratory

Chemistry Sequence

CHEM 111 General Chemistry I

CHEM 112 General Chemistry II

Physics Sequence

PHYS 103	General Physics I	
PHYS 104	General Physics II	
Select one of the following Mathematics Sequences		8.0
Analysis Sequence		
MATH 101	Introduction to Analysis I	
MATH 102	Introduction to Analysis II	
Calculus Sequence		
MATH 121	Calculus I	
MATH 122	Calculus II	
Communication Core Requirements		
Theory Sequence		
COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0
COM 210	Theory and Models of Communication	3.0
COM 400	Seminar in Communication	3.0
LING 101	Introduction to Linguistics	3.0
or LING 102	Language and Society	
Methods Sequence		
COM 220	Qualitative Research Methods	3.0
COM 221	Quantitative Research Methods in Communication	3.0
Additional Core Requirements		
COM 230	Techniques of Speaking	3.0
COM 240	New Technologies In Communication	3.0
COM 491	Senior Project in Communication I	3.0
COM 492	Senior Project in Communication II	3.0
PHIL 305	Ethics and the Media	3.0
Public Relations Concentration Requirements		
COM 160	Introduction to Journalism	3.0
COM 181	Public Relations Principles and Theory	3.0
COM 282 [WI]	Public Relations Writing	3.0
COM 284	Public Relations Research, Measurement and Evaluation	3.0
COM 286	Public Relations Strategies and Tactics	3.0
COM 386	Public Relations Campaign Planning	3.0
MKTG 301	Introduction to Marketing Management	4.0
Visual Communication Courses *		
Select one of the following:		3.0
COM 335	Electronic Publishing	
COM 340	Desktop Publishing	
Additional Electives		
COM electives		15.0
Free electives		40.0
Total Credits		180.0

* Or other courses as appropriate in COM or the College of Media Arts and Design.

Sample Plan of Study: Public Relations (BS)

Term 1		Credits
COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSY 101	General Psychology I	3.0
UNIV H101	The Drexel Experience	1.0
Math sequence course 1		4.0
Term Credits		17.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Math sequence course 2		4.0

Humanities elective		3.0
Social science elective		3.0-4.0
Term Credits		14.0-15.0
Term 3		
COM 181	Public Relations Principles and Theory	3.0
COM 230	Techniques of Speaking	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
International or diversity elective		3.0
Social and behavioral science elective		3.0-4.0
Term Credits		15.0-16.0
Term 4		
COM 160	Introduction to Journalism	3.0
COM 210	Theory and Models of Communication	3.0
Humanities elective		3.0
Science sequence course 1*		4.0
Free elective		3.0
Term Credits		16.0
Term 5		
COM 220	Qualitative Research Methods	3.0
COM 282 [WI]	Public Relations Writing	3.0
LING 102	Language and Society	3.0
Science sequence course 2*		4.0
Free elective		3.0
Term Credits		16.0
Term 6		
COM 221	Quantitative Research Methods in Communication	3.0
COM 284	Public Relations Research, Measurement and Evaluation	3.0
International or diversity elective		3.0
Free electives		6.0
Term Credits		15.0
Term 7		
MKTG 301	Introduction to Marketing Management	4.0
PHIL 305	Ethics and the Media	3.0
COM elective		3.0
International or diversity elective		3.0
Free elective		3.0
Term Credits		16.0
Term 8		
COM 240	New Technologies In Communication	3.0
COM 286	Public Relations Strategies and Tactics	3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Humanities elective		3.0
COM elective		3.0
Free elective		3.0
Term Credits		16.0
Term 9		
COM 340	Desktop Publishing	3.0
or 335	Electronic Publishing	
Free electives		6.0
Social science elective		3.0-4.0
COM elective		3.0
Term Credits		15.0-16.0
Term 10		
COM 386	Public Relations Campaign Planning	3.0
COM 400	Seminar in Communication	3.0
Humanities elective		3.0
Free electives		6.0
Term Credits		15.0
Term 11		
COM 491	Senior Project in Communication I	3.0
COM elective		3.0

Free electives	6.0
Term Credits	12.0
Term 12	
COM 492 Senior Project in Communication II	3.0
International or diversity elective	3.0
COM elective	3.0
Free elective	4.0
Term Credits	13.0
Total Credit: 180.0-183.0	

* See degree requirements (p.).

Degree Requirements: Technical & Science Communication (BS)

Students within this track learn to communicate scientific and technical information to various audiences. The program combines courses that develop communication skills with courses that enhance understanding of science and technology.

Students who study technical and science communication find work in a wide range of areas, including technical writing for software or hardware products, proposal and grant writing, and research or writing in the fields of health, pharmaceuticals, medicine or science.

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Social and behavioral science		9.0
Humanities		9.0
International studies		6.0
Studies in diversity		6.0
One of the following Science sequences:		8.0

Biology Sequence

BIO 107	Cells, Genetics & Physiology	
BIO 108	Cells, Genetics and Physiology Laboratory	
BIO 109	Biological Diversity, Ecology & Evolution	
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	

Chemistry Sequence

CHEM 111	General Chemistry I	
CHEM 112	General Chemistry II	

Physics Sequence

PHYS 103	General Physics I	
PHYS 104	General Physics II	

One of the following Math sequences:

Analysis Sequence		
MATH 101	Introduction to Analysis I	
MATH 102	Introduction to Analysis II	

Calculus Sequence

MATH 121	Calculus I	
MATH 122	Calculus II	

Communication Core Requirements

Theory Sequence

COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0
COM 210	Theory and Models of Communication	3.0

COM 400	Seminar in Communication	3.0
LING 101	Introduction to Linguistics	3.0
or LING 102	Language and Society	

Methods Sequence

COM 220	Qualitative Research Methods	3.0
COM 221	Quantitative Research Methods in Communication	3.0

Additional Core Requirements

COM 230	Techniques of Speaking	3.0
COM 240	New Technologies In Communication	3.0
COM 491	Senior Project in Communication I	3.0
COM 492	Senior Project in Communication II	3.0
PHIL 305	Ethics and the Media	3.0

Technical and Science Concentration Requirements

COM 160	Introduction to Journalism	3.0
COM 181	Public Relations Principles and Theory	3.0
COM 310 [WI]	Technical Communication	3.0
COM 320 [WI]	Science Writing	3.0
COM 335	Electronic Publishing	3.0
COM 350 [WI]	Document Design and Evaluation	3.0
COM 420	Technical and Science Editing	3.0

Technology, Science & Communication Breadth

Select three of the following:		9.0
COM 316	Campaigns for Health & Environment	
COM 317 [WI]	Environmental Communication	
COM 318	Film, Celebrity and the Environmental Movement	
COM 330	Professional Presentations	
COM 340	Desktop Publishing	
COM 345	Intercultural Communication	
COM 351	Computer Mediated Communication	
COM 352	Social Media and Communication	
COM 355	Ethnography of Communication	
COM 385	Media Effects	

Multidisciplinary Breadth

Select three of the following:		9.0
ANTH 355	Anthropology of Cyberspace	
ENGL 300 [WI]	Literature & Science	
ENGL 302	Environmental Literature	
HIST 280	History of Science: Ancient to Medieval	
HIST 281	History of Science: Enlightenment to Modernity	
HIST 285	Technology in Historical Perspective	
INFO 101	Introduction to Information Technology	
INFO 105	Introduction to Informatics	
INFO 108	Foundations of Software	
INFO 110	Human-Computer Interaction I	
PHIL 361	Philosophy of Science	
PSY 330	Cognitive Psychology	
PSY 332	Human Factors and Cognitive Engineering	
PSY 337	Human-Computer Interaction	

Additional Electives

COM electives	15.0
Free electives	29.0
Total Credits	180.0

Sample Plan of Study

Technical and Science Communication (BS)

Term 1		Credits
COM 101	Human Communication	3.0
COM 150	Mass Media and Society	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSY 101	General Psychology I	3.0

UNIV H101	The Drexel Experience	1.0
Math course		4.0
Term Credits		17.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Social and behavioral science elective		3.0
Math course		4.0
Humanities elective		3.0
Term Credits		14.0
Term 3		
COM 160 or 181	Introduction to Journalism Public Relations Principles and Theory	3.0
COM 230	Techniques of Speaking	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Humanities elective		3.0
Social and behavioral science elective		3.0
Term Credits		15.0
Term 4		
COM 181 or 160	Public Relations Principles and Theory Introduction to Journalism	3.0
COM 210	Theory and Models of Communication	3.0
Free elective		3.0
Multidisciplinary elective		3.0
Science course		4.0
Term Credits		16.0
Term 5		
COM 220	Qualitative Research Methods	3.0
LING 101 or 102	Introduction to Linguistics Language and Society	3.0
Technology, science and communication elective		3.0
Free elective		3.0
Science elective		4.0
Term Credits		16.0
Term 6		
COM 221	Quantitative Research Methods in Communication	3.0
COM 310 [WI]	Technical Communication	3.0
Free elective		4.0
Multidisciplinary elective		3.0
International or diversity elective		3.0
Term Credits		16.0
Term 7		
COM 335	Electronic Publishing	3.0
PHIL 305	Ethics and the Media	3.0
COM elective		3.0
International or diversity elective		3.0
Technology, science, and communication elective		3.0
Term Credits		15.0
Term 8		
COM 240	New Technologies In Communication	3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Technology, science, and communication elective		3.0
Free elective		3.0
Humanities elective		3.0
COM elective		3.0
Term Credits		16.0
Term 9		
COM 320 [WI]	Science Writing	3.0
COM 350 [WI]	Document Design and Evaluation	3.0
COM elective		3.0

Free elective		6.0
Term Credits		15.0
Term 10		
COM 400	Seminar in Communication	3.0
COM 420	Technical and Science Editing	3.0
International or diversity elective		3.0
Free electives		6.0
Term Credits		15.0
Term 11		
COM 491	Senior Project in Communication I	3.0
COM elective		3.0
Multidisciplinary elective		3.0
Social science elective		3.0-4.0
Term Credits		12.0-13.0
Term 12		
COM 492	Senior Project in Communication II	3.0
International or diversity elective		3.0
COM elective		3.0
Free elective		4.0
Term Credits		13.0
Total Credit: 180.0-181.0		

* See degree requirements (p. 68).

Co-op/Career Opportunities

Public Relations

Graduates with a concentration in public relations find employment in a wide variety of fields, including public relations, advertising, special events planning, writing and editing, and public information. In addition, the strong communication and management skills stressed by this concentration enable the graduates to find administrative positions in various business areas with an indirect relationship to public relations such as marketing, sales, human resources consulting, or publishing.

Although graduate study is not necessary for those who pursue careers in public relations, students have used the major as a basis for graduate work in a variety of areas, including communication, business, and law.

Co-op Experiences in Public Relations

Cooperative education opportunities are available with a variety of corporations and nonprofits in such positions as corporate communication specialist, public relations assistant, and newsletter writer. The following are samples of past co-op experiences:

- Advertising and Promotions Assistant, CoreStates Bicycle Championships, Philadelphia.
- Corporate Communications Co-op, Philadelphia Electric Company, Philadelphia.
- Advertising/ Promotions Co-op, U.S. Marketing Division, Mobil Oil Corp., Fairfax, VA.
- Assistant Coordinator, Communications Bureau, United Way of Southeastern Pennsylvania, Philadelphia.

Journalism

Journalism students pursue careers in journalism, creative writing, and news. Given the rapidly changing nature of these fields, graduates may also find work in new types of publishing platforms, such as social media or mobile, or involving audiovisual content creation. Journalism graduates

may also choose to pursue graduate study, whether in journalism or another discipline.

Co-op Experiences in Journalism

Journalism students have held co-ops with a number of media, news, and information companies, including the following:

- *Production assistant*, WPVI-TV (Channel 6) Philadelphia
- *Staff writer*, Delaware County Daily Times
- *Promotions department*, WPLY-FM (Y-100)
- *Production assistant*, sports department, FOX-29 (WTFX-TV)

Technical and Science Communication

Students who study technical and science communication are prepared for a variety of career options. Many students become technical writers and editors who produce manuals and reports about high-technology products and services. Students may also go on to write specifications and in-house organs for business, industry, and government. Other students conduct and interpret surveys for business. In addition, this program is excellent preparation for graduate study in a number of fields, such as law and medicine.

Co-op Experiences in Technical and Science Communication

Communication students have worked for corporations and nonprofit organizations. The following are some samples of past co-op experiences:

- *Technical writer*, Unisys Corp. and Hewlett Packard
- *Web page writer*, Hospital of the University of Pennsylvania
- *Pharmaceutical writer*, GlaxoSmithKline
- *Medical writer*, Medcases Corp.

Open Communication Track

Students in the Open track will develop a focus that fits their interests in the field of Communication and will thus be ready for a variety of career options, which can include any of the directions open to students in the other concentrations in communication. In addition, this program is excellent preparation for graduate study in a number of fields, such as law and medicine.

Co-op Experiences in the Open Communication track

Students in this track can choose from the variety of co-op opportunities open to any student in Communication.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Communication

The minor in communication is a 24.0 credit curriculum designed to familiarize students with communication theory while providing training in print and digital communication. The minor can provide a strong complement for majors that emphasize presentations, interpersonal skills, publicity, and marketing. Students minoring in communication can focus on public relations, journalism, technical and science communication, environmental communication, or nonprofit communication.

Finally, students complete three additional electives from the area that fits their interest.

Please note: No more than three courses that are required for a student's major can count towards fulfilling requirements for the minor.

Core Courses		
COM 101	Human Communication	3.0
or COM 111	Principles of Communication	
COM 210	Theory and Models of Communication	3.0
Focus Areas		
6.0		
Select one of the following areas of focus (2 courses):		
Journalism		
COM 160	Introduction to Journalism	
COM 261	Advanced Journalism	
Public Relations		
COM 181	Public Relations Principles and Theory	
COM 270 [WI]	Business Communication	
or COM 282	Public Relations Writing	
or COM 284	Public Relations Research, Measurement and Evaluation	
Technical and Science Communication		
COM 310 [WI]	Technical Communication	
COM 320 [WI]	Science Writing	
or COM 375	Grant Writing	
Environmental Communication		
COM 316	Campaigns for Health & Environment	
or COM 318	Film, Celebrity and the Environmental Movement	
COM 317 [WI]	Environmental Communication	
FOUR Additional Courses		
Four COM or LING electives		12.0
Total Credits		24.0

Communication Faculty

Ronald Bishop, III, PhD (*Temple University*). Professor. Investigative reporting, sports journalism, journalism history, journalism sourcing patterns, textual narrative and ideological analysis, cultural history of fame.

Joan W. Blumberg, BA (*Pennsylvania State University*). Instructor. Publishing, electronic publishing, publishing and communications, publishing and mass-media.

Karen Cristiano, MS (*Temple University*) *Assistant Department Head of Communication*. Associate Teaching Professor. Journalism, medical writing, feature writing, copy editing, mass media and society.

Richard Forney Instructor. Broadcast journalism technology and the effects of new technologies on personal and corporate communication skills.

Alexander Friedlander, PhD (*Carnegie Mellon University*) *Interim Department Head of Communication; Associate Dean for Undergraduate Education, College of Arts and Sciences*. Associate Professor. Rhetorical theory and practice, document design, writing and technology.

Ernest A. Hakanen, PhD (*Temple University*). Professor. Telecommunications policy, adolescent media use, communication theory and history, global media, and semiotics.

Barbara Hoekje, PhD (*University of Pennsylvania*) *Director, English Language Center*. Associate Professor. Sociolinguistic theory, discourse analysis, applied linguistics (language teaching, learning, and testing).

Frank Kelley, PhD (*Temple University*). Associate Teaching Professor. Corporate university systems online, power structure of media enterprises, public relations, event planning.

Julia May, PhD (*Drexel University*). Assistant Teaching Professor. Political communication; international politics and its news coverage; public opinion; transatlantic relations; war, torture and human rights; debate in the public sphere.

Jordan McClain, PhD (*Temple University*). Assistant Teaching Professor. Media framing and music journalism; relationship between television and music; American popular culture; celebrity, consumerism, and consumer behavior; branding, brand positioning, and advertising criticism.

Alexander Nikolaev, PhD (*Florida State University*) *Interim Director, Communication Undergraduate Programs*. Associate Professor. Public relations, political communication, organizational communication, mass communication, international communications and negotiations, communications theory.

Rosemary Rys, MA. Instructor. Public relations and marketing.

Lawrence Souder, PhD (*Temple University*). Associate Teaching Professor. Science and technical writing, communication ethics, nonprofit communication.

Allan Stegeman, MA (*University of Houston*). Teaching Professor. Communication, technology and mass media, video.

Susan Stein, PhD (*University of Wisconsin*) *Graduate Director*. Associate Teaching Professor. Science, environmental, and health communication

Asta Zelenkauskaitė, PhD (*Indiana University*). Assistant Professor. Social media; user-generated content; computer-mediated communication; interactivity; active audience analysis; mobile communication; gender and online identity; prosumer culture; internet of things; quantitative/qualitative research.

Criminology and Justice Studies

About the Program

In what ways did the War on Drugs of the 1980s and 1990s impact urban communities in terms of street-corner dealing, violence, and overall health? What about national incarceration rates, and racial disparities in the adjudication process? How do so-called Three Strikes laws typically influence the decisions of judges at sentencing? How far will the War on Terrorism push the legal boundaries of government surveillance and the monitoring of electronic communications, and what will be the impacts of such forces? Finally, how are "big data" being used (now and in the future) by justice, intelligence, or private organizations to identify social networks, conduct risk assessments, and make decisions about crime policy and resource deployment?

Drexel University's Program of Criminology and Justice Studies offers a rich educational experience that emphasizes justice and criminological theory, and translating concepts into practice. With its three thematic concentrations -- one in Criminology and Justice Policy, one in Justice Informatics, and one in Criminal Justice -- the Program in Criminology and Justice Studies provides all students with foundational knowledge and tools of the discipline, while allowing them to specialize in different areas of interest within the discipline.

Please click the links below to explore the degree concentrations in Criminology and Justice Studies.

Degree Concentrations

- Criminology & Justice Policy (p. 74)
- Justice Informatics (p. 77)
- Criminal Justice

Minor in Criminal Justice

Students from any major who are interested in the law, legal issues and the forensic sciences may envision a future connection with the criminal justice system. These students could enhance their career possibilities by adding a minor in criminal justice to their major field of study.

The minor consists of four required courses and four criminal justice electives chosen from two categories, for a total of 24.0 credits. Students minoring in criminal justice are assumed to have already taken SOC 101 Introduction to Sociology.

Required Courses

CJS 101	Introduction to Criminal Justice	3.0
CJS 200	Criminology	3.0
CJS 210	Race, Crime, and Justice	3.0
CJS 220	Crime and the City	3.0

Criminal Justice Elective Courses

Select 12 credits from the following:		12.0
CJS 260	Justice in Our Community	
CJS 261	Prison, Society and You	
CJS 265	Criminal Investigation	
CJS 266	Crime Prevention Planning	
CJS 267	Introduction to Security Studies	
CJS 273	Surveillance, Technology, and the Law	
CJS 274	Sex, Violence, & Crime on the Internet	
CJS 275	Issues in Domestic Violence	
CJS 276	Introduction to Computer Crime	
CJS 277	Introduction to Correctional Practices	
CJS 278	Introduction to Law Enforcement	
CJS 280	Communities and Crime	
CJS 289	Terrorism	
CJS 290	Crime and Public Policy	
CJS 295	International Field Experience	
CJS 302	Advanced Criminological Theorizing	
CJS 320	Comparative Justice Systems	
CJS 330	Crime Mapping Using Geographic Information Systems	
CJS 335	Intelligence-Led Decision-Making	
CJS 360	Juvenile Justice	
CJS 362	Gender, Crime, and Justice	
CJS 364	Community Corrections	
CJS 365	Computer Investigations and the Law	
CJS 366	Technology and the Justice System	
CJS 369	Forensic Science Survey Course	
CJS 372	Death Penalty - An American Dilemma	
CJS 374	Restorative Justice	
CJS 375	Criminal Procedure	
CJS 376	Sentencing	
CJS 377	Intellectual Property Theft in the Digital Age	
CJS 378	Science of Forensic Science	
CJS 379	Forensic DNA Analysis	
CJS 401	Program Evaluation	
CJS T380	Special Topics in Criminology and Justice Studies	

CJS I399	Independent Study
Total Credits	24.0

Criminology and Justice Studies Faculty

Robert D'Ovidio, PhD (*Temple University*) Associate Dean for Humanities and Social Science Research and Graduate Education. Associate Professor. The intersection of computer technology, crime, and the criminal justice system; criminological theory; policing; transnational crime.

Ashley Dickinson, PhD (*Indiana University of Pennsylvania*). Assistant Teaching Professor. Corrections; offender rehabilitation; risk management; offender classification; gender and crime.

Julia Hall, PhD (*University of Pennsylvania*). Professor. Criminal justice and juvenile justice reform, including community based alternatives to incarceration, correctional education and programming, reentry and reintegration, restorative justice, and issues relating to special needs offenders, including the el

Jordan Hyatt, PhD, JD (*University of Pennsylvania, Villanova University School of Law*). Assistant Professor. Community corrections; drug treatment; homelessness; probation/parole; re-entry; risk assessment; sentencing.

Lallen Johnson, PhD (*Temple University*). Assistant Professor. Drugs and violence; race, crime and justice; ecology of crime; geographic information systems.

Robert J. Kane, PhD (*Temple University*) Director, *Criminology and Justice Studies Program*. Professor. Police authority and accountability; urban ecology and sociology; violence and public health; police strategies and practices.

Cyndi Rickards, EdD (*Drexel University*) Senior Assistant Dean for *Community Engagement*. Assistant Teaching Professor. On-line pedagogy; service-learning pedagogy; juvenile justice; domestic violence.

Criminology and Justice Studies

Major: *Criminology and Justice Studies*

Degree Awarded: *Bachelor of Science (BS)*

Calendar Type: *Quarter*

Total Credit Hours: 183.0

Co-op Options: One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 45.0401

Standard Occupational Classification (SOC) code: 11-9199

Criminal Justice Concentration

The Criminal Justice concentration is housed in the Program of Criminology and Justice Studies and serves as the "generalist" concentration for the program. Specifically, the Criminal Justice concentration focuses its curriculum primarily on the substance of criminal justice institutions and crime and does not require many of the analytics and computer-based courses that the other two concentrations require. This concentration is primarily intended for students seeking a traditional criminal justice education. Because the Criminal Justice concentration reserves 41.0 credits of free electives, it is the most flexible of the three concentrations, allowing students, for example, to relatively easily double major, or to take on a minor while still reserving enough free credit for other courses of interest outside the program.

Despite that the CJ concentration is the least analytically demanding of the three concentrations, it still offers the community-based learning and global perspective of the other two concentrations. Students in all three concentrations are encouraged to participate in at least one faculty-led study abroad program during which students will explore various justice related themes. Recent trips have been *The Legacy of Nazi Policing and Cold War Justice* in Munich and Prague and *The Roots of Common Law Justice* in London. Please see the Study Abroad Program (http://studyabroad.drexel.edu/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=47709) web page to view the location and itinerary of the 2016 study tour. The emphasis on comparative justice and study abroad reside at the leading edges of Drexel's core value of global citizenship.

Criminal Justice Concentration Degree Requirements

General Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
COM 150	Mass Media and Society	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 101	Introduction to Western Philosophy	3.0
PSCI 100	Introduction to Political Science	4.0
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
English Elective (any ENGL course over 200-level)		3.0
Fine Arts Elective		3.0
History Elective		4.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
CIVC 101	Introduction to Civic Engagement	1.0

Math Sequences

Take any two Math courses	6.0-8.0
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Science Sequence

Take any two Science courses with a lab from any combination of Biology, Chemistry, and Physics	8.0
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Program in Criminology and Justice Studies Core Requirements

CJS 101	Introduction to Criminal Justice	3.0
CJS 200	Criminology	3.0
CJS 210	Race, Crime, and Justice	3.0
CJS 220	Crime and the City	3.0
CJS 260	Justice in Our Community	4.0
CJS 261	Prison, Society and You	3.0
CJS 290	Crime and Public Policy	3.0
CJS 375	Criminal Procedure	3.0
CJS 376	Sentencing	3.0
PHIL 330	Criminal Justice Ethics	3.0

Methods and Analytics Sequence

CJS 250	Research Methods & Analytics I	3.0
CJS 300	Research Methods and Analytics II	3.0

Criminal Justice Thematic Concentration

CJS 266	Crime Prevention Planning	3.0
CJS 276	Introduction to Computer Crime	3.0
CJS 278	Introduction to Law Enforcement	3.0
CJS 280	Communities and Crime	3.0
CJS 360	Juvenile Justice	3.0
CJS 374	Restorative Justice	3.0

Program Electives

Complete 10 of the following courses:	30.0
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CJS 265	Criminal Investigation	
CJS 273	Surveillance, Technology, and the Law	
CJS 274	Sex, Violence, & Crime on the Internet	
CJS 275	Issues in Domestic Violence	
CJS 289	Terrorism	
CJS 295	International Field Experience	
CJS 301	Methods and Analytics III	
CJS 302	Advanced Criminological Theorizing	
CJS 320	Comparative Justice Systems	
CJS 330	Crime Mapping Using Geographic Information Systems	
CJS 335	Intelligence-Led Decision-Making	
CJS 362	Gender, Crime, and Justice	
CJS 365	Computer Investigations and the Law	
CJS 366	Technology and the Justice System	
CJS 372	Death Penalty - An American Dilemma	
CJS 373	Environmental Crime	
CJS 377	Intellectual Property Theft in the Digital Age	
CJS T380	Special Topics in Criminology and Justice Studies	
CJS I399	Independent Study	
PSCI 229	Theories of Justice	
Free Electives		42.0
Total Credits		182.0-184.0

* Review the prerequisites before trying to register.

Criminal Justice Concentration Sample Plan of Study

Term		Credits
Term 1		
CJS 101	Introduction to Criminal Justice	3.0
SOC 101	Introduction to Sociology	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV H101	The Drexel Experience	1.0
Science sequence course		4.0
Term Credits		14.0
Term 2		
COM 150	Mass Media and Society	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHIL 101	Introduction to Western Philosophy	3.0
CJS 260	Justice in Our Community	4.0
Science sequence course		4.0
Term Credits		17.0
Term 3		
CJS 200	Criminology	3.0
ANTH 101	Introduction to Cultural Diversity	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSCI 100	Introduction to Political Science	4.0
CIVC 101	Introduction to Civic Engagement	1.0
CJS 261	Prison, Society and You	3.0
Term Credits		17.0
Term 4		
CJS 210	Race, Crime, and Justice	3.0
CJS 250	Research Methods & Analytics I	3.0
PHIL 330	Criminal Justice Ethics	3.0
CJS Course		3.0
Free Elective		3.0
Term Credits		15.0
Term 5		
CJS 300	Research Methods and Analytics II	3.0
CJS 360		3.0

CJS Course		3.0
Free Elective		3.0
Math Sequence		3.0-4.0
Term Credits		15.0-16.0
Term 6		
CJS 266	Crime Prevention Planning	3.0
Math Sequence		3.0-4.0
CJS Course		3.0
CJS Course		3.0
Free Elective		3.0
Term Credits		15.0-16.0
Term 7		
PSY 101	General Psychology I	3.0
Fine Arts Elective		3.0
CJS Course		3.0
Free Elective		3.0
Free Elective		3.0
Term Credits		15.0
Term 8		
CJS 290	Crime and Public Policy	3.0
CJS 220	Crime and the City	3.0
CJS 375	Criminal Procedure	3.0
Free Elective		3.0
Free Elective		3.0
Term Credits		15.0
Term 9		
CJS 376	Sentencing	3.0
CJS 280	Communities and Crime	3.0
CJS Course		3.0
History Elective		4.0
Free Elective		3.0
Term Credits		16.0
Term 10		
CJS 276	Introduction to Computer Crime	3.0
CJS 374	Restorative Justice	3.0
CJS Course		3.0
English 200+		3.0
Free Elective		3.0
Term Credits		15.0
Term 11		
UNIV H201	Looking Forward: Academics and Careers	1.0
CJS 278	Introduction to Law Enforcement	3.0
CJS Course		3.0
CJS Course		3.0
Free Elective		3.0
Free Elective		3.0
Term Credits		16.0
Term 12		
CJS Course		3.0
Free Elective		3.0
Free Elective		3.0
Free Elective		3.0
Term Credits		12.0
Total Credit:		182.0-184.0

Criminal Justice Concentration Professional Experiences

Students will complete one co-op (i.e., professional placement), typically during the spring and summer quarters of their Junior year. When they return for the start of their senior year, they can immediately begin their

(impending) post-graduation job search with their co-op experience still recent on their resume. Some placements are paid (usually in the private sector) and others are unpaid (primarily in the public sector). The placements earn students academic credit while providing professional socialization and learning with crime and justice professionals. The networking aspects of these placements are invaluable for future career development. In addition to the learning experiences, past students have received excellent letters of recommendation for future employment agencies and for graduate and law school admissions.

In recent years, students have been placed in local agencies such as the District Attorney's Office, the Institutional Law Project, the Juvenile Law Center, the Defendants Association of Philadelphia, the Philadelphia and Bucks County Prison Systems and the Pennsylvania Prison Society, Pennsylvania and New Jersey State Police. Several students have done co-ops and later worked full time at the Eastern State Penitentiary Historical Site and Museum. On the state level, co-op students have worked with the Board of Probation & Parole and other agencies. At the federal level, the US Customs Service had an agreement to accept cooperative education placements after having been screened by faculty. The faculty in Criminology and Justice Studies has been working over the past few years to expand its list of research co-ops (primarily for students working toward graduate school) and international co-ops.

Criminology and Justice Studies Faculty

Robert D'Ovidio, PhD (*Temple University*) Associate Dean for Humanities and Social Science Research and Graduate Education. Associate Professor. The intersection of computer technology, crime, and the criminal justice system; criminological theory; policing; transnational crime.

Ashley Dickinson, PhD (*Indiana University of Pennsylvania*). Assistant Teaching Professor. Corrections; offender rehabilitation; risk management; offender classification; gender and crime.

Julia Hall, PhD (*University of Pennsylvania*). Professor. Criminal justice and juvenile justice reform, including community based alternatives to incarceration, correctional education and programming, reentry and reintegration, restorative justice, and issues relating to special needs offenders, including the el

Jordan Hyatt, PhD, JD (*University of Pennsylvania, Villanova University School of Law*). Assistant Professor. Community corrections; drug treatment; homelessness; probation/parole; re-entry; risk assessment; sentencing.

Lallen Johnson, PhD (*Temple University*). Assistant Professor. Drugs and violence; race, crime and justice; ecology of crime; geographic information systems.

Robert J. Kane, PhD (*Temple University*) Director, *Criminology and Justice Studies Program*. Professor. Police authority and accountability; urban ecology and sociology; violence and public health; police strategies and practices.

Cyndi Rickards, EdD (*Drexel University*) Senior Assistant Dean for *Community Engagement*. Assistant Teaching Professor. On-line pedagogy; service-learning pedagogy; juvenile justice; domestic violence.

Criminology and Justice Studies

Major: *Criminology and Justice Studies*

Degree Awarded: *Bachelor of Science (BS)*

Calendar Type: *Quarter*

Total Credit Hours: *183.0*

Co-op Options: One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 45.0401

Standard Occupational Classification (SOC) code: 11-9199

Criminology and Justice Policy concentration

About the Program

The Criminology & Justice Policy concentration grounds students in criminological theory and crime policy, as well as justice analytics, to help them identify, describe, and respond to current and emerging crime and security problems. A key goal of any rational crime policy is to maximize its benefits — e.g., reducing crime — while limiting its social costs, such as mass-incarceration, racial disparities, and violent backlashes. Through that lens, C&JP students will work with crime and police calls for service data, geo-tagged social media transmissions, and other sources of information to identify and explain crime trends, "hotspots," and "coldspots" across given geographies; and they will put their theory to use as they learn to generate and test research hypotheses related to crime and justice policy outcomes. Moreover, through community-based learning (a core value of the program), C&JP offers students the unique opportunity to experience criminology and justice education from the perspectives of those most affected by the criminal justice system: One required course is taught in an active jail; another is taught in a local community service organization.

Finally, recognizing the global nature of crime and justice issues, C&JP requires one course on international justice systems, two globally-themed courses outside the program; and it encourages all students to participate in at least one faculty-led study abroad program during which students will explore various justice-related themes (examples of recent trips: *The Legacy of Nazi Policing and Cold War Justice in Munich and Prague*; *The Roots of Common Law Justice in London*. Please see the Study Abroad Program (http://studyabroad.drexel.edu/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=47709) web page to view the location and itinerary of the 2016 study tour.). The emphasis on comparative justice and study abroad reside at the leading edge of Drexel's core value of global citizenship.

The Criminology & Justice Policy thematic concentration reserves 31.0 credits of free electives so that students can earn a minor outside the Program in Criminology and Justice Studies. Students interested in intelligence/security-related careers should consider minoring in a language. Visit Drexel's Modern Languages Program (<http://www.drexel.edu/coas/academics/departments-centers/global-studies-modern-languages/degrees-programs/modern-languages>) web page for a list of language minors.

Additional Information

For more information about the Criminology & Justice Policy concentration, please contact:

Robert Kane, PhD

Department Head

Department of Criminology and Justice Studies

robert.j.kane@drexel.edu

Criminology and Justice Policy concentration

Degree Requirements

General Degree Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COM 150	Mass Media and Society	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 101	Introduction to Western Philosophy	3.0
PSCI 100	Introduction to Political Science	4.0
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
English Elective (any ENGL course over 200-level)		3.0
Fine Arts Elective		3.0
History Elective		4.0

Math Sequence

Take any two Math courses	6.0-8.0
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Science Sequence

Take any two Science courses with a lab from any combination of Biology, Chemistry, and Physics	8.0
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Program in Criminology and Justice Studies Core Requirements

CJS 101	Introduction to Criminal Justice	3.0
CJS 200	Criminology	3.0
CJS 210	Race, Crime, and Justice	3.0
CJS 220	Crime and the City	3.0
CJS 260	Justice in Our Community	4.0
CJS 261	Prison, Society and You	3.0
CJS 290	Crime and Public Policy	3.0
CJS 375	Criminal Procedure	3.0
CJS 376	Sentencing	3.0
PHIL 330	Criminal Justice Ethics	3.0

Global Perspectives

Any courses across the university whose descriptions are global and/or comparative	6.0
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Methods and Analytics Sequence

CJS 250	Research Methods & Analytics I	3.0
CJS 300	Research Methods and Analytics II	3.0
CJS 301	Methods and Analytics III	3.0
CJS 302	Advanced Criminological Theorizing	3.0
CJS 320	Comparative Justice Systems	3.0
CJS 330	Crime Mapping Using Geographic Information Systems	3.0
CJS 335	Intelligence-Led Decision-Making	3.0
CJS 400	Capstone in Criminology and Justice Policy	3.0
CJS 401	Program Evaluation	3.0

Criminology and Justice Policy Thematic Concentration

Select eight of the following:	24.0	
CJS 266	Crime Prevention Planning	
CJS 267	Introduction to Security Studies	
CJS 273	Surveillance, Technology, and the Law	
CJS 276	Introduction to Computer Crime	
CJS 278	Introduction to Law Enforcement	
CJS 280	Communities and Crime	
CJS 289	Terrorism	
CJS 295	International Field Experience	
CJS 360	Juvenile Justice	

CJS 362	Gender, Crime, and Justice
CJS 372	Death Penalty - An American Dilemma
CJS 373	Environmental Crime
CJS 374	Restorative Justice
PSCI 229	Theories of Justice

Program Electives

Complete 6 credits from the following:	6.0
CJS 265	Criminal Investigation
CJS 275	Issues in Domestic Violence
CJS 365	Computer Investigations and the Law
CJS 369	Forensic Science Survey Course
CJS 378	Science of Forensic Science
CJS 379	Forensic DNA Analysis
CJS T380	Special Topics in Criminology and Justice Studies
CJS I399	Independent Study

Free Electives	33.0
Total Credits	182.0-184.0

Criminology and Justice Policy concentration

Sample Plan of Study

Term 1		Credits
CJS 101	Introduction to Criminal Justice	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
SOC 101	Introduction to Sociology	3.0
UNIV H101	The Drexel Experience	1.0
Science sequence course		4.0
Term Credits		14.0
Term 2		
CJS 260	Justice in Our Community	4.0
COM 150	Mass Media and Society	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHIL 101	Introduction to Western Philosophy	3.0
Science sequence course		4.0
Term Credits		17.0
Term 3		
ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
CJS 200	Criminology	3.0
CJS 261	Prison, Society and You	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSCI 100	Introduction to Political Science	4.0
Term Credits		17.0
Term 4		
CJS 210	Race, Crime, and Justice	3.0
CJS 250	Research Methods & Analytics I	3.0
PHIL 330	Criminal Justice Ethics	3.0
CJS Course		3.0
Free Elective		3.0
Term Credits		15.0
Term 5		
CJS 300	Research Methods and Analytics II	3.0
Math Sequence		3.0-4.0
CJS Course		3.0
Global Persp. Course		3.0
Free Elective		3.0
Term Credits		15.0-16.0
Term 6		
CJS 301	Methods and Analytics III	3.0

Math Sequence		3.0-4.0
CJS Course		3.0
Free Elective		3.0
Free Elective		3.0
Term Credits		15.0-16.0
Term 7		
PSY 101	General Psychology I	3.0
CJS Courses		6.0
Fine Arts Elective		3.0
Free Electives		3.0
Term Credits		15.0
Term 8		
CJS 220	Crime and the City	3.0
CJS 290	Crime and Public Policy	3.0
CJS 330	Crime Mapping Using Geographic Information Systems	3.0
CJS 375	Criminal Procedure	3.0
Free Elective		3.0
Term Credits		15.0
Term 9		
CJS 302	Advanced Criminological Theorizing	3.0
CJS 320	Comparative Justice Systems	3.0
CJS 376	Sentencing	3.0
Program Elective		3.0
Free Elective		3.0
Term Credits		15.0
Term 10		
Program Elective		3.0
English 200+		3.0
History Elective		4.0
CJS Course		3.0
Free Elective		3.0
Term Credits		16.0
Term 11		
CJS 335	Intelligence-Led Decision-Making	3.0
CJS 401	Program Evaluation	3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
CJS Course		3.0
Free Elective		3.0
Term Credits		13.0
Term 12		
CJ 400 [WI]	Capstone in Criminology and Justice Policy	3.0
CJS Course		3.0
Global Persp. Course		3.0
Free Electives		6.0
Term Credits		15.0

Total Credit: 182.0-184.0

Minor in Criminal Justice

Students from any major who are interested in the law, legal issues and the forensic sciences may envision a future connection with the criminal justice system. These students could enhance their career possibilities by adding a minor in criminal justice to their major field of study.

The minor consists of four required courses and four criminal justice electives chosen from two categories, for a total of 24.0 credits. Students minoring in criminal justice are assumed to have already taken SOC 101 Introduction to Sociology .

Required Courses

CJS 101	Introduction to Criminal Justice	3.0
CJS 200	Criminology	3.0

CJS 210	Race, Crime, and Justice	3.0
CJS 220	Crime and the City	3.0
Criminal Justice Elective Courses		
Select 12 credits from the following:		12.0
CJS 260	Justice in Our Community	
CJS 261	Prison, Society and You	
CJS 265	Criminal Investigation	
CJS 266	Crime Prevention Planning	
CJS 267	Introduction to Security Studies	
CJS 273	Surveillance, Technology, and the Law	
CJS 274	Sex, Violence, & Crime on the Internet	
CJS 275	Issues in Domestic Violence	
CJS 276	Introduction to Computer Crime	
CJS 277	Introduction to Correctional Practices	
CJS 278	Introduction to Law Enforcement	
CJS 280	Communities and Crime	
CJS 289	Terrorism	
CJS 290	Crime and Public Policy	
CJS 295	International Field Experience	
CJS 302	Advanced Criminological Theorizing	
CJS 320	Comparative Justice Systems	
CJS 330	Crime Mapping Using Geographic Information Systems	
CJS 335	Intelligence-Led Decision-Making	
CJS 360	Juvenile Justice	
CJS 362	Gender, Crime, and Justice	
CJS 364	Community Corrections	
CJS 365	Computer Investigations and the Law	
CJS 366	Technology and the Justice System	
CJS 369	Forensic Science Survey Course	
CJS 372	Death Penalty - An American Dilemma	
CJS 374	Restorative Justice	
CJS 375	Criminal Procedure	
CJS 376	Sentencing	
CJS 377	Intellectual Property Theft in the Digital Age	
CJS 378	Science of Forensic Science	
CJS 379	Forensic DNA Analysis	
CJS 401	Program Evaluation	
CJS T380	Special Topics in Criminology and Justice Studies	
CJS I399	Independent Study	
Total Credits		24.0

Criminology and Justice Policy concentration

Professional Experiences

Students will complete one co-op (i.e., professional placement), typically during the spring and summer quarters of their Junior year. When they return for the start of their senior year, they can immediately begin their (impending) post-graduation job search with their co-op experience still recent on their resume. Some placements are paid (usually in the private sector) and others are unpaid (primarily in the public sector). The placements earn students academic credit while providing professional socialization and learning with crime and justice professionals. The networking aspects of these placements are invaluable for future career development. In addition to the learning experiences, past students have received excellent letters of recommendation for future employment agencies and for graduate and law school admissions.

In recent years, students have been placed in local agencies such as the District Attorney's Office, the Institutional Law Project, the Juvenile Law Center, the Defendants Association of Philadelphia, the Philadelphia

and Bucks County Prison Systems and the Pennsylvania Prison Society, Pennsylvania and New Jersey State Police. Several students have done co-ops and later worked full time at the Eastern State Penitentiary Historical Site and Museum. On the state level, co-op students have worked with the Board of Probation & Parole and other agencies. At the federal level, The US Customs Service had an agreement to accept cooperative education placements after having been screened by faculty. The faculty in Criminology and Justice Studies has been working over the past few years to expand its list of research co-ops (primarily for students working toward graduate school) and international co-ops.

Criminology and Justice Studies Faculty

Robert D'Ovidio, PhD (*Temple University*) Associate Dean for Humanities and Social Science Research and Graduate Education. Associate Professor. The intersection of computer technology, crime, and the criminal justice system; criminological theory; policing; transnational crime.

Ashley Dickinson, PhD (*Indiana University of Pennsylvania*). Assistant Teaching Professor. Corrections; offender rehabilitation; risk management; offender classification; gender and crime.

Julia Hall, PhD (*University of Pennsylvania*). Professor. Criminal justice and juvenile justice reform, including community based alternatives to incarceration, correctional education and programming, reentry and reintegration, restorative justice, and issues relating to special needs offenders, including the el

Jordan Hyatt, PhD, JD (*University of Pennsylvania, Villanova University School of Law*). Assistant Professor. Community corrections; drug treatment; homelessness; probation/parole; re-entry; risk assessment; sentencing.

Lallen Johnson, PhD (*Temple University*). Assistant Professor. Drugs and violence; race, crime and justice; ecology of crime; geographic information systems.

Robert J. Kane, PhD (*Temple University*) Director, *Criminology and Justice Studies Program*. Professor. Police authority and accountability; urban ecology and sociology; violence and public health; police strategies and practices.

Cyndi Rickards, EdD (*Drexel University*) Senior Assistant Dean for *Community Engagement*. Assistant Teaching Professor. On-line pedagogy; service-learning pedagogy; juvenile justice; domestic violence.

Criminology and Justice Studies

Major: *Criminology and Justice Studies*

Degree Awarded: *Bachelor of Science (BS)*

Calendar Type: *Quarter*

Total Credit Hours: *182.0*

Co-op Options: One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 45.0401

Standard Occupational Classification (SOC) code: 11-9199

Justice Informatics Concentration

Program Description

With its thematic concentration in Justice Informatics (JI), Drexel University has transformed the traditional criminal justice degree program to produce graduates who possess knowledge and skills that are highly

valued by criminal justice agencies in the 21st century. Namely, the program draws from criminology and criminal justice and computing and informatics to produce globally aware and technology proficient graduates who bring an analytical and information-led approach to solving the problems crime creates for society.

Each exposure to the criminal justice system represents a data collection point, which becomes part of a massive and disparate array of data held by the government. Students will learn how to collect, manage, visualize, and analyze large sources of information so that they can bring their expertise into the crime and justice occupational arena and/or graduate school. In addition to learning to work with "big" data in the public justice arena, students will learn how to identify, collect, manage, and use data from the expansive -- and rapidly growing -- private system of justice and security to create innovative solutions for identifying, solving, and preventing crime.

Graduates of Drexel's Justice Informatics concentration will be ideally suited to meet the demands of the growing job market for crime analysts among criminal justice, defense, and intelligence agencies and in the private-sector security community. Crime analysts have become an essential part of the modern criminal justice agency. They have become vital to, for example, the large police department looking to deploy resources in a manner that matches crime trends, the intelligence agency working to prevent terrorist events, and the financial services firm hoping to identify the fraudulent use of a credit card. JI graduates can also play an integral role on teams that build future information technology solutions for intelligence, defense, and criminal justice agencies from the public and private sectors.

Given the global nature of crime and justice issues, JI requires one course on international justice systems; and it encourages all students to participate in at least one faculty-led study abroad program during which students will explore various justice-related themes (examples of recent trips: *The Legacy of Nazi Policing and Cold War Justice in Munich and Prague*; *The Roots of Common Law Justice in London*. Please click [HERE](http://studyabroad.drexel.edu/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=47709) (http://studyabroad.drexel.edu/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=47709) to view the location and itinerary of the 2016 study tour). The emphasis on comparative justice and study abroad reside at the leading edge of Drexel's core value of global citizenship.

The Justice Informatics thematic concentration reserves 27.0 credits of free electives so that students can earn a minor outside the Program in Criminology and Justice Studies. Students interested in intelligence/security-related careers should consider minoring in a language. Click [HERE](http://www.drexel.edu/culturecomm/academics/undergraduate/modernlang/languages) (<http://www.drexel.edu/culturecomm/academics/undergraduate/modernlang/languages>) to visit Drexel's Modern Languages Program for a list of language minors.

Additional Information

For more information about the Justice Informatics concentration, please contact:

Robert D'Ovidio, PhD

Associate Professor of Criminology and Justice Studies

College of Arts and Sciences

rd64@drexel.edu

Justice Informatics Concentration

Degree Requirements

General Degree Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COM 150	Mass Media and Society	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 101	Introduction to Western Philosophy	3.0
PSCI 100	Introduction to Political Science	4.0
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
English Elective (any ENGL course over 200-level)		3.0
Fine Arts Elective		3.0
History Elective		4.0
Math Sequences		
Take any two math courses		6.0-8.0
Science Sequences		
Take any two Science courses with a lab from any combination of Biology, Chemistry, and Physics		8.0
Program in Criminology and Justice Study Core Requirements		
CJS 101	Introduction to Criminal Justice	3.0
CJS 200	Criminology	3.0
CJS 210	Race, Crime, and Justice	3.0
CJS 220	Crime and the City	3.0
CJS 260	Justice in Our Community	4.0
CJS 261	Prison, Society and You	3.0
CJS 290	Crime and Public Policy	3.0
CJS 375	Criminal Procedure	3.0
CJS 376	Sentencing	3.0
PHIL 330	Criminal Justice Ethics	3.0
Global Perspectives		
Any course across the University whose description is global and/or comparative		3.0
CJS 320	Comparative Justice Systems	3.0
Methods and Analytics Sequence		
CJS 250	Research Methods & Analytics I	3.0
CJS 300	Research Methods and Analytics II	3.0
CJS 301	Methods and Analytics III	3.0
CJS 330	Crime Mapping Using Geographic Information Systems	3.0
CJS 335	Intelligence-Led Decision-Making	3.0
CJS 401	Program Evaluation	3.0
Justice Informatics Thematic Concentration		
CJS 267	Introduction to Security Studies	3.0
CJS 273	Surveillance, Technology, and the Law	3.0
CJS 302	Advanced Criminological Theorizing	3.0
CJS 276	Introduction to Computer Crime	3.0
CJS 365	Computer Investigations and the Law	3.0
CJS 366	Technology and the Justice System	3.0
CJS 402	Capstone in Justice Informatics	3.0
INFO 101	Introduction to Information Technology	3.0
INFO 105	Introduction to Informatics	3.0
INFO 108	Foundations of Software	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0
INFO 240	Introduction to Data Science	3.0
INFO 440	Social Media Trend Spotting	3.0
Free Electives		27.0
Total Credits		182.0-184.0

Justice Informatics Concentration

Sample Plan of Study

Term 1		Credits
CJS 101	Introduction to Criminal Justice	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
SOC 101	Introduction to Sociology	3.0
UNIV H101	The Drexel Experience	1.0
Science Sequence		4.0
Term Credits		14.0
Term 2		
CJS 260	Justice in Our Community	4.0
COM 150	Mass Media and Society	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHIL 101	Introduction to Western Philosophy	3.0
Science Sequence		4.0
Term Credits		17.0
Term 3		
ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
CJS 200	Criminology	3.0
CJS 261	Prison, Society and You	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSCI 100	Introduction to Political Science	4.0
Term Credits		17.0
Term 4		
CJS 210	Race, Crime, and Justice	3.0
CJS 250	Research Methods & Analytics I	3.0
CJS 276	Introduction to Computer Crime	3.0
INFO 101	Introduction to Information Technology	3.0
PHIL 330	Criminal Justice Ethics	3.0
Term Credits		15.0
Term 5		
CJS 300	Research Methods and Analytics II	3.0
INFO 105	Introduction to Informatics	3.0
Math Sequence		3.0-4.0
Free Elective		3.0
Global Perspectives Course		3.0
Term Credits		15.0-16.0
Term 6		
CJS 273	Surveillance, Technology, and the Law	3.0
CJS 301	Methods and Analytics III	3.0
INFO 108	Foundations of Software	3.0
INFO 110	Human-Computer Interaction I	3.0
Math Sequence		3.0-4.0
Term Credits		15.0-16.0
Term 7		
CJS 267	Introduction to Security Studies	3.0
INFO 200	Systems Analysis I	3.0
PSY 101	General Psychology I	3.0
Fine Arts Elective		3.0
Free Elective		3.0
Term Credits		15.0
Term 8		
CJS 220	Crime and the City	3.0
CJS 290	Crime and Public Policy	3.0
CJS 330	Crime Mapping Using Geographic Information Systems	3.0
CJS 375	Criminal Procedure	3.0
Free Elective		3.0
Term Credits		15.0

Term 9		
CJS 302	Advanced Criminological Theorizing	3.0
CJS 320	Comparative Justice Systems	3.0
CJS 376	Sentencing	3.0
INFO 210	Database Management Systems	3.0
Free Elective		3.0
Term Credits		15.0
Term 10		
CJS 366	Technology and the Justice System	3.0
English 200+		3.0
History Elective		4.0
Free Electives		6.0
Term Credits		16.0
Term 11		
CJS 335	Intelligence-Led Decision-Making	3.0
CJS 401	Program Evaluation	3.0
INFO 240	Introduction to Data Science	3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Free Elective		3.0
Term Credits		13.0
Term 12		
CJS 365	Computer Investigations and the Law	3.0
CJS 402	Capstone in Justice Informatics	3.0
INFO 440	Social Media Trend Spotting	3.0
Free Electives		6.0
Term Credits		15.0
Total Credit: 182.0-184.0		

Minor in Criminal Justice

Students from any major who are interested in the law, legal issues and the forensic sciences may envision a future connection with the criminal justice system. These students could enhance their career possibilities by adding a minor in criminal justice to their major field of study.

The minor consists of four required courses and four criminal justice electives chosen from two categories, for a total of 24.0 credits. Students minoring in criminal justice are assumed to have already taken SOC 101 Introduction to Sociology .

Required Courses

CJS 101	Introduction to Criminal Justice	3.0
CJS 200	Criminology	3.0
CJS 210	Race, Crime, and Justice	3.0
CJS 220	Crime and the City	3.0

Criminal Justice Elective Courses

Select 12 credits from the following: 12.0

CJS 260	Justice in Our Community	
CJS 261	Prison, Society and You	
CJS 265	Criminal Investigation	
CJS 266	Crime Prevention Planning	
CJS 267	Introduction to Security Studies	
CJS 273	Surveillance, Technology, and the Law	
CJS 274	Sex, Violence, & Crime on the Internet	
CJS 275	Issues in Domestic Violence	
CJS 276	Introduction to Computer Crime	
CJS 277	Introduction to Correctional Practices	
CJS 278	Introduction to Law Enforcement	
CJS 280	Communities and Crime	
CJS 289	Terrorism	
CJS 290	Crime and Public Policy	
CJS 295	International Field Experience	
CJS 302	Advanced Criminological Theorizing	

CJS 320	Comparative Justice Systems	
CJS 330	Crime Mapping Using Geographic Information Systems	
CJS 335	Intelligence-Led Decision-Making	
CJS 360	Juvenile Justice	
CJS 362	Gender, Crime, and Justice	
CJS 364	Community Corrections	
CJS 365	Computer Investigations and the Law	
CJS 366	Technology and the Justice System	
CJS 369	Forensic Science Survey Course	
CJS 372	Death Penalty - An American Dilemma	
CJS 374	Restorative Justice	
CJS 375	Criminal Procedure	
CJS 376	Sentencing	
CJS 377	Intellectual Property Theft in the Digital Age	
CJS 378	Science of Forensic Science	
CJS 379	Forensic DNA Analysis	
CJS 401	Program Evaluation	
CJS T380	Special Topics in Criminology and Justice Studies	
CJS I399	Independent Study	
Total Credits		24.0

Note: Starting in Academic Year 2015, all CJ course codes will transition from CJ to CJS to reflect the new name of the program.

Justice Informatics Concentration Professional Experiences

Students will complete one co-op (i.e., professional placement), typically during the spring and summer quarters of their Junior year. This way, when they return for the start of their senior year, they can immediately begin their (impending) post-graduation job search with their co-op experience still recent on their resume. Some placements are paid (usually in the private sector) and others are unpaid (primarily in the public sector). The placements earn students academic credit while providing professional socialization and learning with crime and justice professionals. The networking aspects of these placements are invaluable for future career development. In addition to the learning experiences, past students have received excellent letters of recommendation for future employment agencies and for graduate and law school admissions.

In recent years, students have been placed in local agencies such as the District Attorney's Office, the Institutional Law Project, the Juvenile Law Center, the Defendants Association of Philadelphia, the Philadelphia and Bucks County Prison Systems and the Pennsylvania Prison Society, Pennsylvania and New Jersey State Police. Several students have co-op'd and later worked full time at the Eastern State Penitentiary Historical Site and Museum. On the state level, co-op students have worked with the Board of Probation & Parole and other agencies. At the federal level, The US Customs Service had an agreement to accept cooperative education placements after having been screened by faculty. The faculty in Criminology and Justice Studies has been working over the past few years to expand its list of research co-ops (primarily for students working toward graduate school) and international co-ops.

Criminology and Justice Studies Faculty

Robert D'Ovidio, PhD (*Temple University*) Associate Dean for Humanities and Social Science Research and Graduate Education. Associate Professor. The intersection of computer technology, crime, and the criminal justice system; criminological theory; policing; transnational crime.

Ashley Dickinson, PhD (*Indiana University of Pennsylvania*). Assistant Teaching Professor. Corrections; offender rehabilitation; risk management; offender classification; gender and crime.

Julia Hall, PhD (*University of Pennsylvania*). Professor. Criminal justice and juvenile justice reform, including community based alternatives to incarceration, correctional education and programming, reentry and reintegration, restorative justice, and issues relating to special needs offenders, including the el

Jordan Hyatt, PhD, JD (*University of Pennsylvania, Villanova University School of Law*). Assistant Professor. Community corrections; drug treatment; homelessness; probation/parole; re-entry; risk assessment; sentencing.

Lallen Johnson, PhD (*Temple University*). Assistant Professor. Drugs and violence; race, crime and justice; ecology of crime; geographic information systems.

Robert J. Kane, PhD (*Temple University*) Director, *Criminology and Justice Studies Program*. Professor. Police authority and accountability; urban ecology and sociology; violence and public health; police strategies and practices.

Cyndi Rickards, EdD (*Drexel University*) Senior Assistant Dean for *Community Engagement*. Assistant Teaching Professor. On-line pedagogy; service-learning pedagogy; juvenile justice; domestic violence.

English

Major: English

Degree Awarded: Bachelor of Arts (BA)

Calendar Type: Quarter

Total Credit Hours: 182.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 23.9999

Standard Occupational Classification (SOC) code: 25-1123

About the Program

Specifically designed to engage students in critical thinking and applied writing skills, the English major offers a wide-ranging curriculum on British, American and World literatures and stresses the cultural, historical and political contexts that shape and affect literary production. The Department of English and Philosophy (<http://www.drexel.edu/coas/academics/departments-centers/english-philosophy>) also offers variety of courses on periods and genres; creative writing; and the relationship between literature and the visual arts, science and technology.

Students develop solid techniques in critical inquiry as well as in writing, literary, and reading skills. Implicit in our undertaking is the leadership role of our department in the formulation and discussion of such broad theoretical and practical questions as the following: the connection between oral and written communication skills; analytical, ethical, and critical thinking; questions of value and morality; the relevance and relation of the past to the present; the relations between and among cultures; the role of literary and philosophical texts in our attempts to explain human motives and behavior; and the relations between the sexes.

Degree Requirements

University Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Mathematics Courses for a minimum of 6.0 credits		6.0
Science Courses for a minimum of 6.0 credits		6.0
Foreign Language Courses		
Any two (2) consecutive foreign language courses (completing level 201)		7.0
Humanities and Fine Arts		
Select any of the following for a minimum of 12.0 credits:		12.0
ARTH 101	History of Art I: Ancient to Medieval	
ARTH 102	History of Art II: Renaissance to Romanticism	
ARTH 103	History of Art: Modern Art	
DANC 201 [W]	Dance Appreciation	
DANC 210	Introduction to Dance	
DANC 220	History of Dance	
DANC 325 [W]	Twentieth Century Dance	
FMST 150	American Classic Cinema	
FMST 250	The Documentary Tradition	
FMST 355	Contemporary Cinema	
FMVD 218	Intermediate Cinematography	
MUSC 130	Introduction to Music	
MUSC 231	Music History I	
MUSC 232	Music History II	
MUSC 236	Rock Music Through the Mid-60s	
MUSC 238	Rock Music Since the Mid-60s	
PHIL 101	Introduction to Western Philosophy	
PHIL 105	Critical Reasoning	
PHIL 211	Metaphysics: Philosophy of Reality	
PHIL 221	Epistemology: Philosophy of Knowledge	
PHIL 231	Aesthetics: Philosophy of Art	
PHIL 251	Ethics	
PHTO 110	Photography	
THTR 115	Theatrical Experience	
THTR 221 [W]	Theatre History I	
THTR 222 [W]	Theatre History II	
Social and Behavioral Sciences		
Select any of the following for a minimum of 12.0 credits:		12.0
ANTH 110	Human Past: Anthropology and Prehistoric Archeology	
ANTH 210 [W]	Worldview: Science, Religion and Magic	
COM 150	Mass Media and Society	
COM 230	Techniques of Speaking	
HIST 161	Themes in World Civilization I	
HIST 162	Themes in World Civilization II	
HIST 163	Themes in World Civilization III	
PSCI 100	Introduction to Political Science	
PSCI 120	History of Political Thought	
PSY 101	General Psychology I	
PSY 120	Developmental Psychology	
PSY 140	Approaches to Personality	
SOC 101	Introduction to Sociology	
SOC 115	Social Problems	
SOC 221	Sociology of the Family	
International Studies		
Select any of the following for a minimum of 6.0 credits:		6.0
ANTH 212 [W]	Topics in World Ethnography	
ANTH 312	Approaches to Intercultural Behavior	

COM 360	International Communication	
COM 361	International Public Relations	
COM 362	International Negotiations	
FMST 160	European Cinema	
FMST 245	Non-Western Cinema	
HIST 235	The Great War, 1914-1918	
HIST 236	World War II	
HIST 259	History of Europe in the 20th Century	
HIST 270 [WI]	Introduction to Latin American History	
MUSC 331	World Musics	
PHIL 335	Global Ethical Issues	
PSCI 150	International Politics	
SOC 340	Globalization	

Studies in Diversity

Select any of the following for a minimum of 6.0 credits:		6.0
AFAS 101	Introduction to Africana Studies	
AFAS 201	Cross Currents in Africana Studies	
ANTH 101	Introduction to Cultural Diversity	
ANTH 215	Anthropology of Gender	
COM 345	Intercultural Communication	
ENGL 345	American Ethnic Literature	
ENGL 350	Jewish Literature and Civilization	
ENGL 355 [WI]	Women and Literature	
ENGL 365	Topics in African American Literature	
HIST 208	Women in American History	
HIST 212	Themes in African-American History	
HIST 214	United States Civil Rights Movement	
HIST 215	American Slavery	
HIST 216	Freedom in America	
HIST 218	Race and Film in United States History	
HIST 249	Modern Jewish History	
JUDA 201	Jewish Literature and Civilization	
JUDA 202	Jewish Life and Culture in the Middle Ages	
JUDA 203	Modern Jewish History	
MUSC 333	Afro-American Music USA	
SOC 210	Race, Ethnicity and Social Inequality	
SOC 330	Development and Underdevelopment in the Global South	
WGST 101	Introduction to Women's and Gender Studies	
WGST 240	Women and Society in a Global Context	

Major Requirements**Foundational and Professional Courses**

ENGL 195	English Freshman Seminar	3.0
ENGL 205 [WI]	American Literature I	3.0
ENGL 206 [WI]	American Literature II	3.0
ENGL 211 [WI]	British Literature I	3.0
ENGL 212	British Literature II	3.0
ENGL 315 [WI]	Shakespeare	3.0
ENGL 380	Literary Theory	3.0
ENGL 490	Seminar in English and American Literature	4.0
ENGL 492	Seminar in World Literature	4.0
ENGL 499	Senior Project in Literature	4.0
Select any of the following for 9.0 credits:		9.0
ENGL 200 [WI]	Classical to Medieval Literature	
ENGL 201	Renaissance to the Enlightenment	
ENGL 202 [WI]	Romanticism to Modernism	
ENGL 203 [WI]	Post-Colonial Literature I	
ENGL 204	Post-Colonial Literature II	
ENGL 207 [WI]	African American Literature	
ENGL 214	Readings in Fiction	
ENGL 215 [WI]	Readings in Poetry	
ENGL 216 [WI]	Readings in Drama	
Select any of the following for 9.0 credits:		9.0

ENGL 310 [WI]	Period Studies	
ENGL 320 [WI]	Major Authors	
ENGL 325	Topics in World Literature	
ENGL 330	The Bible as Literature	
ENGL 335	Mythology	
Select any of the following for 9.0 credits:		9.0
ENGL 305 [WI]	The Mystery Story	
ENGL 306	Literature of Baseball	
ENGL 307	Literature of the Holocausts	
ENGL 323	Literature and Other Arts	
ENGL 345	American Ethnic Literature	
ENGL 350	Jewish Literature and Civilization	
ENGL 355 [WI]	Women and Literature	
ENGL 360 [WI]	Literature and Society	
ENGL 365	Topics in African American Literature	
ENGL 395 [WI]	Special Studies in Literature	
ENGL I399	Independent Study in ENGL	
PHIL 381 [WI]	Philosophy in Literature	

Creative and Professional Writing

Select any of the following for a minimum of 15.0 credits:		15.0
COM 160	Introduction to Journalism	
COM 310 [WI]	Technical Communication	
COM 315	Investigative Journalism	
COM 335	Electronic Publishing	
COM 340	Desktop Publishing	
SCRIP 270	Screenwriting I	
[WI]		
SCRIP 275	Screenwriting II	
[WI]		
WRIT 210 [WI]	The Peer Reader in Context	
WRIT 220 [WI]	Creative Nonfiction Writing	
WRIT 225 [WI]	Creative Writing	
WRIT 301 [WI]	Writing Poetry	
WRIT 302 [WI]	Writing Fiction	
WRIT 303	Writing Humor and Comedy	
WRIT 306	Writing About the Media	
WRIT 310	Literary Editing & Publication	
WRIT 312 [WI]	The Practice of Professional Writing	
WRIT 400 [WI]	Writing in Cyberspace	
WRIT 405	Internship in Literary Publishing	

Science and Technology in the Humanities

Select any of the following for a minimum of 12.0 credits:		12.0
ENGL 300 [WI]	Literature & Science	
ENGL 302	Environmental Literature	
ENGL 303	Science Fiction	
ENGL 370	Topics in Literature and Medicine	
HIST 285	Technology in Historical Perspective	
HIST 287	History of Science: Ancient to Medieval	
HIST 289	History of Science: Enlightenment to Modernity	
HIST 292	Technology in American Life	
PHIL 311	Ethics and Information Technology	
PHIL 315	Engineering Ethics	
PHIL 341	Philosophy of the Environment	
PHIL 351	Philosophy of Technology	
PHIL 355	Philosophy of Medicine	
PHIL 361	Philosophy of Science	

Electives

Electives (total available varies depending on credits completed above):		28.0
Total Credits		182.0

Sample Plan of Study

Sample Plan

	Credits
Term 1	
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 195 English Freshman Seminar	3.0
UNIV H101 The Drexel Experience	1.0
Foreign Language Course (1st consecutive course)	4.0
Math elective	3.0
Social/Behavioral Sciences elective	3.0
Term Credits	17.0
Term 2	
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
CIVC 101 Introduction to Civic Engagement	1.0
Foreign Language Course (2nd consecutive course, 201-level)	3.0
Math elective	3.0
Social/Behavioral Science elective	3.0
Term Credits	13.0
Term 3	
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
Humanities/Fine Arts	6.0
Social/Behavioral Science	4.0
Language/Free elective	3.0
Term Credits	16.0
Term 4	
ENGL 205 [WI] American Literature I	3.0
ENGL 211 [WI] British Literature I	3.0
ENGL/WRIT course chosen from foundational/professional course options (200-level recommended)	3.0
Science elective	3.0
Social/Behavioral Sciences	3.0
Term Credits	15.0
Term 5	
ENGL 206 [WI] American Literature II	3.0
ENGL 212 British Literature II	3.0
International Studies	3.0
Diversity Studies	3.0
Science elective	3.0
Term Credits	15.0
Term 6	
ENGL 315 [WI] Shakespeare	3.0
ENGL/WRIT course chosen from foundational/professional course options (200-level recommended)	3.0
Creative/Professional Writing Course	3.0
Science/Technology in the Humanities	3.0
Diversity Studies	3.0
Term Credits	15.0
Term 7	
Creative/Professional Writing	3.0
ENGL/WRIT course chosen from foundational/professional course options (200-level recommended)	3.0
Humanities/Fine Arts	3.0
Science/Technology in the Humanities	3.0
Free elective	3.0
Term Credits	15.0
Term 8	
Creative/Professional Writing course	3.0
ENGL/WRIT course chosen from foundational/professional course options (200-level recommended)	3.0
Science/Technology in the Humanities course	3.0

Free electives	6.0
Term Credits	15.0
Term 9	
ENGL 380 Literary Theory	3.0
Creative/Professional Writing Course	3.0
ENGL 490 or 492--Seminar in American/English OR World Lit.	4.0
ENGL/WRIT course chosen from foundational/professional course options (300-level recommended)	3.0
International Studies elective	3.0
Term Credits	16.0
Term 10	
UNIV H201 Looking Forward: Academics and Careers	1.0
Creative/Professional Writing course	3.0
ENGL/WRIT course chosen from foundational/professional course options	3.0
ENGL/WRIT course chosen from foundational/professional course options (300-level recommended)	3.0
Science/Technology in the Humanities	3.0
Free elective	3.0
Term Credits	16.0
Term 11	
ENGL 490 or 492--Seminar in American/English OR World Lit.	4.0
ENGL/WRIT course chosen from foundational/professional course options	3.0
ENGL/WRIT course chosen from foundational/professional course options (300-level recommended)	3.0
Science/Technology in the Humanities	3.0
Free elective	3.0
Term Credits	16.0
Term 12	
ENGL 499 Senior Project in Literature	4.0
Humanities/Fine Arts course	3.0
Free electives	6.0
Term Credits	13.0
Total Credit: 182.0	

* See degree requirements (p. 80).

Co-op/Career Opportunities

English majors pursue many professional fields in addition to teaching and creative writing. Many go on to law school, politics and government, or business careers. The critical thinking, analytical and writing skills provided by our program are essential for high-level decision-making and problem solving in any professional situation.

Co-op employment is an option for English majors who can explore co-op or internship opportunities at Philadelphia museums, city government and visitors' bureaus, television and radio stations, law firms, and nonprofit organizations.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) for more detailed information on co-op and post-graduate opportunities.

Minor in English

The English minor provides students from other majors with a more intensive background in literature. Coursework in the minor exposes students to literature from a variety of periods, cultures and genres and also provides practice in critical thinking, literary analysis and writing. These courses enrich students' intellectual lives and provide them with skills that are valuable in a variety of professional situations.

Where a course required for the minor is already required for a student's major, the student is directed to choose another English elective. Other substitutions are permissible at the discretion of the Program Director.

Requirements

Select a minimum of 9 credits of the following:	9.0
ENGL 200 [WI] Classical to Medieval Literature	
ENGL 201 Renaissance to the Enlightenment	
ENGL 202 [WI] Romanticism to Modernism	
ENGL 203 [WI] Post-Colonial Literature I	
ENGL 204 Post-Colonial Literature II	
ENGL 205 [WI] American Literature I	
ENGL 206 [WI] American Literature II	
ENGL 207 [WI] African American Literature	
ENGL 211 [WI] British Literature I	
ENGL 212 British Literature II	
ENGL 214 Readings in Fiction	
ENGL 215 [WI] Readings in Poetry	
ENGL 216 [WI] Readings in Drama	
Select a minimum of 6 credits of the following:	6.0
WRIT 220 [WI] Creative Nonfiction Writing	
WRIT 225 [WI] Creative Writing	
WRIT 301 [WI] Writing Poetry	
WRIT 302 [WI] Writing Fiction	
WRIT 303 Writing Humor and Comedy	
WRIT 304 [WI] Special Topics in Writing	
WRIT 306 Writing About the Media	
WRIT 310 Literary Editing & Publication	
WRIT 312 [WI] The Practice of Professional Writing	
WRIT 400 [WI] Writing in Cyberspace	
WRIT 405 Internship in Literary Publishing	
Select a minimum of 9 credits of the following:	9.0
ENGL 300 [WI] Literature & Science	
ENGL 302 Environmental Literature	
ENGL 303 Science Fiction	
ENGL 305 [WI] The Mystery Story	
ENGL 306 Literature of Baseball	
ENGL 307 Literature of the Holocausts	
ENGL 310 [WI] Period Studies	
ENGL 315 [WI] Shakespeare	
ENGL 320 [WI] Major Authors	
ENGL 325 Topics in World Literature	
ENGL 330 The Bible as Literature	
ENGL 335 Mythology	
ENGL 345 American Ethnic Literature	
ENGL 350 Jewish Literature and Civilization	
ENGL 355 [WI] Women and Literature	
ENGL 360 [WI] Literature and Society	
ENGL 365 Topics in African American Literature	
ENGL 370 Topics in Literature and Medicine	
ENGL 380 Literary Theory	
Total Credits	24.0

Accelerated/Dual Degree

About the Program

In keeping with Drexel University's commitment to experiential learning, the accelerated degree program of a BA in English and an MA in Publishing offers students the opportunity to graduate in five years with two separate six-month co-op experiences and a Masters degree, which also includes many opportunities for hands-on experience.

Drexel's unique quarter system allows English majors with considerable flexibility within their course of study. Students can focus on writing, literary criticism, or comparative literature, for example, while also enhancing the breadth and depth of their education with courses taught in other departments and programs across the University. Drexel Publishing Group (DPG) is a unique part of the English department. DPG is solely responsible for three publications, each one unique and vital: Painted Bride Quarterly, one of the nation's oldest literary magazines; 5027mac.org, a news and culture blog written by our students; and The 33rd, the only university-based text in the United States that includes interdisciplinary, multi-genre pieces written by students at all levels and faculty as well. DPG and its activities are the overlapping element between our undergraduate and graduate programs, with student at all levels working together to make each element more successful.

Drexel's Masters of Arts in Publishing is interdisciplinary, offering courses in law, marketing, and graphic design. Instructors come from all areas of publishing: from newspapers to small presses, from online venues to academic presses. Classes often feature guest speakers who are also currently working in the industry, such as small press founders, trade magazine editors, agents, and more. Course instructors and guest speakers inform students and broaden perspectives on career opportunities in the publishing industry.

Admission Requirements

Students must apply when their undergrad status is at a minimum of 90.0 credits and a maximum of 120.0 credits.

Students apply through Graduate Admissions and must follow Drexel University admission application guidelines.

Degree Requirements

Undergraduate Requirements:

University Requirements:		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0

Two Mathematics Courses

6.0

Two Science Courses

6.0

Two Foreign Language Courses

8.0

Any two (2) consecutive foreign language courses (completing level 201)

Humanities and Fine Arts

Select four of the following:		
ARTH 101	History of Art I: Ancient to Medieval	
ARTH 102	History of Art II: Renaissance to Romanticism	
ARTH 103	History of Art: Modern Art	
DANC 201 [WI]	Dance Appreciation	
DANC 210	Introduction to Dance	
DANC 220	History of Dance	
DANC 325 [WI]	Twentieth Century Dance	
FMST 150	American Classic Cinema	
FMST 250	The Documentary Tradition	
FMST 355	Contemporary Cinema	
FMVD 218	Intermediate Cinematography	
MUSC 130	Introduction to Music	
MUSC 231	Music History I	

MUSC 232	Music History II
MUSC 236	Rock Music Through the Mid-60s
MUSC 238	Rock Music Since the Mid-60s
PHIL 101	Introduction to Western Philosophy
PHIL 105	Critical Reasoning
PHIL 211	Metaphysics: Philosophy of Reality
PHIL 221	Epistemology: Philosophy of Knowledge
PHIL 231	Aesthetics: Philosophy of Art
PHIL 251	Ethics
PHTO 110	Photography
PHTO 115	Photographic Principles
THTR 115	Theatrical Experience
THTR 221 [WI]	Theatre History I
THTR 222 [WI]	Theatre History II

Social and Behavioral Sciences

Select four of the following: 13.0

ANTH 110	Human Past: Anthropology and Prehistoric Archeology
ANTH 210 [WI]	Worldview: Science, Religion and Magic
COM 150	Mass Media and Society
COM 230	Techniques of Speaking
HIST 161	Themes in World Civilization I
HIST 162	Themes in World Civilization II
HIST 163	Themes in World Civilization III
PSCI 100	Introduction to Political Science
PSCI 120	History of Political Thought
PSY 120	Developmental Psychology
PSY 140	Approaches to Personality
SOC 101	Introduction to Sociology
SOC 115	Social Problems
SOC 120	Sociology of the Family

International Studies

Select two of the following: 6.0

ANTH 212 [WI]	Topics in World Ethnography
ANTH 312	Approaches to Intercultural Behavior
COM 360	International Communication
COM 361	International Public Relations
COM 362	International Negotiations
FMST 160	European Cinema
HIST 209	The United States & Central America: From Monroe Doctrine to Cold War
HIST 235	The Great War, 1914-1918
HIST 236	World War II
HIST 259	History of Europe in the 20th Century
HIST 270 [WI]	Introduction to Latin American History
MUSC 331	World Musics
PHIL 335	Global Ethical Issues
SOC 340	Globalization

Studies in Diversity

Select two of the following: 6.0

AFAS 101	Introduction to Africana Studies
AFAS 201	Cross Currents in Africana Studies
ANTH 101	Introduction to Cultural Diversity
COM 345	Intercultural Communication
ANTH 210 [WI]	Worldview: Science, Religion and Magic
ENGL 345	American Ethnic Literature
ENGL 350	Jewish Literature and Civilization
ENGL 355 [WI]	Women and Literature
ENGL 365	Topics in African American Literature
HIST 212	Themes in African-American History
HIST 214	United States Civil Rights Movement
HIST 215	American Slavery
HIST 216	Freedom in America

HIST 218	Race and Film in United States History
HIST 223	Women and Work in America
HIST 224	Women in American History
HIST 249	Modern Jewish History
JUDA 201	Jewish Literature and Civilization
JUDA 202	Jewish Life and Culture in the Middle Ages
JUDA 203	Modern Jewish History
MUSC 333	Afro-American Music USA
SOC 210	Race, Ethnicity and Social Inequality
SOC 330	Development and Underdevelopment in the Global South
WGST 101	Introduction to Women's and Gender Studies
WGST 240	Women and Society in a Global Context

Major Requirements**Professional and Foundational Courses**

Select five of the following: 15.0

ENGL 205 [WI]	American Literature I
ENGL 206 [WI]	American Literature II
ENGL 211 [WI]	British Literature I
ENGL 212	British Literature II
ENGL 315 [WI]	Shakespeare
ENGL 380	Literary Theory
ENGL 490	Seminar in English and American Literature
ENGL 492	Seminar in World Literature
ENGL 499	Senior Project in Literature

Select three of the following: 9.0

ENGL 200 [WI]	Classical to Medieval Literature
ENGL 201	Renaissance to the Enlightenment
ENGL 202 [WI]	Romanticism to Modernism
ENGL 203 [WI]	Post-Colonial Literature I
ENGL 204	Post-Colonial Literature II
ENGL 207 [WI]	African American Literature
ENGL 214	Readings in Fiction
ENGL 215 [WI]	Readings in Poetry
ENGL 216 [WI]	Readings in Drama

Select three of the following: 9.0

ENGL 310 [WI]	Period Studies
ENGL 320 [WI]	Major Authors
ENGL 325	Topics in World Literature
ENGL 330	The Bible as Literature
ENGL 335	Mythology

Select three of the following: 9.0

ENGL 305 [WI]	The Mystery Story
ENGL 306	Literature of Baseball
ENGL 307	Literature of the Holocausts
ENGL 323	Literature and Other Arts
ENGL 345	American Ethnic Literature
ENGL 350	Jewish Literature and Civilization
ENGL 355 [WI]	Women and Literature
ENGL 360 [WI]	Literature and Society
ENGL 365	Topics in African American Literature
ENGL 395 [WI]	Special Studies in Literature
ENGL I399	Independent Study in ENGL
PHIL 381 [WI]	Philosophy in Literature

Creative and Professional Writing

Select five of the following: 15.0

COM 310 [WI]	Technical Communication
COM 315	Investigative Journalism
COM 335	Electronic Publishing
COM 340	Desktop Publishing
SCRIP 270	Screenwriting I
[WI]	

SCRIP 275	Screenwriting II [W]	
WRIT 210 [W]	The Peer Reader in Context	
WRIT 220 [W]	Creative Nonfiction Writing	
WRIT 225 [W]	Creative Writing	
WRIT 301 [W]	Writing Poetry	
WRIT 302 [W]	Writing Fiction	
WRIT 303	Writing Humor and Comedy	
WRIT 306	Writing About the Media	
WRIT 310	Literary Editing & Publication	
WRIT 312 [W]	The Practice of Professional Writing	
WRIT 400 [W]	Writing in Cyberspace	
WRIT 405	Internship in Literary Publishing	

Science and Technology in the Humanities

Select four of the following:		12.0
ENGL 300 [W]	Literature & Science	
ENGL 302	Environmental Literature	
ENGL 303	Science Fiction	
ENGL 370	Topics in Literature and Medicine	
HIST 280	History of Science: Ancient to Medieval	
HIST 281	History of Science: Enlightenment to Modernity	
HIST 285	Technology in Historical Perspective	
HIST 292	Technology in American Life	
PHIL 311	Ethics and Information Technology	
PHIL 315	Engineering Ethics	
PHIL 341	Philosophy of the Environment	
PHIL 355	Philosophy of Medicine	
PHIL 351	Philosophy of Technology	
PHIL 361	Philosophy of Science	

Electives

Free Electives

Publishing Program Requirements

LAW 603S	Media Law	2.0-3.0
MKTG 601	Marketing Strategy & Planning	3.0
PUB 504	Drexel Publishing Group Special Projects	3.0
PUB 530	The Publishing Environment	3.0
PUB 631	Publication Design: Print and Digital	3.0
PUB 635	Periodicals Publishing	3.0
PUB 720	The Ebook and Online Magazines	3.0
PUB 730	Book Publishing	3.0
PUB 750	Small Press Development	3.0
WEST 500	Introduction to Digital Design Tools	3.0

Select five of the following 15.0

COM 500	Reading & Res Communication	
COM 510	Technical Writing	
COM 520	Science Writing	
COM 525	Document Design and Evaluation	
COM 530	Techniques and Science of Photography	
COM 540	Technical and Science Graphics	
COM 570	Technical and Science Editing	
COM 575	Grant Writing for the Arts and Humanities	
COM 610	Theories of Communication and Persuasion	
COM 640	Desktop Publishing	
COM 670	Medical Writing	
COM T680	Special Topics in Communication	
CCM 555	Ethnography of Communication	
LAW 602S	First Amendment	
LAW 760S	Copyright	
MGMT 601	Managing the Total Enterprise	
MKTG 630	Global Marketing	
ORGB 625	Leadership and Professional Development	
PUB I599	Independent Study in PUB	

PUB T680	Special Topics in Publishing	
PUB 701	Independent Project in Publishing	
Total Credits		182.0-183.0

* Publishing electives must be 500-level or above.

Sample Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV H101	The Drexel Experience	1.0
Any Social and Behavioral Sciences course		4.0
Any Mathematics course		4.0
Any Foreign Language course		4.0
Term Credits		16.0
Term 2		Credits
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Any Social and Behavioral Sciences course		4.0
Any Foreign Language Course		4.0
Any Mathematics course		4.0
Free elective		3.0
Term Credits		18.0
Term 3		Credits
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Any Science course		3.0
Any two Social and Behavioral Science courses		6.0
Two free electives		6.0
Term Credits		18.0
Term 4		Credits
ENGL 205 [W]	American Literature I	3.0
Any Social and Behavioral Science course		3.0
ENGL 211 [W]	British Literature I	3.0
Any Science course		3.0
Any Humanities and Fine Arts Course		3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Term Credits		16.0
Term 5		Credits
ENGL 206 [W]	American Literature II	3.0
ENGL 212	British Literature II	3.0
PSCI 150	International Politics	4.0
One Study in Diversity course		3.0
Environmental Science course (ENVSS)		3.0
Students will do Spring/Summer co-op		
Term Credits		16.0
Term 6		Credits
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 202 [W]	Romanticism to Modernism	3.0
ENGL 203 [W]	Post-Colonial Literature I	3.0
Any Creative and Professional Writing course		3.0
Any Social and Behavioral Sciences Course		3.0
Free Elective		3.0
Term Credits		16.0
Term 7		Credits
Creative & Professional Writing course		3.0
ENGL 216 [W]	Readings in Drama	3.0
ENGL 315 [W]	Shakespeare	3.0
PHIL 381 [W]	Philosophy in Literature	3.0
WRIT 220 [W]	Creative Nonfiction Writing	3.0
Free elective		3.0
Students will do Spring/Summer co-op		
Term Credits		18.0

Term 8		
COM 610	Theories of Communication and Persuasion	3.0
PUB 530	The Publishing Environment	3.0
PUB 631	Publication Design: Print and Digital	3.0
PUB 635	Periodicals Publishing	3.0
MKTG 601	Marketing Strategy & Planning	3.0
Elective		3.0
Term Credits		18.0
Term 9		
ENGL 320 [WI]	Major Authors	3.0
ENGL 325	Topics in World Literature	3.0
ENGL 335	Mythology	3.0
ENGL 380	Literary Theory	3.0
ENGL 492	Seminar in World Literature	4.0
Term Credits		16.0
Term 10		
ENGL 300 [WI]	Literature & Science	3.0
WRIT 310	Literary Editing & Publication	3.0
PUB 504	Drexel Publishing Group Special Projects	3.0
PUB T680	Special Topics in Publishing	3.0
Any PUB elective		3.0
Term Credits		15.0
Term 11		
ENGL 490	Seminar in English and American Literature	4.0
PHIL 361	Philosophy of Science	3.0
HIST 287	History of Science: Ancient to Medieval	4.0
PHIL 351	Philosophy of Technology	3.0
PUB 701	Independent Project in Publishing	3.0
Term Credits		17.0
Term 12		
ENGL 499	Senior Project in Literature	4.0
WRIT 312 [WI]	The Practice of Professional Writing	3.0
COM 525	Document Design and Evaluation	3.0
COM 575	Grant Writing for the Arts and Humanities	3.0
Free elective:		3.0
Term Credits		16.0
Term 13		
ENGL 360 [WI]	Literature and Society	3.0
WEST 500	Introduction to Digital Design Tools	3.0
LAW 603S	Media Law	3.0
Free electives:		6.0
Term Credits		15.0
Term 14		
PUB 720	The Ebook and Online Magazines	3.0
PUB 730	Book Publishing	3.0
2 PUB electives		6.0
PUB 720	The Ebook and Online Magazines	3.0
Term Credits		15.0

Total Credit: 230.0

English Faculty

Jan Armon, PhD (*University of Michigan*). Associate Teaching Professor. Academic functions of personal writing, composition.

Valarie Arms, PhD (*Temple University*). Professor. Rhetoric and Composition

Kenneth Bingham, MA (*Temple University*). Teaching Professor. First-year writing; engineering ethics; literature of baseball.

Valerie Booth, PhD (*Emory University*). Associate Teaching Professor.

Raymond Brebach, PhD (*University of Illinois*). Associate Professor. Modern British fiction; the novel; textual studies.

André Carrington, PhD (*New York University*). Assistant Professor. Cultural politics of race, gender and genre; feminism criticism; critical race theory.

Paula Marantz Cohen, PhD (*Columbia University*) *Distinguished Professor, Dean of the Pennoni Honors College*. Co-editor, *Journal of Modern Literature*; Host of the *Drexel Interview*. Nineteenth- and early twentieth-century English and American literature; film studies.

Albert DiBartolomeo, MA (*Temple University*). Teaching Professor. Co-Director, Drexel Publishing Group; Creative writing; first-year writing; non-fiction.

Dan Driscoll, MA (*Temple University*). Associate Teaching Professor. Associate Director, University Writing Center: Curricular Initiatives. Co-Director, Minor in Writing. First-year writing.

Anne Erickson, PhD (*Purdue University*). Assistant Teaching Professor. Online educational applications; the short story cycle.

Nomi Eve, MFA (*Brown University*). Assistant Teaching Professor.

Lisa Farley, MEd (*Temple University*). Associate Teaching Professor. English as a Second Language (ESL).

Robert Finegan, MFA (*University of Pittsburgh*). Associate Teaching Professor. First-year writing; technical and creative writing.

Alexis Finger, MS (*Queens College, CUNY*). Associate Teaching Professor. Speech; ESL; oral communication.

Valerie Fox, PhD (*SUNY at Binghamton*). Teaching Professor. Founding Editor, *Press 1*. Twentieth century drama; modern and contemporary American poetry; first-year writing.

Edward Fristrom, PhD (*State University of New York-Albany*). Associate Teaching Professor. Professional writing, creative writing, multimedia, and writing education.

Keunah Han, PhD (*Temple University*). Assistant Teaching Professor. English as a Second Language (ESL)

Cassandra Hirsch, MFA (*Rosemont College*). Assistant Teaching Professor. Fiction.

Gabriella Ibieta, PhD (*City University of New York*). Associate Professor. Comparative literature; Cuban and Latin American fiction.

Henry Israeli, MFA (*University of Iowa*) *Associate Director, Certificate in Writing and Publishing*. Associate Teaching Professor. Founder and editor of *Saturnalia Books*, a publisher of contemporary poetry.

Miriam Kotzin, PhD (*New York University*). Professor. Founding Editor, *Per Contra*. American literature; genre studies; creative writing; communications.

Stephen Mandell, PhD (*Temple University*). Professor. First-year writing; technical writing; speech; American literature.

Deirdre McMahon, PhD (*University of Iowa*). Associate Teaching Professor. 19th-century British literature and culture: empire, critical race studies and analyses of material culture.

Marianallet Mendez-Rivera, PhD (*University of Minnesota*). Assistant Teaching Professor. Use of the mass media to secure, maintain and enhance political power; international technical communication—including issues of translation v. localization.

Harriet Levin Millan, MFA (*University of Iowa*) *Director, Certificate in Writing and Publishing*. Associate Teaching Professor. Poetry.

Jill Moses, MFA (*University of Oregon*). Assistant Teaching Professor. Dramatic literature; first-year writing.

Christopher T. Nielson, PhD (*Purdue University*) *Assistant Department Head; Director, Programs in English*. Teaching Professor. Shakespeare; Renaissance drama and literature; dramatic literature; first-year writing.

Karen Nulton, PhD (*Rutgers University*) *Director, Writing Assessment*. Associate Teaching Professor. Writing assessment, writing pedagogy, and writing across the curriculum.

Margene Peterson, MA (*Rhode Island School of Design*). Instructor. English as a Second Language (ESL); the learning styles and strategies of non-native speakers of English.

Abioseh Porter, PhD (*University of Alberta, Canada*). Professor. Comparative literature; postcolonial literatures; Editor, JALA, Journal of the African Literature Association.

Donald Riggs, PhD (*University of North Carolina-Chapel Hill*). Teaching Professor. Cinematic monsters; science fiction and fantasy literature and film; Renaissance literature; creative writing; first-year writing.

Donna Rondolone, PhD (*University of Pennsylvania*). Associate Teaching Professor. Medieval literature; Arthurian legend; first-year writing.

Gail Rosen, JD (*Temple University*). Associate Teaching Professor. Literature and law; first-year writing.

Doreen Alvarez Saar, PhD (*SUNY Buffalo*) *American Literature Editor, Rocky Mountain Review of Language and Literature*. Professor. Early American literature; Eighteenth-century America; race and gender studies.

Sheila Sandapen, PhD (*Indiana University of Pennsylvania*). Assistant Teaching Professor. First-year writing; cultural studies; women's studies; history and film.

Fred A. Siegel, PhD (*New York University*) *Director, First-Year Writing Program*. Teaching Professor. Popular theater; dramatic literature, creative non-fiction; first-year writing.

Scott Stein, MFA (*University of Miami*). Teaching Professor. Creative writing; first-year writing; Founding Editor, When Falls the Coliseum: A Journal of American Culture (Or Lack Thereof).

Elizabeth Thorpe, MFA (*Goddard College*). Assistant Teaching Professor. New England literature, illness/healing narratives, and the creative process.

Eva Thury, PhD (*University of Pennsylvania*). Associate Professor. Mythology; classical literature; drama; first-year writing; desktop publishing and software documentation.

Kathleen Volk Miller, MA (*Rutgers University*) *Director, Graduate Program in Publishing; Co-Director, Drexel Publishing Group*. Teaching Professor. Co-Editor, Painted Bride Quarterly (PBQ); creative writing; first-year writing.

Maria Volynsky, EdD (*Temple University*) *Associate Director, First-Year Writing Program; ESL Coordinator*. Assistant Teaching Professor. English as a Second Language (ESL).

Scott Warnock, PhD (*Temple University*) *Director, Drexel Writing Center; Director, University Writing Program*. Associate Professor. Rhetoric and composition; medical writing; information technology and literacy.

Robert A. Watts, MA (*Temple University*). Associate Teaching Professor. Creative writing; first-year writing.

Rachel Wenrick, MFA (*Columbia University*) *Associate Director, University Writing Program: Strategic Initiatives; Co-Director, Minor in Writing*. Associate Teaching Professor. First-year writing.

Vincent Williams, PhD (*Temple University*). Assistant Teaching Professor. First-year writing; the intersection of race, gender, class and urbanism.

Jennifer Yusin, PhD (*Emory University*). Associate Professor. Postcolonial literature; trauma theory; literary theory; psychoanalysis, and memory studies in contemporary literature in English.

Emeritus Faculty

Richard Astro, PhD (*University of Washington*) *Distinguished Professor, Provost Emeritus*. Twentieth-century American literature; literature and sports.

Environmental Science

Major: Environmental Science

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 182.5 - 186.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 03.0104

Standard Occupational Classification (SOC) code: 19-2041

About the Program

The environmental science program at Drexel University is committed to educating undergraduates for technical careers and graduate study in the diverse areas of environmental science vital to restoration of a clean and healthy environment in the 21st century. The affiliation between the Academy of Natural Science (<http://www.ansp.org>) and Drexel University offers the opportunity to take a national leadership role in environmental science and environmental policy, and grow the scope, capacity and reputation of the natural sciences at the University. The philosophy of the Biodiversity, Earth, and Environmental Science Department is "Experiential Learning Early and Often."

Environmental science is a multidisciplinary field designed to examine environmental problems and find solutions. This field requires understanding of a number of disciplines, including biology, physics and chemistry. Solving some of our environmental problems also requires knowledge of environmental policy, ethics, and scientific data analysis.

The program has an integrated curricular approach designed around student laboratory investigations. The goal of this program is to give students not only knowledge about biology, chemistry, and ecology but also the ability to use the tools and skills of a scientist. The program includes extensive use of computers in the laboratory, and students make frequent oral and written presentations based on their laboratory projects.

Field experience electives may include trips to local aquatic and terrestrial habitats such as streams, lakes, the John Heinz National Wildlife Refuge, New Jersey Pine Barrens, Delaware, Barnegat and Chesapeake Bays, and Appalachian Mountains. Students are also encouraged to take advantage of study abroad (<http://www.drexel.edu/studyabroad>) options. These programs often require early planning so it is advisable for interested students to speak to their advisor about opportunities in their first year.

Concentrations are available in:

- Biodiversity and Evolution
- Earth Science
- Ecology & Conservation
- Environmental Science

Additional Information

For more information about the program, visit the Department of Biodiversity, Earth & Environmental Science's (<http://www.drexel.edu/coas/academics/departments-centers/bees>) web page.

Susan Cole
Undergraduate Advisor
Environmental Science
coless@drexel.edu or email bees@drexel.edu.

Degree Requirements

The program is designed to prepare students for careers in environmental science, environmental assessment, marine science, applied ecology, biodiversity and conservation and paleontology. The requirements for specific concentrations in biodiversity and evolution; earth science; ecology & conservation; and environmental science follow the list of degree requirements.

Degree Requirements

Humanities and Social Science		
CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
COM 310 [WI]	Technical Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 341	Philosophy of the Environment	3.0
or PHIL 251	Ethics	
UNIV S101	The Drexel Experience	1.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Humanities/Social Science electives		6.0
Mathematics and Statistics		18.0
Select one of the following sequences:		
Calculus sequence		
MATH 121	Calculus I	
MATH 122	Calculus II	
MATH 123	Calculus III	
Analysis sequence		
MATH 101	Introduction to Analysis I	
MATH 102	Introduction to Analysis II	
MATH 239	Mathematics for the Life Sciences	
Additional required mathematics courses:		
MATH 410	Scientific Data Analysis I	
MATH 411	Scientific Data Analysis II	

Physical Sciences		
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
Choose two from:		5.0-7.0
CHEM 241	Organic Chemistry I	
ENVS 302	Environmental Chemistry Laboratory	
ENVS 310	Introduction to Environmental Chemistry	
Physics sequence		
PHYS 152	Introductory Physics I	4.0
PHYS 153	Introductory Physics II	4.0
PHYS 154	Introductory Physics III	4.0
Biological Sciences		
BIO 122	Cells and Genetics	4.5
BIO 124	Evolution & Organismal Diversity	4.5
BIO 126	Physiology and Ecology	4.5
Geoscience Requirements		
GEO 103	Introduction to Field Methods in Earth Science	2.0
GEO 201 [WI]	Earth Systems Processes	3.0
GEO 301	Advanced Field Methods in Earth Science	2.0
Environmental Science Core Requirements		
ENSS 341	Environmental Movements in America	4.0
or ENSS 347	Introduction to Environmental Policy Analysis	
ENVS 101	Introduction to Environmental Science	5.0
ENVS 102	Natural History, Research and Collections	2.0
ENVS 201	Practical Identification of Plants and Animals	2.0
ENVS 202	Tree of Life	2.0
ENVS 203	The Watershed Approach	2.0
ENVS 212	Evolution	4.0
ENVS 230	General Ecology	3.0
ENVS 308	GIS and Environmental Modeling	3.0
ENVS 441 [WI]	Issues in Global Change I: Seminar	2.0
ENVS 442	Issues in Global Change II: Research	2.0
ENVS 443	Issues in Global Change III: Synthesis	2.0
Environmental Science Lab Requirements		2.0
Environmental Concentration Requirements		12.0-16.0
See list of concentration requirements below.		
Environmental Electives		15.0
Free Electives		24.0
Total Credits		181.5-187.5

Environmental Science Concentrations

Each concentration has four required courses. In addition, the department maintains a menu of electives specific to each concentration. Check with the department for selecting the appropriate 12.0 - 16.0 credits of Environmental Science electives.

Biodiversity & Evolution Concentration

Required Courses		
BIO 244	Genetics I	3.0
ENVS 312	Systematic Biology	3.0
ENVS 438	Biodiversity	3.0
ENVS 470	Advanced Topics in Evolution	3.0
Total Credits		12.0

Earth Science Concentration

Required Courses		
GEO 101	Physical Geology	4.0
GEO 102	History of the Earth	4.0
GEO 309	Geochemistry	4.0

GEO 310	Sedimentary Environments	4.0
Total Credits		16.0

Ecology & Conservation Concentration**Required Courses**

ENVS 284	Physiological and Population Ecology	3.0
ENVS 286	Community and Ecosystem Ecology	3.0
ENVS 328	Conservation Biology	3.0
Ecology & Conservation elective		3.0
Total Credits		12.0

Environmental Science Concentration**Required Courses**

ENSS 341	Environmental Movements in America	4.0
or ENSS 347	Introduction to Environmental Policy Analysis	
ENVS 275	Global Climate Change	3.0
ENVS 310	Introduction to Environmental Chemistry	3.0
GEO 101	Physical Geology	4.0
Total Credits		14.0

Notes about Environmental Science Opportunities:

- Field experience electives include quantitative environmental measurements in local aquatic and terrestrial habitats, such as streams, lakes, the Delaware Bay, the Poconos, and the New Jersey Pine Barrens (for example, Field Botany: NJ Pine Barrens; Ecology of the Pine Barrens; Marine Field Methods).
- Students are required to consult frequently with their academic advisors for curriculum planning. Many of the graduate courses in environmental science are also open to qualified seniors who wish to become familiar with some of the applications in the field. Prerequisites and descriptions of available graduate courses appear in the graduate catalog.
- The Equatorial Guinea: Bioko Island Study Abroad Program offers a unique opportunity for undergraduates and recent graduates to study tropical biodiversity and its conservation, with an emphasis on field work that takes advantage of Bioko Island's pristine rainforests ranging from sea level to over 10,000 feet in altitude, its seven species of rare monkeys and its four species of nesting sea turtles. For more information, please visit the Drexel Study Abroad Office (<http://www.drexel.edu/studyabroad>).

Sample Plan of Study

The plan of study below is a generic plan, suited for all four concentrations. Contact the program advisor for additional details.

Term 1		Credits
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENVS 101	Introduction to Environmental Science	5.0
MATH 101 or 121	Introduction to Analysis I Calculus I	4.0
UNIV S101	The Drexel Experience	1.0
Term Credits		16.5

Term 2

BIO 124	Evolution & Organismal Diversity	4.5
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0

MATH 102 or 122	Introduction to Analysis II Calculus II	4.0
Term Credits		17.0

Term 3

BIO 126	Physiology and Ecology	4.5
CHEM 103	General Chemistry III	5.0
ENVS 102	Natural History, Research and Collections	2.0
GEO 103	Introduction to Field Methods in Earth Science	2.0
MATH 239 or 123	Mathematics for the Life Sciences Calculus III	4.0
Term Credits		17.5

Term 4

BIO 122	Cells and Genetics	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENVS 201	Practical Identification of Plants and Animals	2.0
Env Chem elective		3.0-4.0
Free elective		3.0
Term Credits		15.5-16.5

Term 5

ENVS 202	Tree of Life	2.0
ENVS 308	GIS and Environmental Modeling	3.0
GEO 201 [WJ]	Earth Systems Processes	3.0
Humanities/Social Science elective		3.0
Free elective		3.0
Term Credits		14.0

Term 6

ENVS 203	The Watershed Approach	2.0
ENVS 212	Evolution	4.0
ENVS 230	General Ecology	3.0
PHYS 152	Introductory Physics I	4.0
Humanities/Social Science elective		3.0
Term Credits		16.0

Term 7

ENSS 341 or 347	Environmental Movements in America Introduction to Environmental Policy Analysis	4.0
PHYS 153	Introductory Physics II	4.0
UNIV S201	Looking Forward: Academics and Careers	1.0
ENVS concentration course*		3.0-4.0
Free elective		3.0
Term Credits		15.0-16.0

Term 8

COM 230	Techniques of Speaking	3.0
GEO 301	Advanced Field Methods in Earth Science	2.0
MATH 410	Scientific Data Analysis I	3.0
PHYS 154	Introductory Physics III	4.0
ENVS concentration course*		3.0-4.0
Term Credits		15.0-16.0

Term 9

COM 310 [WJ]	Technical Communication	3.0
MATH 411	Scientific Data Analysis II	3.0
ENVS concentration course*		3.0-4.0
Env Chem elective		2.0-3.0
Free elective		3.0
Term Credits		14.0-16.0

Term 10

ENVS 441 [WJ]	Issues in Global Change I: Seminar	2.0
ENVS concentration course*		3.0-4.0
Environmental Science (ENVS) elective		3.0
Environmental Science (ENVS) lab elective		2.0
Free elective		3.0
Term Credits		13.0-14.0

Term 11

ENVS 442	Issues in Global Change II: Research	2.0
PHIL 341 or 251	Philosophy of the Environment Ethics	3.0
Environmental Science (ENVS) electives		6.0
Free elective		3.0
Term Credits		14.0
Term 12		
ENVS 443	Issues in Global Change III: Synthesis	2.0
Environmental Science (ENVS) electives		6.0
Free electives		6.0
Term Credits		14.0
Total Credit: 181.5-187.5		

* See degree requirements (p. 88).

Co-op/Career Opportunities

Environmental scientists pursue careers in environmental assessment, environmental health, ecology, conservation, marine science, and atmospheric science.

Co-op Opportunities

Co-op and research opportunities will be available with the scientists at the Academy of Natural Sciences (<http://www.ansp.org>). In addition, recent co-op experiences have included:

CHPlanning, Center City Philadelphia
Lakes Environmental Assn., Maine
US Environmental Protection Agency, Center City Philadelphia
Criterion Lab Inc, Philadelphia PA Suburbs
Philadelphia Water Department, Philadelphia
Temple University, Philadelphia
Fairway Testing Co., NYC
University of Alaska, Fairbanks, Alaska
Bioko Biodiversity Protection Program, Equatorial Guinea
React Environmental Professional Services Group Inc., Philadelphia
Air Management Services, Philadelphia
Exelon Corporation, Philadelphia

Graduate Opportunities

Graduates in this major typically work for government environmental agencies, in environmental consulting firms, and in environmental departments of various industries. Additional training at the graduate level is an option for many students.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Environmental Science Faculty

Walter F. Bien, PhD (*Drexel University*) *Director, Laboratory of Pinelands Research*. Research Professor. Natural resource management, restoration ecology, conservation biology, and New Jersey Pinelands community dynamics.

Elizabeth Burke Watson, PhD (*University of California, Berkeley*). Assistant Professor. The implications of global and regional environmental change, and unraveling the interacting effects of multiple anthropogenic stressors on coastal ecosystems to promote more informed management, conservation, and restoration.

Donald F. Charles, PhD (*Indiana University*) *Senior Scientist and Section Leader, Phycology Section, Academy of Natural Sciences*. Professor. Diatoms as water quality indicators; paleolimnological approaches for inferring change in biology and chemistry of lakes; lake management; assessment of perturbations in aquatic ecosystems due to municipal and industrial effluents, land-use change, acid deposition, eutrophication and climate change.

Carol Collier, FAICP, MRP (*University of Pennsylvania*) *Sr. Advisor, Watershed Management and Policy at the Academy of Natural Sciences; Director, Environmental Studies and Sustainability Program*. Water resources management, environmental planning, climate change policy, the intersection of science, policy and decision making.

Ted Daeschler, PhD (*University of Pennsylvania*) *Associate Curator of Vertebrate Zoology; Vice President for Systematic Biology and the Library: Academy of Natural Sciences*. Associate Professor. Vertebrate fauna of the Late Devonian Period in eastern North America; fossil collecting; systematic work focusing on freshwater vertebrates; nature of early non-marine ecosystems.

Daniel P. Duran, PhD (*Vanderbilt University*). Assistant Teaching Professor. Phylogeography, systematics and taxonomy, population and conservation genetics, ecological niche modeling, focusing on insect systems to better understand fundamental evolutionary processes and maintain biodiversity.

Jon Gelhaus, PhD (*University of Kansas*) *Curator, Department of Entomology: Academy of Natural Sciences*. Professor. Systematic expertise in crane flies (Tipuloidea); phylogenetic reconstruction; historical and ecological biogeography; biodiversity measures and evolution of morphological character systems.

Richard J. Horwitz, PhD (*University of Chicago*) *Senior Scientist; Fisheries Section Leader; Ruth Patrick Chair of Environmental Sciences*. Associate Professor. Reproductive ecology, life history and distribution of freshwater fishes; effects of land use, habitat structure and hydrology on population dynamics and species composition in aquatic systems; ecological modeling and biometry; anthropogenic contaminants in fishes.

Susan S. Kilham, PhD (*Duke University*). Professor. Aquatic ecology: phytoplankton; physiological ecology, especially of diatoms in freshwater and marine systems; large lakes; food webs; biogeochemistry.

Danielle Kreeger, PhD (*Oregon State University*). Research Associate Professor. Trophic interactions in aquatic ecosystems.

Tatyana Livshultz, PhD (*Cornell University*) *Assistant Curator of Botany*. Assistant Professor. Expertise of the milkweed and dogbane family (Apocynaceae); evolution and species diversity of the genus *Dischidia*; differences in floral form and function.

Richard McCourt, PhD (*University of Arizona*) *Associate Curator of Botany, Academy of Natural Sciences of Drexel University; 2010-2012: Program Director, Division of Graduate Education, National Science Foundation*. Professor. Biodiversity, evolution, ecology, and systematic of green algae, specifically charophyte algae.

Michael O'Connor, MD, PhD (*MD, Johns Hopkins University; PhD, Colorado State*). Associate Professor. Biophysical and physiological ecology, thermoregulation of vertebrates, ecological modeling.

Sean O'Donnell, PhD (*University of Wisconsin-Madison*). Professor. Tropical ecology, focusing on geographic variation and elevation effects on ecology and behavior of army ants and ant-bird interactions;

neurobiology, focusing on brain plasticity and brain evolution in social insects.

Marina Potapova, PhD (*Russian Academy of Sciences*) Assistant Curator. Assistant Professor. Taxonomy, ecology, and biogeography of freshwater diatoms; methods of quantifying morphological characters of diatom frustules based on geometric morphometrics; systematic of monoraphid freshwater diatoms.

Gary Rosenberg, PhD (*Harvard University*) *Pilsbry Chair of Malacology*. Professor. Magnitude and origin of species-level diversity in the Mollusca.

Jacob Russell, PhD (*University of Arizona*). Associate Professor. Microbiomes and metagenomics; ecology and evolution of symbiosis.

Ron Smith, MS (*Rutgers University*). Instructor. Shorebird Ecology and Conservation; Amphibians of the NJ Pine Barrens; Restoration Ecology; Climate Change – Regional Effects and Education

James R. Spotila, PhD (*University of Arkansas*) *L. D. Betz Chair Professor*. Professor. Physiological and biophysical ecology, thermoregulation of aquatic vertebrates, biology of sea turtles.

Loyc Vanderkluysen, PhD (*University of Hawaii*). Assistant Professor. The cyclicity of volcanic eruptions, volcanic degassing processes, and large igneous provinces.

David J. Velinsky, PhD (*Old Dominion University*) *Department Head, Biodiversity, Earth and Environmental Science*. Professor. Geochemical cycling of organic and inorganic constituents of sediments and waters; Sedimentary diagenesis of major and minor elements; Isotope biogeochemistry of carbon, nitrogen and sulfur in marine and freshwater systems.

Jason Weckstein, PhD (*Louisiana State University*) *Associate Curator of Ornithology*. Associate Professor. Avian phylogenetics, comparative biology and evolutionary history; biodiversity surveys of birds and their parasites and pathogens; coevolutionary history of birds and their parasites.

Emeritus Faculty

John G. Lundberg, PhD (*University of Michigan*). Professor Emeritus. Diversity and diversification of fishes; documenting and interpreting the morphological, molecular, and taxonomic diversity of living and fossil fishes in the interrelated fields of systematic, faunistics and biogeography and paleobiology; exploration and collecting in poorly-known tropical freshwater habitats and regions.

Daniel Otte, PhD (*University of Michigan*) *Senior Curator, Systematics and Evolutionary Biology*. Professor Emeritus. Taxonomy and biogeography of Orthoptera (grasshoppers, crickets, katydids and their relatives).

Environmental Studies

Major: Environmental Science

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 182.0

Classification of Instructional Programs (CIP) code: 03.0313

Standard Occupational Classification (SOC) code: 19-2041

About the Program

Note: Effective Fall 2014, students are no longer being accepted into this program. Please see the BA in Environmental Studies and Sustainability (p. 93).

The major in environmental studies is a multi-disciplinary program designed to provide students with both a technical grounding in environmental science as well as a strong emphasis in social science in order to prepare students for environmental policy careers

The causes and consequences of environmental problems are extremely complex, involving the connection of natural ecological systems to human systems such as physical infrastructure and the built environment. Equally important to understanding environmental problems are the social, economic and political considerations that govern society's ability to balance its current needs and desires with those of future generations. Indeed, ecological problems and their consequences are an enduring problem of society. Problems such as air and water pollution, exposure to toxic chemicals, sprawling land development, environmentally damaging energy extraction and unsustainable energy use practices, to name a few, all conspire to negatively influence our natural world as well as human health and well being.

The environmental studies major draws on the University's academic strengths in science, technology, social science and communication. Courses and faculty are drawn from a diverse set of academic programs: including the natural sciences, social sciences and the humanities. The program also benefits from Drexel's urban location -- as issues related to urban sustainability policy and planning, including urban redevelopment and land reuse practices, transportation policy, green building, energy efficiency, urban farming and food systems, recycling, and racial and class-based environmental justice and health -- are core topics of the program of study.

The degree is designed to prepare students for a wide set of vocational opportunities with governmental agencies, corporations, and nonprofit organizations that develop, implement and communicate environmental policies. Students are strongly encouraged to gain valuable professional experience through Drexel's cooperative education program.

For more information visit the Department of Biodiversity, Earth & Environmental Science (<http://www.drexel.edu/coas/academics/departments-centers/bees>) web page.

Degree Requirements

General Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
or ANTH 110	Human Past: Anthropology and Prehistoric Archeology	
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
COM 150	Mass Media and Society	3.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSCI 110	American Government I	4.0
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0

UNIV H101	The Drexel Experience	2.0
Two English (ENGL) Electives *		6.0
Philosophy (PHIL) Elective		3.0
Two History (HIST) Electives		6.0
Math Sequences		8.0

Select one of the following sequences:

MATH 101	Introduction to Analysis I	
& MATH 102	and Introduction to Analysis II	
MATH 121	Calculus I	
& MATH 122	and Calculus II	

Environmental Studies Core Requirements

Theory Sequence Requirements

COM 210	Theory and Models of Communication	3.0
SOC 260	Classical Social Theory	3.0
ANTH 410	Cultural Theory I	3.0
or SOC 460	Contemporary Social Theory	

Methods Sequence Requirements

COM 220	Qualitative Research Methods	3.0
SOC 250	Research Methods I	3.0
SOC 364	Computer-Assisted Data Analysis	3.0

Natural Science Requirements

ENVS 230	General Ecology	3.0
ENVS 286	Community and Ecosystem Ecology	3.0
ENVS 328	Conservation Biology	3.0
Natural Science Elective **		3.0

Other Required Courses

ANTH 360	Culture and the Environment	3.0
COM 316	Campaigns for Health & Environment	3.0
COM 317 [WI]	Environmental Communication	3.0
CJS 373	Environmental Crime	3.0
ENSS 325	Introduction to Urban and Environmental Planning	3.0
ENSS 341	Environmental Movements in America	3.0
ENSS 345	Sociology of the Environment	3.0
ENSS 346	Environmental Justice	3.0
ENSS 347	Introduction to Environmental Policy Analysis	3.0
ENVS 260	Environmental Science and Society	3.0
PSCI 331	Environmental Politics	4.0
SOC 240	Urban Sociology	3.0

Other Environmental Studies Program Electives

Select ten of the following: 30.0

BIO 118	Basics of Cancer	
BIO 220	Essential Microbiology	
CHEM 111	General Chemistry I	
CHEM 112	General Chemistry II	
CHEM 151	Applied Chemistry	
COM 101	Human Communication	
COM 230	Techniques of Speaking	
COM 260	Advanced Journalism	
COM 270 [WI]	Business Communication	
COM 280	Public Relations Principles and Theory	
COM 310 [WI]	Technical Communication	
COM 318	Film, Celebrity and the Environmental Movement	
COM 320 [WI]	Science Writing	
COM 350 [WI]	Document Design and Evaluation	
COM 375 [WI]	Grant Writing	
ENGL 302	Environmental Literature	
ENSS 275	Global Climate Change	
ENSS 480	Special Topics	
ENVS 284	Physiological and Population Ecology	
ENVS 285 [WI]	Population Ecology Laboratory	
ENVS 321	Environmental Health	
ENVS 322	Tropical Ecology	

ENVS 330	Aquatic Ecology	
ENVS 413	Advanced Population Ecology	
ENVS 436	Principles of Toxicology I	
ENVS 437	Principles of Toxicology II	
ENVS 441 [WI]	Issues in Global Change I: Seminar	
HNRS 201	Colloquium I	
PHEV 145	Weather I: Climate and Global Change	
PHIL 335	Global Ethical Issues	
PHIL 341	Philosophy of the Environment	
PSCI 211	American Government II	
PSCI 371	Science, Technology, & Public Policy	
PSCI 372	City in United States Political Development	
PSY 150	Introduction to Social Psychology	
SOC 110	Sociology of the Future	
SOC 115	Social Problems	
SOC 235	Sociology of Health and Illness	
SOC 330	Development and Underdevelopment in the Global South	
SOC 340	Globalization	
SOC 343	The American Experience of the Wilderness	
SOC 344	Social Movements	
SOC 349	Sociology of Disasters	

Free Electives 19.0

Total Credits 182.0

Sample Plan of Study

Term 1		Credits
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
MATH 101	Introduction to Analysis I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
SOC 101	Introduction to Sociology	3.0
UNIV H101	The Drexel Experience	2.0
	Term Credits	16.0
Term 2		
BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
or 102	Introduction to Analysis II	
Environmental Studies Program Elective *		3.0
	Term Credits	14.0
Term 3		
COM 150	Mass Media and Society	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENVS 230	General Ecology	3.0
ANTH 110	Human Past: Anthropology and Prehistoric Archeology	3.0
or 101	Introduction to Cultural Diversity	
Environmental Studies Program Elective *		3.0
	Term Credits	15.0
Term 4		
COM 210	Theory and Models of Communication	3.0
COM 220	Qualitative Research Methods	3.0
ECON 201	Principles of Microeconomics	4.0
ENVS 260	Environmental Science and Society	3.0
SOC 240	Urban Sociology	3.0
	Term Credits	16.0
Term 5		
ANTH 360	Culture and the Environment	3.0
ECON 202	Principles of Macroeconomics	4.0
ENSS 345	Sociology of the Environment	3.0

SOC 250	Research Methods I	3.0
SOC 260	Classical Social Theory	3.0
Term Credits		16.0
Term 6		
CJS 373	Environmental Crime	3.0
ENVS 286	Community and Ecosystem Ecology	3.0
PSCI 110	American Government I	4.0
PSY 101	General Psychology I	3.0
SOC 364	Computer-Assisted Data Analysis	3.0
Term Credits		16.0
Term 7		
ENSS 346	Environmental Justice	3.0
PSCI 331	Environmental Politics	4.0
ENSS 341	Environmental Movements in America	3.0
Environmental Studies Program Elective*		3.0
Natural Science Elective		3.0
Term Credits		16.0
Term 8		
COM 317 [WI]	Environmental Communication	3.0
English Literature Course 200-level or Above		3.0
Environmental Studies Program Electives*		9.0
Term Credits		15.0
Term 9		
COM 316	Campaigns for Health & Environment	3.0
English Literature Course 200-level or Above		3.0
ENSS 325	Introduction to Urban and Environmental Planning	3.0
Environmental Studies Program Elective*		3.0
History (HIST) Elective		3.0
Term Credits		15.0
Term 10		
Free Elective		3.0
ENSS 347	Introduction to Environmental Policy Analysis	3.0
Philosophy (PHIL) Elective		3.0
Environmental Studies Program Electives*		6.0
Term Credits		15.0
Term 11		
SOC 460	Contemporary Social Theory	3.0
or ANTH 410	Cultural Theory I	
Free Elective		3.0
History (HIST) Elective		3.0
Environmental Studies Program Elective*		3.0
Term Credits		12.0
Term 12		
ENVS 328	Conservation Biology	3.0
Free Electives		13.0
Term Credits		16.0

Total Credit: 182.0

* See degree requirements (p. 91).

Minor in Environmental Studies

The environmental studies minor is an interdisciplinary minor designed to give students specializing in other fields a background in contemporary environmental issues and the ability to analyze such issues. For students majoring in such fields as business and engineering, the minor in environmental studies will provide them with the tools to make better decisions about products or projects related to environmental economics, politic pollutants, environmental policy, and environmental justice. For students who are liberal arts majors, the minor in environmental studies offers the opportunity to focus on the social- and natural-science aspects

of the environment, and to be prepared for issues they may encounter in their careers.

Required Courses

ENSS 120	Introduction to Environmental Studies	3.0
ENVS 260	Environmental Science and Society	3.0
ENSS 326	Cities and Sustainability	4.0
ENSS 345	Sociology of the Environment	4.0
ENSS 347	Introduction to Environmental Policy Analysis	4.0
Select two of the following:*		6.0
ENSS 275	Global Climate Change	
ENSS 325	Introduction to Urban and Environmental Planning	
ENSS 341	Environmental Movements in America	
ENSS 346	Environmental Justice	
ANTH 360	Culture and the Environment	
CJS 373	Environmental Crime	
ECON 351	Resource and Environmental Economics	
ENGL 302	Environmental Literature	
ENVS 230	General Ecology	
GEO 101	Physical Geology	
GEO 306	Environmental Geology	
PHIL 340	Environmental Ethics	
PHIL 341	Philosophy of the Environment	
PSCI 331	Environmental Politics	
SOC 444	Social Movements	
Total Credits		24.0

* Other courses may be taken as electives with Departmental approval.

Environmental Studies and Sustainability

Major: Environmental Studies and Sustainability

Degree Awarded: Bachelor of Arts (BA)

Calendar Type: Quarter

Total Credit Hours: 184.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 03.0313

Standard Occupational Classification (SOC) code: 19-2041

The BA in Environmental Studies and Sustainability is administered in the Department of Biodiversity, Earth and Environmental Science. It is a multidisciplinary degree that takes advantage of existing courses in both the Arts and Sciences to educate graduates who will be able to work in government agencies, corporations and nonprofit organizations who develop, implement or are affected by environmental policies.

Objective

The objective of this major is to educate students so that they will be successful in finding common solutions to environmental challenges that all societies will face in the 21st century. Graduates will be educated with the goal of thinking in terms of cross-cultural ideas and dialogue. In that way they will be encouraged to help people of all cultures understand environmental problems and act in the area of environmental stewardship.

The BA in Environmental Studies and Sustainability will provide our graduates with communication skills, collaboration abilities and team orientation, a "customer" orientation, creativity and innovative thinking ability, a broad environmental science understanding, analytical ability and critical thinking and problem solving ability, a work orientation with

professionalism and a positive attitude, occupation-specific skill and knowledge through co-op, and leadership ability.

Drexel Advantage

There is a distinct advantage to a student in undertaking an environmental studies degree at Drexel. Drexel University was one of the first universities in the nation to establish an undergraduate environmental science degree in the late 1960s. Since that time Drexel is known for its research and scholarship in this area. Over the long history of the program, Drexel has established an extensive network of co-op employers who value Drexel students. Therefore, there is a natural constituency for our students in Environmental Studies and Sustainability as well. Drexel students will take advantage of the co-op program to both get more extensive experience and get paid while doing so.

Degree Requirements

General Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
UNIV S101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0

Social and Behavioral Sciences

SOC 101	Introduction to Sociology	3.0
or ANTH 101	Introduction to Cultural Diversity	
PSY 101	General Psychology I	3.0
PSCI 110	American Government I	4.0
Social Behavior elective		3.0

Physical and Natural Sciences

BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
ENVS 101	Introduction to Environmental Science	5.0
ENVS 230	General Ecology	3.0
ENSS 275	Global Climate Change	3.0
or ENVS 289	Global Warming, Biodiversity and Your Future	
GEO 201 [WI]	Earth Systems Processes	3.0

Humanities and Fine Arts

Humanities & Fine Arts Electives		9.0
PHIL 340	Environmental Ethics	3.0
or PHIL 341	Philosophy of the Environment	

Diversity Electives

		6.0
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International Studies

		6.0
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Foreign Language (up to 201)

		7.0-8.0
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ENSS Core Requirements

Economics		
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ECON elective		4.0
Policy and Planning		
Choose 3 of the following:		12.0
PSCI 331	Environmental Politics	
ENSS 325	Introduction to Urban and Environmental Planning	
ENSS 326	Cities and Sustainability	
ENSS 347	Introduction to Environmental Policy Analysis	
Social Science		
ENSS 120	Introduction to Environmental Studies	3.0
ENVS 260	Environmental Science and Society	3.0

ENSS 341	Environmental Movements in America	4.0
ENSS 346	Environmental Justice	4.0
SOC 355 [WI]	Classical Social Theory	4.0
Modeling and Research		
ENVS 308	GIS and Environmental Modeling	3.0
SOC 250	Research Methods I	4.0
ENSS Electives		18.0
Senior Sequence		
ENVS 441 [WI]	Issues in Global Change I: Seminar	2.0
ENVS 442	Issues in Global Change II: Research	2.0
ENVS 443	Issues in Global Change III: Synthesis	2.0
Free Electives		25.0-24.0
Total Credits		180.0

Sample Plan of Study

Term 1		Credits
ENSS 120	Introduction to Environmental Studies	3.0
ENVS 101	Introduction to Environmental Science	5.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV S101	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
Foreign Language (103 or higher)		4.0
CIVC 101	Introduction to Civic Engagement	1.0
Term Credits		16.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
or ANTH 101	Introduction to Cultural Diversity	
Foreign Language (201 or higher)		3.0-4.0
Free elective		3.0
Term Credits		15.0-16.0
Term 4		
ENVS 260	Environmental Science and Society	3.0
ENVS 230	General Ecology	3.0
PSCI 110	American Government I	4.0
Soc/Behavior Science elective		3.0
Free elective		3.0
Term Credits		16.0
Term 5		
ENSS 275	Global Climate Change	3.0
or ENVS 289	Global Warming, Biodiversity and Your Future	
ENVS 308	GIS and Environmental Modeling	3.0
SOC 355 [WI]	Classical Social Theory	4.0
Humanities & Fine Arts elective		3.0
Free elective		3.0
Term Credits		16.0
Term 6		
ECON 201	Principles of Microeconomics	4.0
ENSS 341	Environmental Movements in America	4.0
Policy & Planning elective		4.0
Free elective		3.0
Term Credits		15.0
Term 7		

ECON 202	Principles of Macroeconomics	4.0
SOC 250	Research Methods I	4.0
GEO 201 [WI]	Earth Systems Processes	3.0
International elective		3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Term Credits		15.0
Term 8		
ENSS elective		4.0
ECON elective		4.0
PHIL 340 or 341	Environmental Ethics Philosophy of the Environment	3.0
Humanities/Fine Arts elective		3.0
Term Credits		14.0
Term 9		
Policy & Planning elective		4.0
ENSS elective		3.0
Diversity elective		3.0
Humanities/Fine Arts elective		3.0
Free elective		3.0
Term Credits		16.0
Term 10		
ENVS 441 [WI]	Issues in Global Change I: Seminar	2.0
ENSS 346	Environmental Justice	4.0
ENSS elective		3.0
Free elective		3.0
Term Credits		12.0
Term 11		
ENVS 442	Issues in Global Change II: Research	2.0
ENSS elective		4.0
Diversity elective		3.0
International elective		3.0
Free elective		3.0
Term Credits		15.0
Term 12		
ENVS 443	Issues in Global Change III: Synthesis	2.0
Policy & Planning elective		4.0
ENSS elective		4.0
Free elective		4.0-3.0
Term Credits		14.0-13.0

Total Credit: 180.0

The largest job opportunities exist in the areas of environmental communication, sustainability, environmental policy, community action, water quality, parks, outdoor recreation, ecotourism, natural resources and conservation, policy analyst, naturalist, international environmental specialist, and renewable energy.

This major will educate individuals who seek careers and/or additional academic training in the following fields:

- Sustainability planning and implementation
- Urban, Regional and Community Planning
- Geographic Information Systems
- Environmental Communications
- Environmental Journalism
- Environmental Law
- Park Management and Outdoor Recreation
- Environmental Consulting
- Environmental Policy Analysis

Environmental Studies and Sustainability Faculty

Walter F. Bien, PhD (*Drexel University*) *Director, Laboratory of Pinelands Research*. Research Professor. Natural resource management, restoration ecology, conservation biology, and New Jersey Pinelands community dynamics.

Elizabeth Burke Watson, PhD (*University of California, Berkeley*). Assistant Professor. The implications of global and regional environmental change, and unraveling the interacting effects of multiple anthropogenic stressors on coastal ecosystems to promote more informed management, conservation, and restoration.

Donald F. Charles, PhD (*Indiana University*) *Senior Scientist and Section Leader, Phycology Section, Academy of Natural Sciences*. Professor. Diatoms as water quality indicators; paleolimnological approaches for inferring change in biology and chemistry of lakes; lake management; assessment of perturbations in aquatic ecosystems due to municipal and industrial effluents, land-use change, acid deposition, eutrophication and climate change.

Carol Collier, FAICP, MRP (*University of Pennsylvania*) *Sr. Advisor, Watershed Management and Policy at the Academy of Natural Sciences; Director, Environmental Studies and Sustainability Program*. Water resources management, environmental planning, climate change policy, the intersection of science, policy and decision making.

Ted Daeschler, PhD (*University of Pennsylvania*) *Associate Curator of Vertebrate Zoology; Vice President for Systematic Biology and the Library: Academy of Natural Sciences*. Associate Professor. Vertebrate fauna of the Late Devonian Period in eastern North America; fossil collecting; systematic work focusing on freshwater vertebrates; nature of early non-marine ecosystems.

Daniel P. Duran, PhD (*Vanderbilt University*). Assistant Teaching Professor. Phylogeography, systematics and taxonomy, population and conservation genetics, ecological niche modeling, focusing on insect systems to better understand fundamental evolutionary processes and maintain biodiversity.

Jon Gelhaus, PhD (*University of Kansas*) *Curator, Department of Entomology: Academy of Natural Sciences*. Professor. Systematic expertise in crane flies (Tipuloidea); phylogenetic reconstruction; historical and ecological biogeography; biodiversity measures and evolution of morphological character systems.

Richard J. Horwitz, PhD (*University of Chicago*) *Senior Scientist; Fisheries Section Leader; Ruth Patrick Chair of Environmental Sciences*. Associate Professor. Reproductive ecology, life history and distribution of freshwater fishes; effects of land use, habitat structure and hydrology on population dynamics and species composition in aquatic systems; ecological modeling and biometry; anthropogenic contaminants in fishes.

Susan S. Kilham, PhD (*Duke University*). Professor. Aquatic ecology: phytoplankton; physiological ecology, especially of diatoms in freshwater and marine systems; large lakes; food webs; biogeochemistry.

Danielle Kreeger, PhD (*Oregon State University*). Research Associate Professor. Trophic interactions in aquatic ecosystems.

Tatyana Livshultz, PhD (*Cornell University*) *Assistant Curator of Botany*. Assistant Professor. Expertise of the milkweed and dogbane family

(Apocynaceae); evolution and species diversity of the genus *Dischidia*; differences in floral form and function.

Richard McCourt, PhD (*University of Arizona*) Associate Curator of Botany, Academy of Natural Sciences of Drexel University; 2010-2012: Program Director, Division of Graduate Education, National Science Foundation. Professor. Biodiversity, evolution, ecology, and systematic of green algae, specifically charophyte algae.

Michael O'Connor, MD, PhD (*MD, Johns Hopkins University; PhD, Colorado State*). Associate Professor. Biophysical and physiological ecology, thermoregulation of vertebrates, ecological modeling.

Sean O'Donnell, PhD (*University of Wisconsin-Madison*). Professor. Tropical ecology, focusing on geographic variation and elevation effects on ecology and behavior of army ants and ant-bird interactions; neurobiology, focusing on brain plasticity and brain evolution in social insects.

Marina Potapova, PhD (*Russian Academy of Sciences*) Assistant Curator. Assistant Professor. Taxonomy, ecology, and biogeography of freshwater diatoms; methods of quantifying morphological characters of diatom frustules based on geometric morphometrics; systematic of monoraphid freshwater diatoms.

Gary Rosenberg, PhD (*Harvard University*) Pilsbry Chair of Malacology. Professor. Magnitude and origin of species-level diversity in the Mollusca.

Jacob Russell, PhD (*University of Arizona*). Associate Professor. Microbiomes and metagenomics; ecology and evolution of symbiosis.

Ron Smith, MS (*Rutgers University*). Instructor. Shorebird Ecology and Conservation; Amphibians of the NJ Pine Barrens; Restoration Ecology; Climate Change – Regional Effects and Education

James R. Spotila, PhD (*University of Arkansas*) L. D. Betz Chair Professor. Professor. Physiological and biophysical ecology, thermoregulation of aquatic vertebrates, biology of sea turtles.

Loyc Vanderkluysen, PhD (*University of Hawaii*). Assistant Professor. The cyclicity of volcanic eruptions, volcanic degassing processes, and large igneous provinces.

Jason Weckstein, PhD (*Louisiana State University*) Associate Curator of Ornithology. Associate Professor. Avian phylogenetics, comparative biology and evolutionary history; biodiversity surveys of birds and their parasites and pathogens; coevolutionary history of birds and their parasites.

Emeritus Faculty

John G. Lundberg, PhD (*University of Michigan*). Professor Emeritus. Diversity and diversification of fishes; documenting and interpreting the morphological, molecular, and taxonomic diversity of living and fossil fishes in the interrelated fields of systematic, faunistics and biogeography and paleobiology; exploration and collecting in poorly-known tropical freshwater habitats and regions.

Daniel Otte, PhD (*University of Michigan*) Senior Curator, Systematics and Evolutionary Biology. Professor Emeritus. Taxonomy and biogeography of Orthoptera (grasshoppers, crickets, katydids and their relatives).

Geoscience

Major: Geoscience

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 185.0 - 189.0

Co-op Options: Three Co-op (Five years)

Classification of Instructional Programs (CIP) code: 40.0601

Standard Occupational Classification (SOC) code: 11-9121; 19-2042

About the Program

From energy to climate change to environmental degradation, many of the most pressing societal issues of the coming century will pertain to geoscience. The study of the Earth is central to maintaining clean drinking water, mitigating environmental contamination, providing ores and rare elements necessary for industry, and locating new sources of energy.

The Biodiversity, Earth and Environmental Science (BEES) Department offers a major in geoscience, with three concentration options designed to meet the needs of students wishing to pursue graduate school or immediate employment in the geosciences:

- Applied Geology
- General Geoscience
- Paleontology

The core requirements encompass foundational courses in science, writing, and math, and traditional courses that form the backbone of the geosciences. Building upon these are innovative courses focused on Earth systems processes, key environmental issues, practical field experiences, and advanced geological study.

In addition to nourishing and honing the passions of students studying the Earth, the core curriculum is designed to:

1. Instill key technical skills early-on, as a pathway to high-quality co-op opportunities;
2. Lay the groundwork for our students to pursue advanced graduate study in the geosciences and other disciplines, and;
3. Enable our graduates to translate marketable skills and knowledge into high-quality jobs in industry and government.

Geoscience majors will begin their field experiences during the first term of their freshmen year. Most courses include a laboratory section or a hands-on recitation section ("dry lab"), plus at least three field trips to relevant regional geological sites. These courses, combined with the co-op experience and summer geological field camp, provide students real-world experience in the field.

About the Concentrations

Applied Geology

The applied geology concentration is designed for students wishing to enter the geoscience workforce upon graduation. Possible employment opportunities include jobs in: environmental consulting, geotechnical consulting, geophysical consulting, the petroleum and natural gas industry, the mining industry, federal agencies (e.g., USGS, USDA, NOAA, FEMA, EPA, DOI, and Army Corps of Engineers), and state and local agencies (e.g., state environmental agencies, state geological surveys, and municipal water departments).

General Geoscience

The general geoscience concentration allows maximum flexibility and is designed for students wishing to pursue other areas of study within the geosciences, students wishing to pursue policy-related careers, and students planning to apply to professional graduate programs, such as those in law or business schools. The policy component of this concentration allows students to explore related societal issues, which may help guide their career aspirations. This concentration also provides transfer students with a pathway to graduate on time.

Students graduating from this concentration will be well prepared to enter graduate school in science or policy, as well as to pursue professional studies. Students seeking immediate employment will be competitive for jobs with, for example, certain NGOs, environmental foundations, consulting companies, and government policy positions related to natural resources and the environment.

Paleontology

The concentration in paleontology prepares students who are interested in pursuing related research in graduate school and students seeking entry-level positions in paleontology. Examples of these jobs include biostratigrapher for petroleum companies, fossil resource manager for the Bureau of Land Management, and related positions with the National Parks Service, USGS, and state geological surveys.

Undergraduates in this concentration benefit from world-class resources already established at the Academy of Natural Sciences. These include the Invertebrate paleontology collection, with over 1 million specimens; the vertebrate fossil collection, with over 22,000 specimens; historically important specimens, such as the Thomas Jefferson fossil collection, the first discovered dinosaur skeleton, and the first discovered tyrannosaur; and the paleobotany collection, with over 5,000 specimens, including a large proportion of type specimens.

Students in the paleontology concentration will have access to numerous fossil sites along the Atlantic Coastal Plain and in the Appalachian Province. Opportunities exist for student research at two well-established sites: Dr. Daeschler's Red Hill site, which produces evolutionarily important forms representing the fish to tetrapod transition; and Dr. Lacovara's Inversand site, which records a mass-death assemblage at the end of the Cretaceous Period.

Additional Information

For additional information about this program, visit the Biodiversity, Earth and Environmental Science (BEES) Department website.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
COM 310 [WJ]	Technical Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 251	Ethics	3.0
or PHIL 341	Philosophy of the Environment	
UNIV S101	The Drexel Experience	1.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Humanities or Social Science electives		6.0
Free electives		24.0

Mathematics and Statistics

Choose one of the following math sequences: 12.0

MATH 101 Introduction to Analysis I
& MATH 102 and Introduction to Analysis II
& MATH 239 and Mathematics for the Life Sciences

MATH 121 Calculus I
& MATH 122 and Calculus II
& MATH 123 and Calculus III

MATH 410 Scientific Data Analysis I 3.0

MATH 411 Scientific Data Analysis II 3.0

Physical Sciences

CHEM 101 General Chemistry I 3.5

CHEM 102 General Chemistry II 4.5

CHEM 103 General Chemistry III 5.0

Complete one of the following Physics sequences: 8.0

PHYS 101 Fundamentals of Physics I
& PHYS 102 and Fundamentals of Physics II

PHYS 152 Introductory Physics I
& PHYS 153 and Introductory Physics II

Complete one of the following Biological Sciences sequences: 8.0-9.0

BIO 107 Cells, Genetics & Physiology
& BIO 108 and Cells, Genetics and Physiology Laboratory
& BIO 109 and Biological Diversity, Ecology & Evolution

& BIO 110 and Biological Diversity, Ecology and Evolution Laboratory

BIO 124 Evolution & Organismal Diversity
& BIO 126 and Physiology and Ecology

Environmental Science

ENVS 101 Introduction to Environmental Science 5.0

ENVS 102 Natural History, Research and Collections 2.0

ENVS 212 Evolution 4.0

ENVS 441 [WJ] Issues in Global Change I: Seminar 2.0

ENVS 442 Issues in Global Change II: Research 2.0

ENVS 443 Issues in Global Change III: Synthesis 2.0

Geoscience Core Courses

GEO 101 Physical Geology 4.0

GEO 102 History of the Earth 4.0

GEO 103 Introduction to Field Methods in Earth Science 2.0

GEO 201 [WJ] Earth Systems Processes 3.0

GEO 210 Structural Geology 4.0

GEO 215 Mineralogy 4.0

GEO 301 Advanced Field Methods in Earth Science 2.0

GEO 310 Sedimentary Environments 4.0

GEO 311 Stratigraphy 4.0

GEO 320 Invertebrate Paleontology 4.0

GEO 401 Igneous and Metamorphic Petrology 4.0

Geology Field Camp 3.0

GEO Electives * 8.0

Geoscience Concentration Courses 20.0-23.0

Applied Geology Concentration

ENVS 308 GIS and Environmental Modeling

GEO 306 Environmental Geology

GEO 309 Geochemistry

GEO 412 Geology of Groundwater

GEO 418 Geophysics

General Geoscience Concentration

See the Biodiversity, Earth and Environmental Science (BEES) Department for the General Geoscience Concentration course list.

Paleontology Concentration

ENVS 202 Tree of Life

GEO 322 Vertebrate Paleontology

GEO 365 Field Methods in Paleoeecology

Paleontology elective *

Choose one of the following:

BIO 224 Form, Function & Evolution of Vertebrates

& BIO 225 and Vertebrate Biology and Evolution Laboratory

ENVS 254 & ENVS 255	Invertebrate Morphology and Physiology and Invertebrate Morphology and Physiology Lab	
Total Credits		185.0-189.0

* See the Biodiversity, Earth and Environmental Science (BEES) for the GEO Core and Paleo elective list.

Sample Plan of Study

The sample plan of study is a general guideline that can be used for each of the three concentrations, depending on course selections in certain terms.

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENVS 101	Introduction to Environmental Science	5.0
GEO 101	Physical Geology	4.0
MATH 101 or 121	Introduction to Analysis I Calculus I	4.0
UNIV S101	The Drexel Experience	1.0
Term Credits		17.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
GEO 102	History of the Earth	4.0
MATH 102 or 122	Introduction to Analysis II Calculus II	4.0
Choose to start CHEM or BIO sequence depending on concentration. Paleo students should take BIO 124 & BIO 126. Students interested in applied or geochemistry should start CHEM.		
CHEM 101 or BIO 124	General Chemistry I Evolution & Organismal Diversity	3.5
Term Credits		15.5
Term 3		
CHEM 102 or BIO 126	General Chemistry II Physiology and Ecology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENVS 102	Natural History, Research and Collections	2.0
GEO 103	Introduction to Field Methods in Earth Science	2.0
MATH 239 or 123	Mathematics for the Life Sciences Calculus III	4.0
Term Credits		15.5
Term 4		
CHEM 103 or 101	General Chemistry III General Chemistry I	5.0
ENVS 212	Evolution	4.0
GEO 310	Sedimentary Environments	4.0
GEO 301	Advanced Field Methods in Earth Science	2.0
Term Credits		15.0
Term 5		
GEO 201 [WI]	Earth Systems Processes	3.0
GEO 215	Mineralogy	4.0
Choose one of the following two options, based on chosen concentration:		
4-credit GEO concentration course		
2-credit GEO concentration (Paleo) course and a 3-credit free elective		
BIO 109 or CHEM 102	Biological Diversity, Ecology & Evolution General Chemistry II	3.0
BIO 110 or CHEM 102	Biological Diversity, Ecology and Evolution Laboratory General Chemistry II	1.0
Term Credits		15.0
Term 6		
BIO 107 or CHEM 103	Cells, Genetics & Physiology General Chemistry III	3.0

BIO 108 or CHEM 103	Cells, Genetics and Physiology Laboratory General Chemistry III	1.0
COM 230	Techniques of Speaking	3.0
GEO 401	Igneous and Metamorphic Petrology	4.0
PHYS 152 or 101	Introductory Physics I Fundamentals of Physics I	4.0
Term Credits		15.0

Term 7		
COM 310 [WI]	Technical Communication	3.0
GEO 210	Structural Geology	4.0
PHYS 153 or 102	Introductory Physics II Fundamentals of Physics II	4.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Free elective		3.0
Term Credits		15.0

Term 8		
GEO 311	Stratigraphy	4.0
MATH 410	Scientific Data Analysis I	3.0
PHIL 251 or 341	Ethics Philosophy of the Environment	3.0
GEO Concentration elective		4.0
Free elective		3.0
Term Credits		17.0

Term 9		
MATH 411	Scientific Data Analysis II	3.0
GEO Concentration courses		8.0
Free elective		3.0
NOTE: STUDENTS DO FIELD CAMP DURING CO-OP IN THE JUNIOR YEAR. REGISTER FOR THESE 3 CREDITS DURING CO-OP. PLEASE SEE YOUR ADVISOR FOR ADDITIONAL INFORMATION.		
Term Credits		17.0

Term 10		
ENVS 441 [WI]	Issues in Global Change I: Seminar	2.0
GEO 320	Invertebrate Paleontology	4.0
GEO elective		4.0
Humanities or Social Science elective		3.0
Free Elective		3.0
Term Credits		16.0

Term 11		
ENVS 442	Issues in Global Change II: Research	2.0
GEO concentration elective		4.0
Humanities or Social Science elective		3.0
Free elective		6.0
Term Credits		15.0

Term 12		
ENVS 443	Issues in Global Change III: Synthesis	2.0
Free electives		7.0
GEO elective		4.0
Term Credits		13.0
Total Credit: 186.0		

NOTE: Students do field camp (3-6 wks) during co-op in the junior year. Register for 3 credits during co-op. Do not register for the extra three credits in term 9.

Minor in Geoscience

Geosciences are at the core of numerous problems facing the world today, and impact the lives of communities across the planet. Climate change, natural disasters, access to mineral resources and clean water, and availability of energy all shape government policies and corporate strategies, and are a cause of concern for society at large.

The geoscience minor is designed to give students specializing in other fields the skills to understand and analyze these issues. It is a natural fit for environmental science majors who wish to understand how the physical world can impact biodiversity, ecological processes and environmental impacts. For students majoring in such fields as business and engineering, the minor in geoscience will provide them with the tools to make better decisions about products or projects related to natural hazards and their impact, cost and availability of natural resources, energy policy, space exploration, land use, and environmental justice. For students who are liberal arts majors, the minor in geoscience offers the opportunity to explore earth science issues that shape the social, cultural, political and scientific debate, and to be prepared for issues they may encounter in their careers.

GEO 101	Physical Geology	4.0
GEO 102	History of the Earth	4.0
GEO Electives		16.0
GEO 103	Introduction to Field Methods in Earth Science	
GEO 201 [WI]	Earth Systems Processes	
GEO 205	Dinosaurs and Their World	
GEO 210	Structural Geology	
GEO 215	Mineralogy	
GEO 301	Advanced Field Methods in Earth Science	
GEO 306	Environmental Geology	
GEO 309	Geochemistry	
GEO 310	Sedimentary Environments	
GEO 311	Stratigraphy	
GEO 320	Invertebrate Paleontology	
GEO 322	Vertebrate Paleontology	
GEO 340	Quaternary Geology	
GEO 342	Geomorphology	
GEO 346	Coastal Geology	
GEO 348	Oceanography	
GEO 365	Field Methods in Paleocology	
GEO 401	Igneous and Metamorphic Petrology	
GEO 412	Geology of Groundwater	
GEO 418	Geophysics	
GEO 350	Volcanology	
Total Credits		24.0

Co-Op/Career Opportunities

Co-Op Opportunities

There are over one hundred environmental, geophysical, and geotechnical firms within the greater Philadelphia region. Plus, there are opportunities with federal, state, and municipal agencies, jobs in central Pennsylvania related to the Marcellus Shale, and research opportunities between Drexel and the Academy of Natural Sciences.

All geoscience majors follow the five-year, three co-op plan of study program. Transfer students may be granted an exception for a two co-op plan of study, so that they may remain on schedule. The summer geological field camp will occur during the third co-op cycle. In this third co-op, geoscience students attend field camp and also partake in an abbreviated co-op work experience.

Career Opportunities

According to the US Bureau of Labor Statistics (BLS), employment for geoscientists through 2020 is expected to grow faster than the average for all occupations. In addition, the geosciences are expected to outpace life, physical, and social sciences in job creation. The employment outlook for geoscientists in Drexel's surrounding area is particularly bright, with a

robust environmental consulting industry and exploding demand related to Marcellus Shale drilling.

The geoscience major, with its three concentrations, prepares students who are interested in entering the workforce immediately as well as those who are interested in pursuing related research in graduate schools.

Facilities and Field Sites

Facilities

The geoscience major leverages resources at Drexel University and the Academy of Natural Sciences (<http://www.ansp.org>), such as a mineral collection with 9,000 specimens, over a million fossil specimens, Dinosaur Hall, The Patrick Center for Environmental Research, a state-of-the-art fossil preparation lab, notable research programs, and faculty with expertise in geology, paleontology, and related disciplines.

Summer Geological Field Camp

Summer geological field camp is the quintessential undergraduate experience for geosciences students. It is a long-held tradition in geology departments that students head out West, during the summer before graduation, to apply their knowledge to real-world situations and to acquire field skills that will serve them throughout their careers. This is particularly important for students in eastern schools, where the mountains are small and outcrops are scarce. Field camp also provides networking and bonding opportunity for students. Friends made at field camp often become colleagues for life. At the Geological Society of America meeting, reunions are organized by university *and* by field camp.

The summer geological field camp for geoscience students will occur during the third co-op cycle.

Barnegat Bay Coastal Field Station

The BEES field station on Barnegat Bay in Waretown, NJ provides geoscience students with opportunities to engage in hands-on research in coastal geology, barrier island morphology, oceanography, and sedimentology. The facility includes a lodge, two classrooms/meeting rooms, dining hall, dormitories, and rustic cabins. The field station is located on 194 acres of diverse coastal habitat, including a maritime forest, tidal creek, salt marsh, fresh water pond, brackish impoundment, and bayshore environments. The department's research vessel gives students access to back-bay and near-shore marine environments.

The department holds its introductory field session for incoming freshmen and other events at the field station. The facility may also serve as a base for excursions into the Pine Barrens, a heavily forested area containing a number of interesting deposits related to the last glacial period.

Red Hill Fossil Site

The Red Hill fossil site, in Tioga County, Pennsylvania, exposes Devonian coastal sedimentary rocks that preserve a rich fossil fauna. Of particular importance is a fossil fish species, studied by Dr. Ted Daeschler, representing a critical transition between fish and tetrapods (land animals.) This site offers opportunities for studying vertebrate paleontology, stratigraphy, and sedimentology and provides students with a window into an important moment in the history of life on Earth.

Inversand Fossil Site: Local training ground for Geoscience Majors

The Inversand fossil site is a unique resource for geological education, research, and STEM outreach. The quarry is located in Gloucester

Country, NJ, only 20 minutes from Drexel's campus, making it possible to conduct field exercises there within a three-hour class period. The geological formations that outcrop in the Inversand Quarry have yielded many new fossil species. The site has significance beyond vertebrate paleontology, however, and will provide a local laboratory for classes in geochemistry, geophysics, stratigraphy, sedimentology, hydrogeology, and environmental geology. As such, it will provide a valuable training-ground, a short distance from campus, for all Drexel geoscience majors.

Geoscience Faculty

Walter F. Bien, PhD (*Drexel University*) *Director, Laboratory of Pinelands Research*. Research Professor. Natural resource management, restoration ecology, conservation biology, and New Jersey Pinelands community dynamics.

Elizabeth Burke Watson, PhD (*University of California, Berkeley*). Assistant Professor. The implications of global and regional environmental change, and unraveling the interacting effects of multiple anthropogenic stressors on coastal ecosystems to promote more informed management, conservation, and restoration.

Donald F. Charles, PhD (*Indiana University*) *Senior Scientist and Section Leader, Phycology Section, Academy of Natural Sciences*. Professor. Diatoms as water quality indicators; paleolimnological approaches for inferring change in biology and chemistry of lakes; lake management; assessment of perturbations in aquatic ecosystems due to municipal and industrial effluents, land-use change, acid deposition, eutrophication and climate change.

Carol Collier, FAICP, MRP (*University of Pennsylvania*) *Sr. Advisor, Watershed Management and Policy at the Academy of Natural Sciences; Director, Environmental Studies and Sustainability Program*. Water resources management, environmental planning, climate change policy, the intersection of science, policy and decision making.

Ted Daeschler, PhD (*University of Pennsylvania*) *Associate Curator of Vertebrate Zoology; Vice President for Systematic Biology and the Library; Academy of Natural Sciences*. Associate Professor. Vertebrate fauna of the Late Devonian Period in eastern North America; fossil collecting; systematic work focusing on freshwater vertebrates; nature of early non-marine ecosystems.

Daniel P. Duran, PhD (*Vanderbilt University*). Assistant Teaching Professor. Phylogeography, systematics and taxonomy, population and conservation genetics, ecological niche modeling, focusing on insect systems to better understand fundamental evolutionary processes and maintain biodiversity.

Jon Gelhaus, PhD (*University of Kansas*) *Curator, Department of Entomology; Academy of Natural Sciences*. Professor. Systematic expertise in crane flies (Tipuloidea); phylogenetic reconstruction; historical and ecological biogeography; biodiversity measures and evolution of morphological character systems.

Richard J. Horwitz, PhD (*University of Chicago*) *Senior Scientist; Fisheries Section Leader; Ruth Patrick Chair of Environmental Sciences*. Associate Professor. Reproductive ecology, life history and distribution of freshwater fishes; effects of land use, habitat structure and hydrology on population dynamics and species composition in aquatic systems; ecological modeling and biometry; anthropogenic contaminants in fishes.

Susan S. Kilham, PhD (*Duke University*). Professor. Aquatic ecology: phytoplankton; physiological ecology, especially of diatoms in freshwater and marine systems; large lakes; food webs; biogeochemistry.

Danielle Kreeger, PhD (*Oregon State University*). Research Associate Professor. Trophic interactions in aquatic ecosystems.

Tatyana Livshultz, PhD (*Cornell University*) *Assistant Curator of Botany*. Assistant Professor. Expertise of the milkweed and dogbane family (Apocynaceae); evolution and species diversity of the genus *Dischidia*; differences in floral form and function.

Richard McCourt, PhD (*University of Arizona*) *Associate Curator of Botany, Academy of Natural Sciences of Drexel University; 2010-2012: Program Director, Division of Graduate Education, National Science Foundation*. Professor. Biodiversity, evolution, ecology, and systematic of green algae, specifically charophyte algae.

Michael O'Connor, MD, PhD (*MD, Johns Hopkins University; PhD, Colorado State*). Associate Professor. Biophysical and physiological ecology, thermoregulation of vertebrates, ecological modeling.

Sean O'Donnell, PhD (*University of Wisconsin-Madison*). Professor. Tropical ecology, focusing on geographic variation and elevation effects on ecology and behavior of army ants and ant-bird interactions; neurobiology, focusing on brain plasticity and brain evolution in social insects.

Marina Potapova, PhD (*Russian Academy of Sciences*) *Assistant Curator*. Assistant Professor. Taxonomy, ecology, and biogeography of freshwater diatoms; methods of quantifying morphological characters of diatom frustules based on geometric morphometrics; systematic of monoraphid freshwater diatoms.

Gary Rosenberg, PhD (*Harvard University*) *Pilsbry Chair of Malacology*. Professor. Magnitude and origin of species-level diversity in the Mollusca.

Jacob Russell, PhD (*University of Arizona*). Associate Professor. Microbiomes and metagenomics; ecology and evolution of symbiosis.

Ron Smith, MS (*Rutgers University*). Instructor. Shorebird Ecology and Conservation; Amphibians of the NJ Pine Barrens; Restoration Ecology; Climate Change – Regional Effects and Education

James R. Spotila, PhD (*University of Arkansas*) *L. D. Betz Chair Professor*. Professor. Physiological and biophysical ecology, thermoregulation of aquatic vertebrates, biology of sea turtles.

Loyc Vanderkluisen, PhD (*University of Hawaii*). Assistant Professor. The cyclicity of volcanic eruptions, volcanic degassing processes, and large igneous provinces.

David J. Velinsky, PhD (*Old Dominion University*) *Department Head, Biodiversity, Earth and Environmental Science*. Professor. Geochemical cycling of organic and inorganic constituents of sediments and waters; Sedimentary diagenesis of major and minor elements; Isotope biogeochemistry of carbon, nitrogen and sulfur in marine and freshwater systems.

Jason Weckstein, PhD (*Louisiana State University*) *Associate Curator of Ornithology*. Associate Professor. Avian phylogenetics, comparative biology and evolutionary history; biodiversity surveys of birds and their parasites and pathogens; coevolutionary history of birds and their parasites.

Emeritus Faculty

John G. Lundberg, PhD (*University of Michigan*). Professor Emeritus. Diversity and diversification of fishes; documenting and interpreting the morphological, molecular, and taxonomic diversity of living and fossil fishes in the interrelated fields of systematic, faunistics and biogeography and paleobiology; exploration and collecting in poorly-known tropical freshwater habitats and regions.

Daniel Otte, PhD (*University of Michigan*) *Senior Curator, Systematics and Evolutionary Biology*. Professor Emeritus. Taxonomy and biogeography of Orthoptera (grasshoppers, crickets, katydids and their relatives).

Global Studies

Major: Global Studies

Degree Awarded: Bachelor of Arts (BA)

Calendar Type: Quarter

Total Credit Hours: 182.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 23.9999

Standard Occupational Classification (SOC) code: 25-1123

About the Program

Global Studies practices socially-responsible global citizenship through a unique combination of research-oriented and multilingual instruction, professional experience, and meaningful engagement with communities both here in Philadelphia and abroad.

Our students experience Global Studies by:

- Examining the movement of peoples, goods, and cultures across countries and regions
- Studying global issues in concrete socio-economic, cultural, and geographical contexts
- Tackling structural inequalities from a variety of perspectives and disciplines
- Developing intercultural and language skills through unique pedagogical models
- Working with employers and communities in Philadelphia and around the world through Drexel's Co-Op opportunities

Degree Requirements

Global Media, Arts, and Cultures Concentration

General Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGL 204	Post-Colonial Literature II	3.0
LING 102	Language and Society	3.0
PHIL 105	Critical Reasoning	3.0
PSCI 150	International Politics	4.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0

Two mathematics courses	6.0-8.0
Two science courses	6.0-8.0
One ethics course	3.0

Global Studies Core Requirements

GST 190	Global Research Methods	3.0
GST 359	Culture and Values	3.0
GST 360	Civilizations	3.0
WGST 240	Women and Society in a Global Context	3.0

Language minor

Students must complete at least 24 credits above the 103-105 language level to earn a language minor.

Area-Specific Courses

Students select two region specific courses, approved by the GST advisor. Courses must be on the same region, but can be in any discipline.

Media, Arts, and Cultures Distribution Requirements

ANTH 212 [WI]	Topics in World Ethnography	3.0
ANTH 312	Approaches to Intercultural Behavior	3.0
or COM 345	Intercultural Communication	
ENGL 325	Topics in World Literature	3.0
ENGL 360 [WI]	Literature and Society	3.0
MUSC 331	World Musics	3.0
PHIL 231	Aesthetics: Philosophy of Art	3.0

Select one of the following:

ARTH 101	History of Art I: Ancient to Medieval	
ARTH 102	History of Art II: Renaissance to Romanticism	
ARTH 103	History of Art: Modern Art	

Media, Arts, and Cultures Distribution Options

Students select 11 of the following:

ANTH 210 [WI]	Worldview: Science, Religion and Magic	
ANTH 220	Aging In Cross-Cultural Perspective	
ANTH 250	Anthropology of Immigration	
ANTH 310	Societies In Transition: The Impact of Modernization and the Third World	
ANTH 410	Cultural Theory I	
ARCH 141	Architecture and Society I	
COM 210	Theory and Models of Communication	
COM 342	English Worldwide	
COM 355	Ethnography of Communication	
COM 360	International Communication	
COM 375 [WI]	Grant Writing	
COM 390 [WI]	Global Journalism	
CULA 405 [WI]	Culture and Gastronomy I	
ENGL 200 [WI]	Classical to Medieval Literature	
ENGL 201	Renaissance to the Enlightenment	
ENGL 203 [WI]	Post-Colonial Literature I	
ENGL 300 [WI]	Literature & Science	
ENGL 323	Literature and Other Arts	
ENGL 325	Topics in World Literature	
ENGL 335	Mythology	
ENGL 355 [WI]	Women and Literature	
FMST 265	Special Topics in Cinema Studies	
GST 320	Building Global Bridges	
GST 360	Civilizations	
GST 435	Model Organization of American States	
GST T280	Special Topics in Global Studies	
GST T380	Special Topics in Global Studies	
MUSC 130	Introduction to Music	
NFS 446	Perspectives in World Nutrition	
PHIL 211	Metaphysics: Philosophy of Reality	
PHIL 241	Social & Political Philosophy	
PHIL 335	Global Ethical Issues	
PHIL 391	Philosophy of Religion	

PSCI 120	History of Political Thought	
SOC 210	Race, Ethnicity and Social Inequality	
SOC 340	Globalization	
WRIT 310	Literary Editing & Publication	
Electives		31.0-29.0
Total Credits		182.0

Global Business, Economics, and Development Concentration

General Requirements		
ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGL 204	Post-Colonial Literature II	3.0
LING 102	Language and Society	3.0
PHIL 105	Critical Reasoning	3.0
PSCI 150	International Politics	4.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Two mathematics courses		6.0-8.0
Two science courses		6.0-8.0
One ethics course		3.0

Global Studies Core Requirements

GST 190	Global Research Methods	3.0
GST 359	Culture and Values	3.0
GST 360	Civilizations	3.0
WGST 240	Women and Society in a Global Context	3.0

Language minor 24.0

Students must complete at least 24 credits above the 103-105 language level to earn a language minor.

Area-specific requirement 6.0-8.0

Students select two region specific courses, approved by the GST advisor. Courses must be on the same region, but can be in any discipline.

Global Business, Economics, and Development Concentration Requirements

ANTH 310	Societies In Transition: The Impact of Modernization and the Third World	3.0-4.0
or SOC 330	Development and Underdevelopment in the Global South	
BLAW 340	International Business Law	4.0
ECON 342	Economic Development	4.0
ENGL 308 [WI]	The Literature of Business	3.0
INTB 332	Multinational Corporations	4.0
INTB 334	International Trade	4.0
INTB 338	Regional Studies in Economic Policies and International Business	4.0
PHIL 301	Business Ethics	3.0
SOC 355 [WI]	Classical Social Theory	4.0

Global Business, Economics, and Development Distribution Options 44.0-33.0

Select 11 of the following:

ANTH 312	Approaches to Intercultural Behavior	
COM 270 [WI]	Business Communication	
COM 345	Intercultural Communication	
COM 360	International Communication	
COM 361	International Public Relations	
COM 362	International Negotiations	
COM 375 [WI]	Grant Writing	
ECON 301	Microeconomics	
ECON 321	Macroeconomics	
ECON 326	Economic Ideas	
[WI]		

ECON 351	Resource and Environmental Economics	
ENGL 325	Topics in World Literature	
ENGL 360 [WI]	Literature and Society	
FIN 301	Introduction to Finance	
FIN 346	Global Financial Management	
GST 320	Building Global Bridges	
GST 360	Civilizations	
GST 435	Model Organization of American States	
GST T280	Special Topics in Global Studies	
GST T380	Special Topics in Global Studies	
INTB 336	International Money and Finance	
INTB 338	Regional Studies in Economic Policies and International Business	
MKTG 201	Introduction to Marketing Management	
MKTG 322	Advertising & Integrated Marketing Communications	
MKTG 351	Marketing for Non-Profit Organizations	
MKTG 357	Global Marketing	
PSCI 255	International Political Economy	
PSCI 340	Politics of Developing Nations	
PSCI 351	International Organizations: The United Nations	
PSCI 352	Ethics and International Relations	
PSCI 357	The European Union in World Politics	
SOC 220	Wealth and Power	
SOC 310	Topics in Political Sociology	
SOC 340	Globalization	
STAT 201	Introduction to Business Statistics	
STAT 202	Business Statistics II	
Electives		12.0-17.0
Total Credits		182.0-183.0

Global Health and Sustainability Concentration**General Requirements**

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGL 204	Post-Colonial Literature II	3.0
ENVS 260	Environmental Science and Society	3.0
LING 102	Language and Society	3.0
PHIL 105	Critical Reasoning	3.0
PSCI 150	International Politics	4.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Two mathematics courses		6.0-8.0
One additional science course		6.0-8.0
One ethics course		3.0

GST Core Curriculum Requirements

GST 190	Global Research Methods	3.0
GST 359	Culture and Values	3.0
GST 360	Civilizations	3.0
WGST 240	Women and Society in a Global Context	3.0

Language Minor 24.0

Students must complete at least 24 credits above the 103-105 language level to earn a language minor.

Area-Specific Requirement 6.0-8.0

Students select two region-specific courses approved by GST advisor. Courses must focus on the same region, but can be in any discipline.

Global Health and Sustainability Concentration Requirements

PBHL 301	Epidemiology in Public Health	3.0
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PBHL 303	Overview of Issues in Global Health	3.0
SOC 235	Sociology of Health and Illness	4.0
PHIL 335	Global Ethical Issues	3.0
SOC 346	Environmental Justice	4.0
ANTH 360	Culture and the Environment	3.0-4.0
or SOC 345	Sociology of the Environment	
Choose one of the following Culinary Arts classes		3.0
CULA 425	The Kitchen Garden	
CULA 426	The Kitchen Garden: Summer	
CULA 427	The Kitchen Garden: Fall	
Choose one of the following English classes		3.0
ENGL 300 [WI]	Literature & Science	
ENGL 302	Environmental Literature	
ENGL 370	Topics in Literature and Medicine	
Choose one of the following History courses		4.0
HIST 287	History of Science: Ancient to Medieval	
HIST 288	History of Science: Medieval to Enlightenment	
HIST 289	History of Science: Enlightenment to Modernity	
Global Health and Sustainability Distribution Options		33.0-44.0
Select of 11 of the following:		
ANTH 210 [WI]	Worldview: Science, Religion and Magic	
ANTH 310	Societies In Transition: The Impact of Modernization and the Third World	
ANTH 360	Culture and the Environment	
BIO 109	Biological Diversity, Ecology & Evolution	
BIO 264	Ethnobotany	
BIO 312	Genetically Modified Foods	
CJS 373	Environmental Crime	
COM 316	Campaigns for Health & Environment	
COM 317 [WI]	Environmental Communication	
COM 320 [WI]	Science Writing	
COM 375 [WI]	Grant Writing	
ECON 301	Microeconomics	
ECON 321	Macroeconomics	
ECON 351	Resource and Environmental Economics	
ENGL 300 [WI]	Literature & Science	
ENGL 302	Environmental Literature	
ENGL 370	Topics in Literature and Medicine	
ENVS 169	Environmental Science	
ENVS 275	Global Climate Change	
ENVS 289	Global Warming, Biodiversity and Your Future	
ENVS 328	Conservation Biology	
HSAD 312	Development of World Health Care	
HIST 287	History of Science: Ancient to Medieval	
HIST 288	History of Science: Medieval to Enlightenment	
HIST 289	History of Science: Enlightenment to Modernity	
HSAD 316	Health Care across Cultures	
GST 320	Building Global Bridges	
GST 360	Civilizations	
GST 435	Model Organization of American States	
GST T280	Special Topics in Global Studies	
GST T380	Special Topics in Global Studies	
NFS 345	Foods and Nutrition of World Cultures	
NFS 446	Perspectives in World Nutrition	
PBHL 302	Introduction to the History of Public Health	
PBHL 304	Introduction to Health & Human Rights	
PBHL 305	Women and Children: Health & Society	
PHIL 321	Biomedical Ethics	
PHIL 341	Philosophy of the Environment	
PHIL 351	Philosophy of Technology	
PHIL 335	Global Ethical Issues	
PHIL 361	Philosophy of Science	

PSCI 331	Environmental Politics	
PSCI 351	International Organizations: The United Nations	
PSCI 352	Ethics and International Relations	
PSCI 353	International Human Rights	
PSY 352	Environmental Psychology	
SOC 315	HIV/AIDS and Africa	
SOC 330	Development and Underdevelopment in the Global South	
SOC 340	Globalization	
WGST 275	Women's Health and Human Rights	
Electives		22.0-5.0
Total Credits		181.0-182.0

Global Justice and Human Rights Concentration

General Requirements		
ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGL 204	Post-Colonial Literature II	3.0
LING 102	Language and Society	3.0
PHIL 105	Critical Reasoning	3.0
PSCI 150	International Politics	4.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Two mathematics courses		6.0-8.0
Two science courses		6.0-8.0
One ethics course		3.0
GST Core Curriculum Requirements		
GST 190	Global Research Methods	3.0
GST 359	Culture and Values	3.0
GST 360	Civilizations	3.0
WGST 240	Women and Society in a Global Context	3.0
Language Minor		24.0

Students must complete at least 24 credits above the 103-105 level to earn a language minor.

Area-Specific Requirement 6.0-8.0

Students select two region specific courses, approved by the GST advisor. Courses must be on the same region, but can be in any discipline.

Global Justice and Human Rights Distribution Requirements

ANTH 310	Societies In Transition: The Impact of Modernization and the Third World	3.0-4.0
or SOC 330	Development and Underdevelopment in the Global South	
ENGL 360 [WI]	Literature and Society	3.0
PHIL 335	Global Ethical Issues	3.0
PSCI 120	History of Political Thought	4.0
PSCI 229	Theories of Justice	4.0
PSCI 352	Ethics and International Relations	4.0
PSCI 353	International Human Rights	4.0
SOC 355 [WI]	Classical Social Theory	4.0
Select one of the following:		3.0-4.0
GST 435	Model Organization of American States	
PSCI 351	International Organizations: The United Nations	
PSCI 357	The European Union in World Politics	
Justice and Human Rights Distribution Options		33.0-44.0

Students choose 11 of the following:

AFAS T280	Special Topics in Africana Studies (Course must have a global theme)	
ANTH 312	Approaches to Intercultural Behavior	
or COM 345	Intercultural Communication	

ANTH 250	Anthropology of Immigration
CJS 289	Terrorism
COM 360	International Communication
COM 362	International Negotiations
COM 375 [WI]	Grant Writing
CULA 427	The Kitchen Garden: Fall
or CULA 42	The Kitchen Garden: Summer
ECON 301	Microeconomics
ECON 321	Macroeconomics
ECON 342	Economic Development
ECON 351	Resource and Environmental Economics
ENGL 325	Topics in World Literature
GST 320	Building Global Bridges
GST 360	Civilizations
GST 435	Model Organization of American States
GST T280	Special Topics in Global Studies
GST T380	Special Topics in Global Studies
PHIL 241	Social & Political Philosophy
PHIL 341	Philosophy of the Environment
PHIL 385	Philosophy of Law
PHIL 391	Philosophy of Religion
PBHL 303	Overview of Issues in Global Health
PBHL 304	Introduction to Health & Human Rights
PSCI 240	Comparative Government
PSCI 250	American Foreign Policy
PSCI 255	International Political Economy
PSCI 351	International Organizations: The United Nations
PSCI 357	The European Union in World Politics
PSCI 365	Politics, Law, & Justice
SOC 210	Race, Ethnicity and Social Inequality
SOC 220	Wealth and Power
SOC 315	HIV/AIDS and Africa
SOC 340	Globalization
SOC 444	Social Movements
SOC 346	Environmental Justice
WGST T280	Special Topics in Women's and Gender Studies (Course must have a global theme)
Electives	24.0-6.0
Total Credits	182.0-183.0

Sample Plan of Study

Global Media, Arts, and Cultures Concentration

Term	Credits	
Term 1		
ANTH 101	Introduction to Cultural Diversity	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
LING 102	Language and Society	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV H101	The Drexel Experience	1.0
Language course		4.0
Term Credits		18.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSCI 150	International Politics	4.0
Language course		4.0
Term Credits		18.0
Term 3		

CIVC 101	Introduction to Civic Engagement	1.0
ECON 201	Principles of Microeconomics	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
GST 190	Global Research Methods	3.0
Science elective		3.0
Language course		4.0
Term Credits		18.0
Term 4		
ECON 202	Principles of Macroeconomics	4.0
Language course		4.0
MAC Distribution course		3.0
Ethics elective		3.0
Free elective		3.0
Term Credits		17.0
Term 5		
ENGL 325	Topics in World Literature	3.0
Language course		4.0
Science elective		3.0
MAC Distribution course		3.0
Free elective		3.0
Term Credits		16.0
Term 6		
ENGL 204	Post-Colonial Literature II	3.0
GST 360	Civilizations	3.0
MUSC 331	World Musics	3.0
Language course		4.0
MAC Distribution course		3.0
Term Credits		16.0
Term 7		
ENGL 360 [WI]	Literature and Society	3.0
Language course		3.0
MAC Distribution courses		6.0
Free elective		3.0
Term Credits		15.0
Term 8		
WGST 240	Women and Society in a Global Context	3.0
ARTH requirement		3.0
Language course		3.0
MAC Distribution course		3.0
Term Credits		12.0
Term 9		
ANTH 212 [WI]	Topics in World Ethnography	3.0
COM 345	Intercultural Communication	3.0
Language course		3.0
MAC Distribution course		3.0
Free elective		3.0
Term Credits		15.0
Term 10		
PHIL 231	Aesthetics: Philosophy of Art	3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Language course		3.0
MAC Distribution course		3.0
Area speciality		3.0
Term Credits		13.0
Term 11		
GST 359	Culture and Values	3.0
MAC Distribution courses		6.0
Free elective		3.0
Term Credits		12.0
Term 12		
Area specialty		3.0

MAC Distribution course	3.0
Free electives	6.0
Term Credits	12.0

Total Credit: 182.0

Global Business, Economics and Development Concentration

Term 1	Credits
ANTH 101 Introduction to Cultural Diversity	3.0
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
LING 102 Language and Society	3.0
MATH 101 Introduction to Analysis I	4.0
UNIV H101 The Drexel Experience	1.0
Language course	4.0
Term Credits	18.0

Term 2	
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102 Introduction to Analysis II	4.0
PHIL 105 Critical Reasoning	3.0
PSCI 150 International Politics	4.0
Language course	4.0
Term Credits	18.0

Term 3	
CIVC 101 Introduction to Civic Engagement	1.0
ECON 201 Principles of Microeconomics	4.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
GST 190 Global Research Methods	3.0
Science elective	3.0
Language course	4.0
Term Credits	18.0

Term 4	
ANTH 310 Societies In Transition: The Impact of Modernization and the Third World	3.0
ECON 202 Principles of Macroeconomics	4.0
Language course	4.0
BED Distribution course	3.0
Ethics elective	3.0
Term Credits	17.0

Term 5	
Language course	4.0
BED Distribution course	3.0
Science elective	3.0
Free elective	3.0
Term Credits	13.0

Term 6	
INTB 334 International Trade	4.0
WGST 240 Women and Society in a Global Context	3.0
Language course	4.0
BED Distribution course	3.0
Term Credits	14.0

Term 7	
BLAW 340 International Business Law	4.0
ENGL 204 Post-Colonial Literature II	3.0
GST 360 Civilizations	3.0
Language course	3.0
BED Distribution course	3.0
Term Credits	16.0

Term 8	
PHIL 301 Business Ethics	3.0
SOC 355 [WI] Classical Social Theory	4.0

Language course	3.0
BED Distribution courses	6.0
Term Credits	16.0

Term 9	
Language course	3.0
BED Distribution courses	9.0
Term Credits	12.0

Term 10	
ECON 342 Economic Development	4.0
INTB 332 Multinational Corporations	4.0
UNIV H201 Looking Forward: Academics and Careers	1.0
Language course	3.0
Area specialty	3.0
Term Credits	15.0

Term 11	
ENGL 308 [WI] The Literature of Business	3.0
GST 359 Culture and Values	3.0
BED Distribution course	3.0
Free elective	3.0
Term Credits	12.0

Term 12	
INTB 338 Regional Studies in Economic Policies and International Business	4.0
Area specialty	3.0
BED Distribution course	3.0
Free elective	3.0
Term Credits	13.0

Total Credit: 182.0

Global Health & Sustainability Concentration

Term 1	Credits
ANTH 101 Introduction to Cultural Diversity	3.0
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
LING 102 Language and Society	3.0
MATH 101 Introduction to Analysis I	4.0
UNIV H101 The Drexel Experience	1.0
Language course	4.0
Term Credits	18.0

Term 2	
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102 Introduction to Analysis II	4.0
PHIL 105 Critical Reasoning	3.0
PSCI 150 International Politics	4.0
Language course	4.0
Term Credits	18.0

Term 3	
CIVC 101 Introduction to Civic Engagement	1.0
ECON 201 Principles of Microeconomics	4.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
ENVS 260 Environmental Science and Society	3.0
GST 190 Global Research Methods	3.0
Language course	4.0
Term Credits	18.0

Term 4	
ECON 202 Principles of Macroeconomics	4.0
HIST 287, 288, or 289 History of Science: Ancient to Medieval History of Science: Medieval to Enlightenment History of Science: Enlightenment to Modernity	4.0
Ethics elective	3.0
Language course	4.0

GHS distribution option		3.0
Term Credits		18.0
Term 5		
ENGL 300 [WI], 302, or 370	Literature & Science Environmental Literature Topics in Literature and Medicine	3.0
GHS distribution option		3.0
Language course		4.0
Area course		3.0
Science elective		4.0
Term Credits		17.0
Term 6		
ENGL 204	Post-Colonial Literature II	3.0
GST 360	Civilizations	3.0
GHS distribution option		3.0
Language course		4.0
Term Credits		13.0
Term 7		
ANTH 360	Culture and the Environment	3.0
GHS distribution options		6.0
Language course		3.0
Term Credits		12.0
Term 8		
CULA 427	The Kitchen Garden: Fall	3.0
PBHL 303	Overview of Issues in Global Health	3.0
SOC 235	Sociology of Health and Illness	4.0
WGST 240	Women and Society in a Global Context	3.0
Language course		3.0
Term Credits		16.0
Term 9		
PHIL 335	Global Ethical Issues	3.0
Area course		3.0
GHS distribution option		3.0
Language course		3.0
Free elective		3.0
Term Credits		15.0
Term 10		
SOC 346	Environmental Justice	4.0
UNIV H201	Looking Forward: Academics and Careers	1.0
GHS distribution option		3.0
Language course		3.0
Free elective		3.0
Term Credits		14.0
Term 11		
GST 359	Culture and Values	3.0
GHS distribution options		6.0
Free elective		3.0
Term Credits		12.0
Term 12		
PBHL 301	Epidemiology in Public Health	3.0
GHS distribution options		6.0
Free elective		3.0
Term Credits		12.0

Total Credit: 183.0

Global Justice and Human Rights Concentration

		Credits
Term 1		
ANTH 101	Introduction to Cultural Diversity	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
LING 102	Language and Society	3.0

MATH 101	Introduction to Analysis I	4.0
UNIV H101	The Drexel Experience	1.0
Language course		4.0
Term Credits		18.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSCI 150	International Politics	4.0
Language course		4.0
Term Credits		18.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
ECON 201	Principles of Microeconomics	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
GST 190	Global Research Methods	3.0
Science elective		3.0
Language course		4.0
Term Credits		18.0
Term 4		
ECON 202	Principles of Macroeconomics	4.0
PSCI 120	History of Political Thought	4.0
Language course		4.0
JHR Distribution course		3.0
Term Credits		15.0
Term 5		
ENGL 360 [WI]	Literature and Society	3.0
Language course		4.0
JHR Distribution course		3.0
Science elective		3.0
Free elective		3.0
Term Credits		16.0
Term 6		
ENGL 204	Post-Colonial Literature II	3.0
GST 260	Evil Isms	3.0
Language course		4.0
JHR Distribution course		4.0
Term Credits		14.0
Term 7		
ANTH 310	Societies In Transition: The Impact of Modernization and the Third World	3.0
PSCI 353	International Human Rights	4.0
WGST 240	Women and Society in a Global Context	3.0
Language course		3.0
JHR Distribution course		3.0
Term Credits		16.0
Term 8		
PHIL 335	Global Ethical Issues	3.0
PSCI 229	Theories of Justice	4.0
Language course		3.0
JHR Distribution course		3.0
Term Credits		13.0
Term 9		
SOC 355 [WI]	Classical Social Theory	4.0
Language course		3.0
JHR Distribution courses		6.0
Free elective		3.0
Term Credits		16.0
Term 10		
PSCI 352	Ethics and International Relations	4.0
UNIV H201	Looking Forward: Academics and Careers	1.0

Area speciality course	3.0
Language course	3.0
JHR Distribution course	3.0
Term Credits	14.0
Term 11	
GST 359 Culture and Values	3.0
GST 435 Model Organization of American States	3.0
JHR Distribution course	3.0
Free elective	3.0
Term Credits	12.0
Term 12	
Area speciality course	3.0
JHR Distribution courses	6.0
Free elective	3.0
Term Credits	12.0
Total Credit: 182.0	

Minor in Global Studies

Global Studies practices socially-responsible global citizenship through a unique combination of research-oriented and multilingual instruction, professional experience, and meaningful engagement with communities both here in Philadelphia and abroad.

Students experience Global Studies by:

- Examining the movement of peoples, goods, and cultures across countries and regions
- Studying global issues in concrete socio-economic, cultural, and geographical contexts
- Tackling structural inequalities from a variety of perspectives and disciplines
- Developing intercultural and language skills through unique pedagogical models
- Working with employers and communities in Philadelphia and around the world through Drexel's Co-op opportunities

Program Requirements

Students must complete at least 201 of a language before earning the GST minor.

Core requirements		
GST 360	Civilizations	3.0
WGST 240	Women and Society in a Global Context	3.0
Students select one region-specific course approved by GST advisor		3.0-4.0
Global Studies Electives		15.0

Students must complete at least fifteen credits from the following list:

AFAS T280	Special Topics in Africana Studies
ANTH 212 [WI]	Topics in World Ethnography
ANTH 220	Aging In Cross-Cultural Perspective
ANTH 310	Societies In Transition: The Impact of Modernization and the Third World
ANTH 312	Approaches to Intercultural Behavior
ANTH 410	Cultural Theory I
BIO 264	Ethnobotany
BLAW 340	International Business Law
COM 342	English Worldwide
COM 345	Intercultural Communication
COM 355	Ethnography of Communication
COM 361	International Public Relations
COM 362	International Negotiations
COM 390 [WI]	Global Journalism
ECON 342	Economic Development

ENGL 203 [WI]	Post-Colonial Literature I
ENGL 204	Post-Colonial Literature II
ENGL 323	Literature and Other Arts
ENGL 325	Topics in World Literature
ENGL 360 [WI]	Literature and Society
GST 320	Building Global Bridges
INTB 332	Multinational Corporations
INTB 334	International Trade
INTB 336	International Money and Finance
MUSC 331	World Musics
NFS 345	Foods and Nutrition of World Cultures
NFS 446	Perspectives in World Nutrition
PHIL 335	Global Ethical Issues
PSCI 120	History of Political Thought
PSCI 240	Comparative Government
PSCI 255	International Political Economy
PSCI 340	Politics of Developing Nations
PSCI 351	International Organizations: The United Nations
PSCI 352	Ethics and International Relations
PSCI 353	International Human Rights
PSCI 357	The European Union in World Politics
SOC 220	Wealth and Power
SOC 330	Development and Underdevelopment in the Global South
SOC 346	Environmental Justice
SOC 444	Social Movements
WGST T280	Special Topics in Women's and Gender Studies
Total Credits	24.0-25.0

Global Studies Faculty

Anne C. Cecil, MA (*University of the Arts*). Assistant Teaching Professor. Web designer, product designer, merchandising and artist.

George Ciccariello-Maher, PhD (*University of California, Berkeley*). Associate Professor. Colonialism, social movements, political theory.

Rose Corrigan, PhD (*Rutgers University*). Associate Professor. Women, public law, American politics and policy.

Brenda Dyer, MA (*University of Pennsylvania*). Associate Teaching Professor. Language acquisition pedagogy, teaching writing, seventeenth and eighteenth century French literature, women writers, translation.

Mary Ebeling, PhD (*University of Surrey*) Director, *Women's and Gender Studies*. Associate Professor. Science and technology studies; emerging technologies and biocapital; media and democratic cultures; radical social movements; sociology of markets; political sociology; and ethnographic methodologies.

David Fryer, PhD (*Brown University*). Assistant Teaching Professor. Gender theory; psychoanalysis; ethics; queer theory; genderqueer theory; Phenomenology; Africana thought; secular Jewish thought.

Christian Hunold, PhD (*University of Pittsburgh*). Associate Professor. Environmental policy; comparative politics; urban wildlife; political theory.

Gabriella Ibieta, PhD (*City University of New York*). Associate Professor. Comparative literature; Cuban and Latin American fiction.

Emmanuel F. Koku, PhD (*University of Toronto*). Associate Professor. Social network analysis; qualitative/quantitative research; medical sociology; social epidemiology; social demography; sociology of

development; communication and information technology; community and urban sociology.

Christopher A. Laincz, PhD (*Duke University*). Associate Professor. Economic development, technological change, and growth, industrial organization, macroeconomics and monetary economics.

Joanna Lyskovicz, MA (*UAM Poznan, Poland*). Instructor. Comparative linguistics, translation, business Spanish, medical Spanish, modern Spanish literature, XXth cent. Spanish poetry, magical realism in Latin American literature.

Maria delacruz Matus-Mendoza, PhD (*Temple University*) *Language Program Coordinator*. Associate Professor. Spanish Linguistic variation in the US; the relationship between language variation and mobility (social and geographical) among the Mexican communities in Mexico and in the United States; second language acquisition; language variation in media.

Usha Menon, PhD (*University of Chicago*). Professor. Self, identity & personhood, emotional functioning, Hindu morality, gender relations in Hindu society, adult development, popular Hinduism, post-colonial feminism, Hindu religious nationalism and Islamic radicalism.

Rogelio Minana, PhD (*Penn State*) *Department Head, Global Studies and Modern Languages*. Professor. The role of classic cultural icons, particularly Don Quixote, in 21st century political and social justice discourse; the interplay between the traditional humanities, youth organizations, and digital storytelling.

Julie Mostov, PhD (*New York University*) *Vice Provost for Global Initiatives*. Professor. Modern political thought, democratic theory, nationalism, gender studies, South Eastern Europe and the Balkans.

Joel E. Oestreich, PhD (*Brown University*) *Director of the Global Studies major*. Associate Professor. International organizations, international finance, development, and human rights.

Emilie Passow, PhD. Associate Teaching Professor. Medical Humanities, Jewish Studies

Rakhmiel Peltz, PhD (*Columbia University, Linguistics; University of Pennsylvania, Biological Sciences*) *Director of Judaic Studies Program*. Professor. Sociolinguistics, ethnography of communication, social history of Yiddish language and culture, Yiddish culture of Eastern Europe, language planning, language and ethnic identity, language and group memory, aging and ethnicity, history of urban neighbors.

Abioseh Porter, PhD (*University of Alberta, Canada*). Professor. Comparative literature; postcolonial literatures; Editor, JALA, Journal of the African Literature Association.

Robert Powell, PhD (*Temple University*). Assistant Teaching Professor. Early and Middle Bronze Age Crete; archaeoastronomy; early state formation; archaeology and anthropology of frontiers; mass communication.

Rachel R. Reynolds, PhD (*University of Illinois at Chicago*). Associate Professor. Sociolinguistics, ethnography of communication, intercultural communication, globalization and the rhetoric of community, political economy of immigration, race and ethnicity, new African immigrants in the United States, Igbo studies.

Simone Schlichting-Artur, EdD (*University of Pennsylvania*) *Senior Assistant Dean of Global Initiatives*. Teaching Professor. International business communication (Germany and the U.S.), public health policy

and languages, German post-war history through film and literature, development of writing assessment tools for German minor.

Natsumi Shor, MA. Assistant Teaching Professor. Business and professional Japanese; Japanese film and culture; interrelation between Japanese language to the nation's culture and thought.

Wesley Shumar, PhD (*Temple University*) *Department Head, Anthropology*. Professor. Ethnography of cyberspace, online learning communities, political economy of higher education, globalization, activity theory, semiotics, critical realism, psychoanalysis, identity and the self.

Judith Storniolo, PhD (*University of Pennsylvania*). Teaching Professor. Historical and comparative linguistics, Mesoamerican languages and culture, applied anthropology, public policy, oral traditions and narratives, ideology and ritual, Mesoamerican ethnohistory; and pre-Columbian literature.

Alden Young, PhD (*Princeton University*) *Director of the Program in Africana Studies*. Assistant Professor. African history; economic history and the history of Arab and African interactions.

Jennifer Yusin, PhD (*Emory University*). Associate Professor. Postcolonial literature; trauma theory; literary theory; psychoanalysis, and memory studies in contemporary literature in English.

History

Major: History

Degree Awarded: Bachelor of Arts (BA) or Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 182.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 54.0101

Standard Occupational Classification (SOC) code: 19-3093

Note: Effective Fall 2015, students are no longer being accepted into the Bachelor of Science (BS) program.

About the Program

The history program reflects the strengths of Drexel University, including specialization in transnational history and in the history of science, technology and the environment. A series of required courses in history build skills in research and interpretation of the past while elective courses within and outside the history program allow students to shape their curriculum to meet their needs and interests. Our history graduates go to graduate school in history, to professional schools in law, medicine, and business, and to work in business, government agencies, and non-profit organizations.

We apply Drexel's experiential, research-intensive approach to the discipline of history. Using the extensive historical resources of Philadelphia, the region, and the digital world, students develop a profound understanding of history and the ways it is made. We also encourage students to enrich their education through co-op, study abroad, and summer research projects working alongside department faculty.

Degree Offered

The **Bachelor of Arts (BA)** provides a course of study that includes foreign language courses and a broad grounding in the liberal arts, with flexibility for students to choose courses to fulfill humanities, social

science, math, and science requirements that will contribute to their overall educational and career plans.

The History (<http://catalog.drexel.edu/undergraduate/collegeofartsandsciences/history/#historyminor>) minor allows students in other majors to explore the historical background of their discipline, to better understand the origins of the contemporary world, and to build the knowledge and skills needed to understand the development of human societies over time and to understand historical episodes into their proper contexts. The minor in History is highly flexible and allows students to choose those History courses which appeal to them and which will contribute to their broader education. To complete the minor, students must take a total of six History courses (24.0 credits), five of which must be at the 200-level or above.

Additional Information

For more information about this program, please visit the Department of History (<http://drexel.edu/history>) website or contact:

Melissa Mansfield
Department Administrator
History Department
mmm462@drexel.edu

Degree Requirements (BA)

General Education Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV H101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Math courses		6.0-8.0
Science courses *		6.0-8.0

Foundation Requirements

Diversity electives		6.0
Two Consecutive Foreign Language courses (must complete level 201)		7.0-8.0
Humanities/Fine Arts electives		12.0
Social Science electives		12.0
International Studies electives		6.0

Core History Requirements

HIST 101	Introductory Seminar in History I **	
HIST 102	Introductory Seminar in History II **	
HIST 296	Research Methods in History I **	
HIST 301	The Study of History **	
HIST 396	Research Methods in History II **	
HIST 490 [WI]	Senior Seminar I **	
HIST 491 [WI]	Senior Seminar II **	
Any 1 Advanced History Seminar (Topics will vary)		
HIST T380	Special Topics in History	
History Distribution Courses***		20.0
Any 2 non-U.S. History courses		
Any 1 U.S. History Course		
Any 1 History courses covering pre-1700 history (May not be HIST 201)		
Any 1 History of Science, Technology, and Environment course		
History Concentration courses or any 7 History courses (at least four must be 200-level and above)		28.0
Free electives		30.0-35.0
Total Credits		182.0

* Any Biology (BIO), Chemistry (CHEM), Nutrition (NFS), Physics (PHYS), Geoscience (GEO), Environmental Science (ENVS), or Physics-Environmental Science (PHEV).

** These courses must be taken in sequence.

*** Only 200-level and above HIST courses will fulfill this requirement.

Optional History Concentrations

Students may select one of the two following concentrations in the History BA, or they may elect not to undertake a concentration. The courses in the required history distribution list may count toward the 28.0 credits in a concentration; the courses in the required core sequence may not count toward the 28.0 credits in the concentration.

History of Science, Technology, and Environment Concentration

HIST 302	The Study of Science, Technology, and Environment in History	4.0
Select 1 Environmental History course from the following list:		4.0
HIST 280	History of Science: Ancient to Medieval	
HIST 320	Disaster in Global History	
HIST 321	Themes in Global Environmental History	
HIST T380	Special Topics in History (with approval when appropriate topic offered)	
Select 1 Transnational Histories of Science and Technology course from the following list:		4.0
HIST T280	Special Topics in History (with approval when appropriate topic offered)	
HIST 290	Technology and the World Community	
HIST T380	Special Topics in History (with approval when appropriate topic offered)	
HIST 385	Transnational History of Science, Technology and Environment	
Select 1 History of Medicine and Disabilities course from the following list:		4.0
HIST T280	Special Topics in History (with approval when appropriate topic offered)	
HIST T380	Special Topics in History (with approval when appropriate topic offered)	
HIST 340	History of Bodies in Science, Technology, and Medicine	
HIST 341	Disabilities in History	
Concentration Electives (select three from the following list)		12.0
HIST T280	Special Topics in History (with approval when appropriate topic offered)	
HIST 283	Technology and Identity	
HIST 285	Technology in Historical Perspective	
HIST 287	History of Science: Ancient to Medieval	
HIST 288	History of Science: Medieval to Enlightenment	
HIST 289	History of Science: Enlightenment to Modernity	
HIST 290	Technology and the World Community	
HIST 291	Global History of Engineering	
HIST 292	Technology in American Life	
HIST 320	Disaster in Global History	
HIST 321	Themes in Global Environmental History	
HIST 322	Empire and Environment	
HIST 340	History of Bodies in Science, Technology, and Medicine	
HIST 341	Disabilities in History	
HIST 365	Science and State Power: Colonialism	
HIST T380	Special Topics in History (with approval when appropriate topic offered)	
Total Credits		28.0

Global History Concentration

HIST 303	The Study of Global History	4.0
Global Engagement Course †		4.0

One Foreign Language Course ^{††}	3.0-4.0
Concentration Electives (select any four from the following list) ^{†††}	16.0
HIST 235 The Great War, 1914-1918	
HIST 236 World War II	
HIST 246 England from Elizabeth to Waterloo, 1558-1815	
HIST 247 Modern England, 1815 - present	
HIST 250 European Revolutionary Movements and Ideology, 1815-1914	
HIST 251 Fascism	
HIST 254 Russian History Before 1900	
HIST 255 Twentieth Century Russia & the USSR	
HIST 256 Germany & the World of Hitler	
HIST 257 The Reformation Age	
HIST 258 History of Europe in the 19th Century	
HIST 259 History of Europe in the 20th Century	
HIST 261 Making of Modern South Asia	
HIST 263 The World and China	
HIST 264 East Asia in Modern Times	
HIST 267 Twentieth Century World I	
HIST 268 Twentieth Century World II	
HIST 270 [WJ] Introduction to Latin American History	
HIST 271 History of Mexico	
HIST 274 Conquest of Mexico	
HIST T280 Special Topics in History (with approval when appropriate topic offered)	
HIST 290 Technology and the World Community	
HIST 291 Global History of Engineering	
HIST 315 History of Capitalism	
HIST 320 Disaster in Global History	
HIST 321 Themes in Global Environmental History	
HIST 322 Empire and Environment	
HIST 355 Venice and the Mediterranean from the Middle Ages to Napoleon	
HIST 365 Science and State Power: Colonialism	
HIST T380 Special Topics in History (with approval when appropriate topic offered)	
HIST 385 Transnational History of Science, Technology and Environment	
Total Credits	27.0-28.0

[†] Courses which may fulfill the global engagement requirement include designated travel-integrated courses, study abroad courses (with approval), Global Classroom courses in history, or independent study courses (with approval.)

^{††} In addition to the required CoAS Foundation Requirements foreign language courses (two courses, including completion of a language through 201) in one language, students in the global history concentration must take at least one courses in a second foreign language.

^{†††} At least two courses must be 300-level and above.

Sample Plan of Study (BA)

History BA - No concentration

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HIST 101	Introductory Seminar in History I	4.0
UNIV H101	The Drexel Experience	1.0
	Foreign language course (103-level or higher)	4.0
	Non-US History Courses*	4.0
	Term Credits	16.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0

ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
HIST 102	Introductory Seminar in History II	4.0
	Foreign language course (201-level or higher)	3.0-4.0
	Mathematics course	3.0-4.0
	Term Credits	14.0-16.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
	U.S History course*	4.0
	Mathematics course	3.0-4.0
	Free elective	4.0
	Term Credits	14.0-15.0
Term 4		
HIST 296	Research Methods in History I	4.0
	Science elective***	3.0-4.0
	History course covering pre-1700 history**	4.0
	Free elective	4.0
	Term Credits	15.0-16.0
Term 5		
	History of Science, Technology, and Environment course*	4.0
	Humanities/fine arts elective	3.0
	Social and behavioral science elective	3.0
	Science elective***	3.0-4.0
	Free elective	3.0
	Term Credits	16.0-17.0
Term 6		
	Non-U.S. History course*	4.0
	Humanities/fine arts elective	3.0
	Social and behavioral science elective	3.0
	Free electives	6.0
	Term Credits	16.0
Term 7		
	History electives [†]	8.0
	International studies elective	3.0
	Diversity elective	3.0
	Free elective	3.0
	Term Credits	17.0
Term 8		
HIST 301	The Study of History	4.0
UNIV H201	Looking Forward: Academics and Careers	1.0
	History elective [†]	4.0
	Social and behavioral science elective	3.0
	International studies elective	3.0
	Term Credits	15.0
Term 9		
HIST 396	Research Methods in History II	4.0
HIST T380	Special Topics in History	4.0
	History elective [†]	4.0
	Humanities/fine arts elective	3.0
	Free elective	3.0
	Term Credits	18.0
Term 10		
HIST 490 [WJ]	Senior Seminar I	4.0
	History elective [†]	4.0
	Social and behavioral sciences elective	3.0
	Free elective	3.0
	Term Credits	14.0
Term 11		
HIST 491 [WJ]	Senior Seminar II	4.0
	History elective [†]	4.0
	Humanities/fine arts elective	3.0

Free elective	3.0
Term Credits	14.0

Term 12

History elective [†]	4.0
Free electives	8.0
Term Credits	12.0

Total Credit: 181.0-186.0

* Must be 200-level or above.

** Must be 200-level or above. May not be HIST 201.

*** See degree requirements (p. 112).

† At least four core courses must be 200-level or above.

History BA - Science, Technology, and Environment Concentration

Term 1	Credits
HIST 101 Introductory Seminar in History I	4.0
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV H101 The Drexel Experience	1.0
Non-US History course*	4.0
Foreign language course (103-level or higher)	4.0
Term Credits	16.0

Term 2	Credits
HIST 102 Introductory Seminar in History II	4.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
CIVC 101 Introduction to Civic Engagement	1.0
Foreign language course (201-level or higher)	3.0-4.0
Mathematics course	3.0-4.0
Term Credits	14.0-16.0

Term 3	Credits
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
US History course*	4.0
Mathematics course	3.0-4.0
Free elective	4.0
Term Credits	14.0-15.0

Term 4	Credits
HIST 296 Research Methods in History I	4.0
Concentration elective	4.0
Diversity elective	3.0
Free electives	7.0
Term Credits	18.0

Term 5	Credits
HIST 385 Transnational History of Science, Technology and Environment	4.0
Concentration elective	4.0
Diversity elective	3.0
Social or behavioral science elective	3.0
Free elective	3.0
Term Credits	17.0

Term 6	Credits
Non-US History course*	4.0
History course covering pre-1700 history**	4.0
Science elective***	3.0-4.0
Social or behavioral sciences elective	3.0
Term Credits	14.0-15.0

Term 7	Credits
History of Science, Technology, and Environment course*	4.0
Science elective***	3.0-4.0
Social or behavioral science elective	3.0
International studies elective	3.0

Free elective	3.0
Term Credits	16.0-17.0

Term 8

HIST 301 The Study of History	4.0
HIST T380 Special Topics in History	4.0
UNIV H201 Looking Forward: Academics and Careers	1.0
Social or behavioral history science elective	3.0
International studies elective	3.0
Term Credits	15.0

Term 9

HIST 302 The Study of Science, Technology, and Environment in History	4.0
HIST 396 Research Methods in History II	4.0
Humanities/fine arts elective	3.0
Free elective	3.0
Term Credits	14.0

Term 10

HIST 490 [WJ] Senior Seminar I	4.0
History of Medicine and Disabilities course	4.0
Humanities/fine arts elective	3.0
Free elective	3.0
Term Credits	14.0

Term 11

HIST 491 [WJ] Senior Seminar II	4.0
Environmental History course	4.0
Humanities/fine arts elective	3.0
Free elective	3.0
Term Credits	14.0

Term 12

Concentration elective	4.0
Humanities/fine arts elective	3.0
Free electives	8.0
Term Credits	15.0

Total Credit: 181.0-186.0

* Must be 200-level or above.

** Must be 200-level or above. May not be HIST 201.

*** See degree requirements (p. 112).

History BA - Global History Concentration

Term 1	Credits
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HIST 101 Introductory Seminar in History I	4.0
UNIV H101 The Drexel Experience	1.0
Foreign language course (103-level or above)	4.0
Non-US History course*	4.0
Term Credits	16.0

Term 2	Credits
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
HIST 102 Introductory Seminar in History II	4.0
Foreign language course (201-level or above)	3.0-4.0
Mathematics course	3.0-4.0
Term Credits	14.0-16.0

Term 3	Credits
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
US History course*	4.0
Mathematics course	3.0-4.0
Free elective	4.0
Term Credits	14.0-15.0

Term 4		
HIST 296	Research Methods in History I	4.0
Concentration elective **		4.0
Diversity elective		3.0
Free electives		7.0
Term Credits		18.0
Term 5		
Concentration elective **		4.0
Foreign language concentration requirement		4.0
Diversity elective		3.0
Social or behavioral science elective		3.0
Term Credits		14.0
Term 6		
History of Science, Technology, and Environment course *		4.0
History course covering pre-1700 history ***		4.0
Global Engagement course †		4.0
Science elective †		3.0-4.0
Term Credits		15.0-16.0
Term 7		
Non-US History course *		4.0
Science elective †		3.0-4.0
Social or behavioral science elective		3.0
International studies elective		3.0
Free elective		4.0
Term Credits		17.0-18.0
Term 8		
HIST 301	The Study of History	4.0
HIST T380	Special Topics in History	4.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Social or behavioral science elective		3.0
International studies elective		3.0
Term Credits		15.0
Term 9		
HIST 303	The Study of Global History	4.0
HIST 396	Research Methods in History II	4.0
Social behavioral science elective		3.0
Humanities/fine arts elective		3.0
Free elective		4.0
Term Credits		18.0
Term 10		
HIST 490 [WI]	Senior Seminar I	4.0
Concentration elective **		4.0
Humanities/fine arts elective		3.0
Free elective		3.0
Term Credits		14.0
Term 11		
HIST 491 [WI]	Senior Seminar II	4.0
Humanities/fine arts elective		3.0
Free electives		6.0
Term Credits		13.0
Term 12		
Concentration elective **		4.0
Humanities/fine arts elective		3.0
Free electives		6.0
Term Credits		13.0
Total Credit: 181.0-186.0		

* Must be 200-level or above.

** Two must be 200-level or above.

*** Must be 200-level or above. May not be HIST 201.

† See degree requirements (p. 112).

Degree Requirements (BS)

Note: Effective Fall 2015, students are no longer being accepted into the Bachelor of Science (BS) program.

Sample Plan of Study (BS)

Note: Effective Fall 2015, students are no longer being accepted into the Bachelor of Science (BS) program.

Term		Credits
Term 1		
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HIST 161	Themes in World Civilization I	3.0
MATH 101	Introduction to Analysis I	4.0
PSCI 110	American Government I	4.0
UNIV H101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		
COM 150	Mass Media and Society	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
HIST 162	Themes in World Civilization II	3.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
Term Credits		16.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 163	Themes in World Civilization III	3.0
MUSC 130	Introduction to Music	3.0
PSCI 120	History of Political Thought	4.0
PSY 101	General Psychology I	3.0
CIVC 101	Introduction to Civic Engagement	1.0
Term Credits		17.0
Term 4		
HIST 201	United States History to 1815	3.0
HIST 296	Research Methods in History I	3.0
Western Literature Survey course *		3.0
History of Latin America, Africa, or Asia		3.0
Science sequence course 1 *		4.0
Term Credits		16.0
Term 5		
HIST 202	United States History, 1815-1900	3.0
ENGL 203 [WI]	Post-Colonial Literature I	3.0
or 204	Post-Colonial Literature II	
PSCI 140	Introduction to Comparative Political Analysis	4.0
or 150	International Politics	
SOC 101	Introduction to Sociology	3.0
Science sequence course 2 *		4.0
Term Credits		17.0
Term 6		
ECON 201	Principles of Microeconomics	4.0
HIST 203	United States History since 1900	3.0
ANTH 110	Human Past: Anthropology and Prehistoric Archeology	3.0
or 101	Introduction to Cultural Diversity	
Free electives		4.0
Term Credits		14.0
Term 7		
ECON 202	Principles of Macroeconomics	4.0
Statistics elective		4.0
Free electives		6.0
Term Credits		14.0

Term 8		
HIST 301	The Study of History	3.0
History of Europe course (200-level or higher)		3.0
History electives (200-level and above HIST courses)		6.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Free elective		3.0
Term Credits		16.0
Term 9		
History electives (200-level and above HIST courses)		6.0
Free electives		9.0
Term Credits		15.0
Term 10		
HIST 490 [WI]	Senior Seminar I	3.0
Free electives		6.0
History electives (200-level and above HIST courses)		6.0
Term Credits		15.0
Term 11		
HIST 491 [WI]	Senior Seminar II	3.0
History electives (200-level and above HIST courses)		6.0
Free electives		6.0
Term Credits		15.0
Term 12		
History electives (200-level and above HIST courses)		6.0
Free electives		6.0
Term Credits		12.0
Total Credit: 182.0		

* See degree requirements (p. 112).

Co-Op/Career Opportunities

Co-Op Experiences

History majors have a wide variety of co-op experiences from which to choose. Business and public utilities offer many possibilities, and local, state, and federal governments; museums and archives; and law firms present many additional interesting co-op placements. Pre-law students, for example, are especially eager to see the inside of a law office, whether the co-op job they receive is clerical or a more challenging paralegal assignment. These practical experiences in the “real” world can reinforce the lessons of the classroom, sharpen skills, and establish important contacts. Sample co-op positions include:

- Law clerk/paralegal, Joe Davidson, Attorney-at-Law, Philadelphia
- Research analyst, Legislative Office for Research Liaison, Harrisburg, PA
- Legislative intern, Corporate Public Affairs Division, Philadelphia Electric Company
- Assistant lobbyist, Government Relations Office, Drexel University
- Education intern, Philadelphia Museum of Art
- Researcher, Philadelphia Chamber of Commerce
- Assistant, Office of the Governor, Harrisburg, PA

Career Opportunities

The flexible programs allow students to shape a curriculum that meets their needs, whether they are preparing for the business world, graduate school in history or political science, the MS in Science, Technology, and Society program (<http://catalog.drexel.edu/graduate/collegeofartsandsciences/sciencetechnologyandsociety>), an MBA or other business program, or law school.

Accelerated/Dual Degrees

About the Programs

Two accelerated/dual degrees are available:

- BA in History and MS in Science, Technology and Society program
- BA in History and the MS(LIS) program

Drexel University permits undergraduate students in 5-year programs to apply for graduate programs while completing their undergraduate programs, allowing students to complete their master's degrees in a shorter amount of time.

The accelerated-degree program provides an opportunity to simultaneously earn both a BA degree and an MS degree (two diplomas are awarded) in the time normally required to finish a bachelor's degree alone.

Students entering the program must:

- have and maintain a minimum of 3.0 grade point average throughout the program
- have no fewer than 90.0 earned credits
- have no more than 120.0 registered credits
- complete only 2 co-ops if in a BA/MS program.

BA in History and the MS in Science, Technology, and Society Accelerated Degree

The accelerated degree program in History and Science, Technology and Society provides an opportunity to earn both a BA degree and an MS degree (two diplomas are awarded) in five years.

This program was created to meet the academic needs of History students who are interested in History, Technology and Science, and interested in pursuing careers in the rapidly growing field of STS.

Recommended Plan of Study

Students should work closely with undergraduate advisor and the graduate Science, Technology & Society advisor to schedule an individualized plan of study for their accelerated degree completion.

The following is a sample plan of study.

Term		Credits	
Term 1	ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
	HIST 101	Introductory Seminar in History I	4.0
	UNIV H101	The Drexel Experience	1.0
	Foreign language course (103-level or higher)		4.0
	Non-US History Course*		4.0
	Term Credits		16.0
Term 2	CIVC 101	Introduction to Civic Engagement	1.0
	ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
	HIST 102	Introductory Seminar in History II	4.0
	Foreign language course (201-level or higher)		3.0-4.0
	Mathematics course		3.0-4.0
	Term Credits		14.0-16.0
Term 3	ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
	US History course*		4.0
	Mathematics course		3.0-4.0

Free electives		6.0
Term Credits		16.0-17.0
Term 4		
HIST 296	Research Methods in History I	4.0
	History course covering pre-1700 history**	4.0
	Science elective***	3.0-4.0
	Social and behavioral science elective	3.0
	Free elective	3.0
Term Credits		17.0-18.0
Term 5		
	History of Science, Technology, and Environment course*	4.0
	Humanities/fine arts elective	3.0
	Social and behavioral science elective	3.0
	Science elective***	3.0-4.0
	International studies elective	3.0
Term Credits		16.0-17.0
Term 6		
	Non-US History course*	4.0
	Humanities/fine arts elective	3.0
	Social and behavioral science elective	3.0
	International studies elective	3.0
	Diversity elective	3.0
Term Credits		16.0
Term 7		
	History electives†	8.0
	Social and behavioral science elective	3.0
	Humanities/fine arts elective	3.0
	Diversity elective	3.0
Term Credits		17.0
Term 8		
HIST 301	The Study of History	4.0
UNIV H201	Looking Forward: Academics and Careers	1.0
	History elective†	4.0
	Humanities/fine arts elective	3.0
SCTS 501	Introduction to Science, Technology and Society	3.0
Term Credits		15.0
Term 9		
HIST 396	Research Methods in History II	4.0
HIST T380	Special Topics in History	4.0
	Free elective	3.0
SCTS 502	Research Methods	3.0
	SCTS Ethics, Values, Identities, & Cultures course	3.0
Term Credits		17.0
Term 10		
HIST 490 [WI]	Senior Seminar I	4.0
	Free elective	4.0
SCTS 503	Advanced Research Methods	3.0
	SCTS Ethics, Values, Identities, & Cultures course	3.0
Term Credits		14.0
Term 11		
HIST 491 [WI]	Senior Seminar II	4.0
	History elective†	4.0
SCTS 504	Science, Technology & Society Theories	3.0
SCTS 798	Master's Research	3.0
Term Credits		14.0
Term 12		
	History electives†	8.0
	Science, Technology & Society Lab	3.0
	SCTS Science and Technology Policy course	3.0
	SCTS elective	3.0
Term Credits		17.0

Term 13		
	History elective†	4.0
	Free electives	9.0
	SCTS electives	6.0
Term Credits		19.0
Term 14		
	Free electives	8.0
	SCTS electives	9.0
Term Credits		17.0

Total Credit: 225.0-230.0

* Must be 200-level or above.

** Must be 200-level or above. May not be HIST 201.

*** See catalog for BA-History degree requirements.

† At least four core courses must be 200-level or above.

Students are strongly encouraged to take a course during each term while on co-op. Please refer to university policy for more information.

For more information about the accelerated BA/MS program, contact:

Irene Cho
Assistant Director
Center for Science, Technology, and Society
3600 Market Street, 7th Floor
215.895.3852

BA in History and the MS(LIS) Accelerated Degree

This program pairs the undergraduate History major with the school's MS in Library and Information Science in an accelerated time-frame. Students have the opportunity to earn both the undergraduate and graduate degrees in five years. Two diplomas are awarded. For students completing this program, the undergraduate background in history provides a natural fit with areas of library specialization, such as archival studies, records management, and related fields

About the Program

Applicants may be provisionally admitted into the program as incoming freshmen. Participants have the option of choosing either a one or a two co-op history program. The non-co-op option is not available for students choosing this accelerated degree option.

When students have accumulated 90.0 credits, but have not yet registered for 120.0 credits, they can apply to formally enter the graduate program. The student must have at least a 3.2 GPA and must maintain this 3.2 GPA for the graduate portion of the program.

Advising/Plan of Study

Students should work closely with faculty advisers to schedule and maintain a plan of study throughout the accelerated program.

Term 1		Credits
UNIV H101	The Drexel Experience	1.0
HIST 101	Introductory Seminar in History I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
	Foreign language course (103-level or higher)	4.0

Non-U.S. History course*	4.0	
Term Credits	16.0	
Term 2		
HIST 102	Introductory Seminar in History II	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
CIVC 101	Introduction to Civic Engagement	1.0
Foreign language course (201-level or higher)	3.0-4.0	
Mathematics course	3.0-4.0	
Term Credits	14.0-16.0	
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
U.S History course*	4.0	
Mathematics course	3.0-4.0	
Free elective	3.0	
INFO course**	3.0	
Term Credits	16.0-17.0	
Term 4		
HIST 296	Research Methods in History I	4.0
History course covering pre-1700 history***	4.0	
Science elective†	3.0-4.0	
Social and behavioral science elective	3.0	
Free elective	3.0	
Term Credits	17.0-18.0	
Term 5		
History of Science, Technology, and Environment course*	4.0	
Humanities/fine arts elective	3.0	
Science elective†	3.0-4.0	
Social and behavioral science elective	3.0	
International studies elective	3.0	
Term Credits	16.0-17.0	
Term 6		
Non-U.S. History course*	4.0	
Humanities/fine arts elective	3.0	
Social and behavioral science elective	3.0	
International studies elective	3.0	
Diversity elective	3.0	
Term Credits	16.0	
Term 7		
History electives††	8.0	
Social and behavioral science elective	3.0	
Diversity elective	3.0	
Humanities/fine arts elective	3.0	
Term Credits	17.0	
Term 8		
HIST 301	The Study of History	4.0
History elective††	4.0	
Humanities/fine arts elective	3.0	
UNIV H201	Looking Forward: Academics and Careers	1.0
INFO 520	Social Context of Information Professions	3.0
Term Credits	15.0	
Term 9		
HIST 396	Research Methods in History II	4.0
HIST T380	Special Topics in History	4.0
Free elective	4.0	
INFO 521	Information Users and Services	3.0
INFO elective	3.0	
Term Credits	18.0	
Term 10		
HIST 490 [WI]	Senior Seminar I	4.0
Free elective	4.0	

INFO 522	Information Access & Resources	3.0
INFO elective		3.0
Term Credits		14.0
Term 11		
HIST 491 [WI]	Senior Seminar II	4.0
History elective††		4.0
INFO 515	Introduction to Research in Information Organizations	3.0
INFO elective		3.0
Term Credits		14.0
Term 12		
History Electives††		8.0
INFO 530	Foundations of Information Systems	3.0
INFO 640	Managing Information Organizations	3.0
INFO elective		3.0
Term Credits		17.0
Term 13		
History elective††		4.0
Free electives		8.0
INFO electives		6.0
Term Credits		18.0
Term 14		
Free electives		8.0
INFO electives		9.0
Term Credits		17.0

Total Credit: 225.0-230.0

* Must be 200-level or above.

** Select from the following INFO courses: INFO 101, INFO 102, INFO 105, INFO 108, INFO 110, INFO 215.

*** Must be 200-level or above. May not be HIST 201.

† See History degree requirements.

†† At least four core courses must be 200-level or above.

Additional Information

For more information on the undergraduate history portion of the program, contact:

Melissa Mansfield, Department Administrator
Department of History
MacAlister Hall 3025
mmm462@drexel.edu

For more information on the graduate portion of the program, contact:

Susan E. Davis
Associate Teaching Professor
College of Computing and Informatics
sedavis@drexel.edu

Minor in History

History Electives*

*Take any 6 HIST courses; 5 of 6 must be 200-level or higher	24.0
Total Credits	24.0

History Faculty

Lloyd Ackert, PhD (*Johns Hopkins University*). Associate Teaching Professor. History of science and technology; ecology; Russian science.

Debjani Bhattacharyya, PhD (*Emory University*). Assistant Professor. Modern South Asian history; urban environmental history; history of economic thought; and post-colonial theory.

Scott G. Knowles, PhD (*Johns Hopkins University*) *Interim Department Head, History*. Associate Professor. Urban history, history of technology, history of disasters, modern history.

Sharon Ku, PhD (*University of Cambridge, UK*). Assistant Research Professor. History and sociology of science; nanotechnology; scientific standardization.

Jonson Miller, PhD (*Virginia Tech*). Associate Professor. Science and technology, American history, military history.

Tiago Saraiva, PhD (*Universidad Autónoma de Madrid*). Assistant Professor. History of science and technology; transnational history; environmental history

Jonathan Seitz, PhD (*University of Wisconsin*) *Assistant Department Head, History*. Associate Teaching Professor. History of religion, science, medicine, witchcraft, early modern Europe, Italy.

Amy Slaton, PhD (*University of Pennsylvania*). Professor. History of science and technology; history of standards and metrology; intersectionality, race, labor.

Kathryn Steen, PhD (*University of Delaware*). Associate Professor. History of technology, history of industry and business, and comparative history.

Donald F. Stevens, PhD (*University of Chicago*). Associate Professor. Modern Latin American history.

Alden Young, PhD (*Princeton University*) *Director of the Program in Africana Studies*. Assistant Professor. African history; economic history and the history of Arab and African interactions.

Michael Yudell, MPH, MPhil, PhD (*Columbia University*) *Chair, Department of Community Health and Prevention*. Associate Professor. Public health genomics; bioethics; history of public health; addiction.

Robert Zaller, PhD (*Washington University*). Professor. English history and early modern European history.

Emeritus Faculty

Eric Dorn Brose, PhD (*Ohio State University*). Professor Emeritus. German and European history.

Mathematics

Major: Mathematics

Degree Awarded: Bachelor of Arts (BA) or Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 27.0101

Standard Occupational Classification (SOC) code: 15-2021; 15-2041

About the Program

The mathematics major at Drexel provides a supportive learning environment in which students obtain a firm grounding in the core areas

of mathematics and apply this knowledge to problems encountered in a technological society. The Department of Mathematics (<http://drexel.edu/coas/academics/departments-centers/mathematics>) offers students the option of either a BA or a BS degree.

The Mathematics Department takes pride in offering a balanced and flexible curriculum. Three very different kinds of skills are emphasized in the mathematics major:

- **Abstract Reasoning**

All students majoring in mathematics take courses that emphasize abstract reasoning. Students read and write proofs, and graduate well prepared to enter a PhD program in mathematics.

- **Computing**

All students majoring in mathematics take a series of computing courses. This emphasis on computing is one of the distinctive features of the mathematics program at Drexel, and provides students with a competitive advantage in the job market.

- **Mathematical Modeling**

All students majoring in mathematics take multidisciplinary courses that focus on the interplay between mathematics and an area of application.

Students often use electives to focus on an area of personal interest. The Department of Mathematics encourages students to minor in a subject where mathematics is applied. The Department provides an advisor to assist students in selecting electives and planning career paths.

Degree Requirements (BA)

General Education Requirements

UNIV S101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV S201	Looking Forward: Academics and Careers	1.0
COM 230	Techniques of Speaking	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

One of the following Computer Science sequences: 9.0

Option I		
CS 140	Introduction to Multimedia Programming	
CS 143	Computer Programming Fundamentals	
CS 171	Computer Programming I	
Option II		
CS 140	Introduction to Multimedia Programming	
CS 171	Computer Programming I	
CS 172	Computer Programming II	

Humanities and fine arts electives	6.0
International studies electives	6.0
Science electives	6.0
Social and behavioral sciences electives	6.0
Studies in diversity electives	6.0
Free Electives	67.0

Core Mathematics Requirements

MATH 121	Calculus I *	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0

MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	4.0
MATH 210	Differential Equations	4.0
MATH 220 [WI]	Introduction to Mathematical Reasoning	3.0
MATH 331	Abstract Algebra I	3.0-4.0
or MATH 401	Elements of Modern Analysis I	
Math Major Electives**		30.0
Select a minimum of 30 credits from the following:		
MATH 205	Survey of Geometry	
MATH 221	Discrete Mathematics	
MATH 235	Math Competition Problem Solving Seminar	
MATH 238	History of Mathematics	
MATH 250	Mathematics of Investment and Credit	
MATH 285	Differential Equations II	
MATH 300	Numerical Analysis I	
MATH 301	Numerical Analysis II	
MATH 305	Introduction to Optimization Theory	
MATH 311	Probability and Statistics I	
MATH 312	Probability and Statistics II	
MATH 316	Mathematical Applications of Symbolic Software	
MATH 318	Mathematical Applications of Statistical Software [WI]	
MATH 319	Techniques of Data Analysis	
MATH 320	Actuarial Mathematics	
MATH 321	Vector Calculus	
MATH 322	Complex Variables	
MATH 323	Partial Differential Equations	
MATH 332	Abstract Algebra II	
MATH 387	Linear Algebra II	
MATH 401	Elements of Modern Analysis I	
or MATH 331	Abstract Algebra I	
MATH 402	Elements of Modern Analysis II	
MATH 422	Introduction to Topology	
MATH 449	Mathematical Finance	
MATH 450	Introduction to Graph Theory	
MATH 475	Cryptography	
MATH 483	Discrete Event Simulation	
MATH 489	Tensor Calculus	
Total Credits		181.0-182.0

* Math majors must pass MATH 121 with a grade of B or higher.

** If a student takes both of MATH 331 and MATH 401, then one of these can count as a Mathematics Elective. Up to 3 mathematics-related courses from other departments may be substituted for Mathematics Electives with departmental permission. MATH special topics courses may be substituted for Mathematics Electives with departmental permission.

Categories of Electives

- *Humanities and arts electives*

Designated courses in art, art history, communication studies, foreign languages (300-level or above), history, literature, music, philosophy, religion, and theatre arts.

- *International electives*

Designated courses in anthropology, art history, history, literature, music, politics and sociology. Courses with an international focus may be used to fulfill requirements in other categories as well.

- *Science electives*

Students select two courses from chemistry, biology or physics.

Both courses may be in the same subject or they may be in different subject areas.

- *Social and behavioral sciences electives*

Designated courses in anthropology, economics, criminology & justice studies, international relations, history, politics, psychology and sociology.

- *Studies in diversity electives*

Designated courses in Africana studies, anthropology, communication, English, history, Judaic studies, linguistics, music, sociology and women's & gender studies.

Sample Plan of Study (BA)

5-year co-op sequence

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121*	Calculus I	4.0
UNIV S101	The Drexel Experience	1.0
Computer Science (CS) sequence course		3.0
Science elective		3.0-4.0
Term Credits		14.0-15.0
Term 2		Credits
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
Computer Science (CS) sequence course		3.0
Science elective		3.0-4.0
CIVC 101	Introduction to Civic Engagement	1.0
Term Credits		14.0-15.0
Term 3		Credits
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
MATH 220 [WI]	Introduction to Mathematical Reasoning	3.0
Computer Science (CS) sequence course		3.0
Social and behavioral science elective		3.0
Term Credits		16.0
Term 4		Credits
COM 230	Techniques of Speaking	3.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	4.0
Diversity studies elective		3.0
International studies elective		3.0
Term Credits		17.0
Term 5		Credits
Mathematics (MATH) courses**		6.0
Humanities/Fine arts elective		3.0
Free electives		6.0
Term Credits		15.0
Term 6		Credits
MATH 210	Differential Equations	4.0
Mathematics (MATH) course**		3.0
Social and behavioral science elective		3.0
Humanities/Fine arts elective		3.0
Free elective		3.0
Term Credits		16.0
Term 7		Credits
Mathematics (MATH) course**		3.0
Diversity studies elective		3.0

Free electives		9.0
Term Credits		15.0
Term 8		
MATH 401	Elements of Modern Analysis I	3.0-4.0
or 331	Abstract Algebra I	
Mathematics (MATH) course**		3.0
International studies elective		3.0
Free electives		6.0
Term Credits		15.0-16.0
Term 9		
Mathematics (MATH) courses**		4.0
Free electives		10.0
UNIV S201	Looking Forward: Academics and Careers	1.0
Term Credits		15.0
Term 10		
Mathematics (MATH) course**		4.0
Free electives		12.0
Term Credits		16.0
Term 11		
Mathematics (MATH) course**		3.0
Free electives		11.0
Term Credits		14.0
Term 12		
Mathematics (MATH) course**		4.0
Free electives		10.0
Term Credits		14.0

Total Credit: 181.0-184.0

* See degree requirements (p. 116).

** Select from MATH 205, MATH 221, MATH 235, MATH 238, MATH 250, MATH 285, MATH 300, MATH 301, MATH 305, MATH 311, MATH 312, MATH 316, MATH 318 [WI], MATH 319, MATH 320, MATH 321, MATH 322, MATH 323, MATH 332, MATH 387, MATH 402, MATH 422, MATH 449, MATH 450, MATH 475, MATH 483, MATH 489. If a student takes both of MATH 331 and MATH 401, then one of these can count as a Mathematics Elective. Up to 3 mathematics-related courses from other departments may be substituted for Mathematics Electives with departmental permission. MATH special topics courses may be substituted for Mathematics Electives with departmental permission.

Degree Requirements (BS)

General Education Requirements

UNIV S101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV S201	Looking Forward: Academics and Careers	1.0
COM 230	Techniques of Speaking	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

One of the following Computer Science sequences: 9.0

Option I		
CS 140	Introduction to Multimedia Programming	
CS 143	Computer Programming Fundamentals	
CS 171	Computer Programming I	
Option II		
CS 140	Introduction to Multimedia Programming	
CS 171	Computer Programming I	
CS 172	Computer Programming II	

Any Biology (BIO) course	3.0-4.0
Any Chemistry (CHEM) course	3.0-4.0
Any Physics (PHYS) course	3.0-4.0
Humanities electives	6.0
Social sciences electives	15.0
International studies or studies in diversity electives	6.0
Free electives	41.0

Mathematics Requirements

MATH 121	Calculus I*	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	4.0
MATH 210	Differential Equations	4.0
MATH 220 [WI]	Introduction to Mathematical Reasoning	3.0
MATH 331	Abstract Algebra I	4.0
MATH 332	Abstract Algebra II	3.0
MATH 401	Elements of Modern Analysis I	3.0
MATH 402	Elements of Modern Analysis II	3.0

Math Major Electives** 40.0

Select a minimum of 40 credits from the following:

MATH 221	Discrete Mathematics	
MATH 235	Math Competition Problem Solving Seminar	
MATH 250	Mathematics of Investment and Credit	
MATH 285	Differential Equations II	
MATH 300	Numerical Analysis I	
MATH 301	Numerical Analysis II	
MATH 305	Introduction to Optimization Theory	
MATH 311	Probability and Statistics I	
MATH 312	Probability and Statistics II	
MATH 316	Mathematical Applications of Symbolic Software	
MATH 318	Mathematical Applications of Statistical Software [WI]	
MATH 319	Techniques of Data Analysis	
MATH 320	Actuarial Mathematics	
MATH 321	Vector Calculus	
MATH 322	Complex Variables	
MATH 323	Partial Differential Equations	
MATH 387	Linear Algebra II	
MATH 422	Introduction to Topology	
MATH 449	Mathematical Finance	
MATH 450	Introduction to Graph Theory	
MATH 475	Cryptography	
MATH 483	Discrete Event Simulation	
MATH 489	Tensor Calculus	

Total Credits 181.0-184.0

* Math majors must pass MATH 121 with a grade of B or higher.

** MATH special topics courses may be substituted for Math Major Electives with departmental permission.

Sample Plan of Study (BS)

This is a recommended plan, illustrating the five-year co-op sequence. Additional recommended plans of study for other co-op options are available from the department.

First Year

Term 1		Credits
UNIV S101	The Drexel Experience	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0

Computer Science (CS) course sequence *	3.0
Any Biology (BIO) course	3.0
Term Credits	14.0

Term 2

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
Computer Science (CS) sequence course *		3.0
Any Chemistry (CHEM) course		3.0
Term Credits		14.0

Term 3

ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0
Computer Science (CS) sequence course *		3.0
Any Physics (PHYS) course		3.0-4.0
Term Credits		17.0-18.0

Second Year

Term 4

COM 230	Techniques of Speaking	3.0
MATH 201	Linear Algebra	4.0
MATH 220 [WI]	Introduction to Mathematical Reasoning	3.0
Social Science Electives		6.0
Term Credits		16.0

Term 5

Social Science Elective		3.0
MATH 210	Differential Equations	4.0
Mathematics (MATH) elective **		3.0
International Studies or Studies in Diversity Elective		3.0
Term Credits		13.0

Third Year

Term 6

MATH 331	Abstract Algebra I	4.0
Mathematics (MATH) elective **		4.0
Social Science Elective		3.0
Humanities elective		3.0
Term Credits		14.0

Term 7

MATH 332	Abstract Algebra II	3.0
Mathematics (MATH) elective **		4.0
Humanities elective		3.0
International Studies or Studies in Diversity Elective		3.0
Free elective		3.0
Term Credits		16.0

Fourth Year

Term 8

MATH 401	Elements of Modern Analysis I	3.0
Mathematics (MATH) elective **		3.0
Social science elective		3.0
Free electives		6.0
Term Credits		15.0

Term 9

UNIV S201	Looking Forward: Academics and Careers	1.0
MATH 402	Elements of Modern Analysis II	3.0
Mathematics (MATH) electives **		7.0
Free electives		6.0
Term Credits		17.0

Fifth Year

Term 10

Mathematics (MATH) electives **	8.0
Free electives	7.0-8.0
Term Credits	15.0-16.0

Term 11

Mathematics (MATH) electives **	7.0
Free electives	8.0
Term Credits	15.0

Term 12

Mathematics (MATH) electives **	6.0
Free electives	9.0-10.0
Term Credits	15.0-16.0

Total Credit: 181.0-184.0

* See degree requirements (p. 116).

** Select from MATH 221, MATH 250, MATH 285, MATH 300, MATH 301, MATH 305, MATH 311, MATH 312, MATH 316, MATH 318 [WI], MATH 319, MATH 320, MATH 321, MATH 322, MATH 323, MATH 387, MATH 422, MATH 449, MATH 450, MATH 475, MATH 483, MATH 489. MATH special topics courses may be substituted for Mathematics Electives with departmental permission.

Co-op/Career Opportunities

Mathematicians are employed in a variety of capacities in business, industry, and government. Students can combine courses in economics or finance and mathematics to prepare for careers in the actuarial field, banks, stock exchanges, or finance departments of large corporations or other financial institutions. Students interested in science careers may focus on probability and statistics in order to work for industries like pharmaceutical manufacturers. Many others combine math studies with computer science courses to prepare for careers in information systems or engineering.

Teacher certification is also a career option available through a joint program in mathematics and teacher education. Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) for more detailed information on co-op and post-graduate opportunities.

Dual Degree Bachelor's Programs

Since applied mathematics plays an important role in many different disciplines, mathematics majors often choose to pursue specialization in

a second field of study. Students may choose a dual major that involves completing the requirements of two separate majors or they can opt for a minor, which involves completing the major in one field and a smaller set of courses in another.

Dual majors are common in mathematics/computer science and mathematics/physics. Students interested in a dual major should consult with their advisor or contact the assistant department head. Dual majors in other fields are also possible, but early planning and discussions with advisors is essential.

Minor in Mathematics

The minor in mathematics consists of five required courses and elective courses from the specified group of courses listed below resulting in a minimum of 38.0 credits.

Required Courses

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra *	3.0-4.0
or MATH 261	Linear Algebra	

Mathematics Minor Electives **

Select from the following:		18.0-19.0
MATH 210	Differential Equations *	
or MATH 260	Differential Equations	
MATH 220	Introduction to Mathematical Reasoning [WJ]	
MATH 221	Discrete Mathematics	
MATH 235	Math Competition Problem Solving Seminar	
MATH 250	Mathematics of Investment and Credit	
MATH 285	Differential Equations II	
MATH 291	Complex and Vector Analysis for Engineers ***	
MATH 300	Numerical Analysis I	
MATH 301	Numerical Analysis II	
MATH 305	Introduction to Optimization Theory	
MATH 311	Probability and Statistics I	
MATH 312	Probability and Statistics II	
MATH 316	Mathematical Applications of Symbolic Software	
MATH 318	Mathematical Applications of Statistical Software [WJ]	
MATH 319	Techniques of Data Analysis	
MATH 320	Actuarial Mathematics	
MATH 321	Vector Calculus	
MATH 322	Complex Variables	
MATH 323	Partial Differential Equations	
MATH 331	Abstract Algebra I	
MATH 332	Abstract Algebra II	
MATH 387	Linear Algebra II	
MATH 401	Elements of Modern Analysis I	
MATH 402	Elements of Modern Analysis II	
MATH 410	Scientific Data Analysis I	
MATH 411	Scientific Data Analysis II	
MATH 422	Introduction to Topology	
MATH 449	Mathematical Finance	
MATH 450	Introduction to Graph Theory	
MATH 475	Cryptography	
MATH 483	Discrete Event Simulation	
MATH 489	Tensor Calculus	

Total Credits

38.0

* Students count only one of these two courses for their minor.

** A request form is available for any other mathematics courses upon the written approval prior to the beginning of the quarter in which the course is to be offered. Students should contact the Mathematics undergraduate academic advisor at advisor@math.drexel.edu.

*** Students who take MATH 291 cannot also count MATH 321 or MATH 322 toward their minor.

Mathematics Faculty

David M. Ambrose, PhD (*Duke University*) Associate Department Head, *Mathematics*. Associate Professor. Applied analysis and computing for systems of nonlinear partial differential equations, especially free-surface problems in fluid dynamics.

Jason Aran, MS (*Drexel University*). Assistant Teaching Professor.

Jonah D. Blasiak, PhD (*University of California at Berkeley*). Associate Professor. Algebraic combinatorics, representation theory, and complexity theory.

Robert P. Boyer, PhD (*University of Pennsylvania*) Associate Head of the *Mathematics Department*. Professor. Functional analysis, C*-algebras and the theory of group representations.

Patrick Clarke, PhD (*University of Miami*). Assistant Professor. Homological mirror symmetry, Landau-Ginzburg models, algebraic geometry, symplectic geometry.

Daryl Falco, MS (*Drexel University*). Assistant Teaching Professor. Discrete mathematics and automata theory.

Raymond Favocci, MS (*Drexel University*). Assistant Teaching Professor.

Carlo Fazioli, PhD (*University of Illinois at Chicago*). Assistant Teaching Professor. Computational Fluid Dynamics, Free Boundary Problems.

Pavel Grinfeld, PhD (*Massachusetts Institute of Technology*). Associate Professor. Intersection of physics, engineering, applied mathematics and computational science.

Anatolii Grinshpan, PhD (*University of California at Berkeley*). Assistant Teaching Professor. Function theory and operator theory, harmonic analysis, matrix theory.

Yixin Guo, PhD (*University of Pittsburgh*). Associate Professor. Biomathematics, dynamical systems, ordinary and partial differential equations and math education.

R. Andrew Hicks, PhD (*University of Pennsylvania*). Professor. Geometry; optics; computer vision.

Pawel Hitczenko, PhD (*Warsaw University*). Professor. Probability theory and its applications to analysis, combinatorics, wavelets, and the analysis of algorithms.

Robert Immordino, MS (*Drexel University*). Assistant Teaching Professor.

Ryan Kaliszewski, PhD (*The University of North Carolina at Chapel Hill*). Visiting Assistant Professor. Algebraic Combinatorics and Algebraic Geometry--specifically positivity results for generating polynomials.

Dmitry Kaliuzhnyi-Verbovetskyi, PhD (*Kharkov University*). Associate Professor. Operator theory, systems theory, complex analysis, C*-algebras and harmonic analysis.

Hwan Yong Lee, PhD (*University of Utah*). Assistant Teaching Professor. Electromagnetic wave propagation in composite media, optimization and inverse problem.

Georgi S. Medvedev, PhD (*Boston University*). Associate Professor. Ordinary and partial differential equations, mathematical neuroscience.

Taoufik Meklachi, PhD (*University of Houston*). Visiting Assistant Professor. Inverse Problems

Jennifer Morse, PhD (*University of California, San Diego*) *Undergraduate Advisor*. Professor. Algebraic combinatorics.

Shari Moskow, PhD (*Rutgers University*) *Department Head*. Professor. Partial differential equations and numerical analysis, including homogenization theory, numerical methods for problems with rough coefficients, and inverse problems.

Marna A. Mozeff, MS (*Drexel University*). Associate Teaching Professor. Working with Freshmen

Oksana P. Odintsova, PhD (*Omsk State University*). Associate Teaching Professor. Math education; geometrical modeling.

Dimitrios Papadopoulos, MS (*Drexel University*). Instructor.

Ronald K. Perline, PhD (*University of California at Berkeley*). Associate Professor. Applied mathematics, numerical analysis, symbolic computation, differential geometry, mathematical physics.

Marci A. Perlstadt, PhD (*University of California at Berkeley*). Associate Professor. Applied mathematics, computed tomography, numerical analysis of function reconstruction, signal processing, combinatorics.

Adam C. Rickert, MS (*Drexel University*). Associate Teaching Professor.

Eric Schmutz, PhD (*University of Pennsylvania*). Professor. Probabilistic combinatorics, asymptotic enumeration.

Li Sheng, PhD (*Rutgers University*). Associate Professor. Discrete optimization, combinatorics, operations research, graph theory and its application in molecular biology, social sciences and communication networks, biostatistics.

Gideon Simpson, PhD (*Columbia University*). Assistant Professor. Partial differential equations, scientific computing and applied mathematics.

Justin R. Smith, PhD (*Courant Institute, New York University*). Professor. Homotopy theory, operad theory, quantum mechanics, quantum computing.

Xiaoming Song, PhD (*University of Kansas*). Assistant Professor. Stochastic Calculus, Large Deviation Theory, Theoretical Statistics, Data Network Modeling and Numerical Analysis.

Jeanne M. Steuber, MS (*Boston University*). Assistant Teaching Professor.

Kenneth P. Swartz, PhD (*Harvard University*). Assistant Teaching Professor. Applied statistics, data analysis, calculus, discrete mathematics, biostatistics.

Vaishalee T. Wadke, MS (*Columbia University*). Instructor.

Richard D. White, MS (*Penn State University*). Assistant Teaching Professor.

Hugo J. Woerdeman, PhD (*Vrije Universiteit, Amsterdam*). Professor. Matrix and operator theory, systems theory, signal and image processing, and harmonic analysis.

J. Douglas Wright, PhD (*Boston University*) *Graduate Advisor*. Associate Professor. Partial differential equations, specifically nonlinear waves and their interactions.

Dennis G. Yang, PhD (*Cornell University*). Assistant Teaching Professor. Dynamical systems, neurodynamics.

Thomas (Pok-Yin) Yu, PhD (*Stanford University*). Professor. Multiscale mathematics, wavelets, applied harmonic analysis, subdivision algorithms, nonlinear analysis, applied differential geometry and data analysis.

Emeritus Faculty

Loren N. Argabright, PhD (*University of Washington*). Professor Emeritus. Functional analysis, wavelets, abstract harmonic analysis, the theory of group representations.

Robert C. Busby, PhD (*University of Pennsylvania*). Professor Emeritus. Functional analysis, C^* -algebras and group representations, computer science.

Ewaugh Finney Fields, EdD (*Temple University*) *Dean Emeritus*. Professor Emeritus. Mathematics education, curriculum and instruction, minority engineering education.

William M.Y. Goh, PhD (*Ohio State University*). Associate Professor Emeritus. Number theory, approximation theory and special functions, combinatorics, asymptotic analysis.

Bernard Kolman, PhD (*University of Pennsylvania*). Professor Emeritus. Lie algebras; theory, applications, and computational techniques; operations research.

Charles J. Mode, PhD (*University of California at Davis*). Professor Emeritus. Probability and statistics, biostatistics, epidemiology, mathematical demography, data analysis, computer-intensive methods.

Chris Rorres, PhD (*Courant Institute, New York University*). Professor Emeritus. Applied mathematics, scattering theory, mathematical modeling in biological sciences, solar-collection systems.

Jet Wimp, PhD (*University of Edinburgh*). Professor Emeritus. Applied mathematics, special factors, approximation theory, numerical techniques, asymptotic analysis.

Philosophy

Major: Philosophy

Degree Awarded: Bachelor of Arts (BA)

Calendar Type: Quarter

Total Credit Hours: 182.0 - 195.0

Co-op Options: One Co-op (Four years); No Co-op (Four years); Three Co-op (Five years)

Classification of Instructional Programs (CIP) code: 38.0101

Standard Occupational Classification (SOC) code: 25-1126

About the Program

A great philosopher once said, "Philosophers have just interpreted the world--but the point is to change it." At Drexel, we believe ideas do affect and change the world--in how we choose what to do, in how we approach

our activities, and in what we learn from them. At Drexel we believe that the most important reason to engage in philosophy is that we can change the world.

The Drexel philosophy program is organized around the idea that the study of philosophy should help students confront life's most difficult and complex challenges. Philosophy classes at Drexel involve students in the active development of their reflective, creative, rational, logical, and linguistic abilities by engaging them with the problems of life and the world. The Drexel philosophy major is an excellent preparation for success in any field of endeavor that values thoughtful reflection, logical thinking, and clear communication about real issues and concerns. It is particularly valuable as a preparation for careers in education and law, or in graduate study in philosophy, or in fields related to philosophy like critical media studies, public policy, or science, technology, and society (STS).

Drexel philosophy majors take a mixture of historical and topical courses in the major fields of philosophical inquiry. These fields include ethics, metaphysics (philosophy of reality), epistemology (philosophy of knowledge), aesthetics (philosophy of art and beauty), social and political philosophy, philosophy of science, and logic. Our philosophy elective classes cover a wide range of applied subjects including technology, medicine, law, religion, science, the environment, and more. Our upper-level seminar classes are discussion-driven, reading- and writing-intensive classes usually limited to 10-12 students.

Prior to the end of sophomore year students may choose to focus their philosophical studies in one of three areas of concentration. These are:

- Ethical Theory and Practice,
- Philosophy and Law,
- Philosophy, Technology and Science.

Students may also remain in the general Philosophy concentration, which gives them the widest range of options from which to select their courses.

Prior to the end of junior year, students may opt to work on a nine-credit Senior Thesis. This is a year-long, self-designed independent research and writing project, culminating in a defense before the program's faculty and students. This project consists of three one-on-one tutorials with a faculty member of the student's choosing.

The philosophy BA includes about 50.0 credits of free electives, which makes it possible for many students to double major. The Drexel philosophy program also offers a minor in philosophy (24.0 credits) and certificate programs in Philosophy in the Arts and Humanities and Philosophy in Science and Technology, (18.0 credits each).

Additional Information

For more information about Drexel philosophy classes and programs, please visit the Department of English & Philosophy website or drop by to see our director anytime. The Department of English and Philosophy is located in MacAlister Hall, room 5044. The director can be contacted at:

Dr. Peter Amato
Director of Programs in Philosophy
Department of English and Philosophy

MacAlister 5030
215-895-1353

peterama@drexel.edu

Degree Requirements

College of Arts and Sciences Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 105	Critical Reasoning	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Two Studies in Diversity Electives		6.0-8.0
Two International Studies Electives		6.0-8.0
Two Math Electives		6.0-8.0
Two Natural Science Electives		6.0-8.0
Four Social and Behavioral Sciences Electives		12.0-16.0
Select two of the following:		6.0
ARTH 101	History of Art I: Ancient to Medieval	
ARTH 102	History of Art II: Renaissance to Romanticism	
ARTH 103	History of Art: Modern Art	

Language Requirement

Any two (2) consecutive foreign language courses (completing level 201) 7.0-8.0

Major Requirements - All Concentrations

COM 230	Techniques of Speaking	3.0
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 211	Metaphysics: Philosophy of Reality	3.0
PHIL 212	Ancient Philosophy	3.0
PHIL 214	Modern Philosophy	3.0
PHIL 215	Contemporary Philosophy	3.0
PHIL 221	Epistemology: Philosophy of Knowledge	3.0
PHIL 251	Ethics	3.0
PHIL 421 [WJ]	Seminar in Ancient Philosophy	3.0
or PHIL 425	Seminar in Medieval Philosophy	
PHIL 431 [WJ]	Seminar in Modern Philosophy	3.0
PHIL 461 [WJ]	Seminar in Contemporary Philosophy	3.0
or PHIL 465	Seminar in American Philosophy	

Professional Ethics Elective

Select one of the following:		3.0
PHIL 301	Business Ethics	
PHIL 305	Ethics and the Media	
PHIL 311	Ethics and Information Technology	
PHIL 315	Engineering Ethics	
PHIL 317	Ethics and Design Professions	
PHIL 321	Biomedical Ethics	
PHIL 322	Ethics of Human Enhancement	
PHIL 323	Organizational Ethics	
PHIL 325	Ethics in Sports Management	
PHIL 330	Criminal Justice Ethics	
PHIL 335	Global Ethical Issues	
PHIL 340	Environmental Ethics	

Thesis or Non-Thesis Option

Thesis Option:		9.0
PHIL 497 [WJ]	Senior Essay I: Research & Thesis Development	
PHIL 498 [WJ]	Senior Essay II: Argument Construction	
PHIL 499 [WJ]	Senior Essay III: Defense	
Non-Thesis Option:		
PHIL 481 [WJ]	Seminar in a Philosophical School	
PHIL 485 [WJ]	Seminar in a Major Philosopher	
Select one of the following:		
PHIL 341	Philosophy of the Environment	
PHIL 351	Philosophy of Technology	
PHIL 355	Philosophy of Medicine	

PHIL 361	Philosophy of Science
PHIL 371	Philosophy of Social Sciences
PHIL 381 [WI]	Philosophy in Literature
PHIL 385	Philosophy of Law
PHIL 391	Philosophy of Religion
PHIL 395	Advanced Topics in Logic

Electives

Free Electives 52.0

Concentration Option 21.0

General Philosophy Concentration:

PHIL 111	Symbolic Logic I
PHIL 231	Aesthetics: Philosophy of Art or PHIL 218 Philosophy of Mathematics
PHIL 481 [WI]	Seminar in a Philosophical School
PHIL 485 [WI]	Seminar in a Major Philosopher

Select one of the following courses:

PHIL 207	Symbolic Logic II
PHIL 301	Business Ethics
PHIL 305	Ethics and the Media
PHIL 311	Ethics and Information Technology
PHIL 315	Engineering Ethics
PHIL 317	Ethics and Design Professions
PHIL 321	Biomedical Ethics
PHIL 322	Ethics of Human Enhancement
PHIL 323	Organizational Ethics
PHIL 325	Ethics in Sports Management
PHIL 330	Criminal Justice Ethics
PHIL 335	Global Ethical Issues
PHIL 340	Environmental Ethics

Select two of the following courses:

PHIL 341	Philosophy of the Environment
PHIL 351	Philosophy of Technology
PHIL 355	Philosophy of Medicine
PHIL 361	Philosophy of Science
PHIL 371	Philosophy of Social Sciences
PHIL 381 [WI]	Philosophy in Literature
PHIL 385	Philosophy of Law
PHIL 391	Philosophy of Religion
PHIL 395	Advanced Topics in Logic

Philosophy & Law Concentration:

PHIL 111	Symbolic Logic I
PHIL 207	Symbolic Logic II
PHIL 241	Social & Political Philosophy
PHIL 385	Philosophy of Law
PHIL 391	Philosophy of Religion
PHIL 481 [WI]	Seminar in a Philosophical School or PHIL 485 Seminar in a Major Philosopher

Select one of the following courses:

PHIL 301	Business Ethics
PHIL 305	Ethics and the Media
PHIL 311	Ethics and Information Technology
PHIL 315	Engineering Ethics
PHIL 317	Ethics and Design Professions
PHIL 321	Biomedical Ethics
PHIL 322	Ethics of Human Enhancement
PHIL 323	Organizational Ethics
PHIL 325	Ethics in Sports Management
PHIL 330	Criminal Justice Ethics
PHIL 335	Global Ethical Issues
PHIL 340	Environmental Ethics

Ethical Theory & Practice Concentration:

PHIL 102	Introduction to Eastern Philosophy
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PHIL 231	Aesthetics: Philosophy of Art or PHIL 241 Social & Political Philosophy
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PHIL 385	Philosophy of Law
PHIL 391	Philosophy of Religion
PHIL 481 [WI]	Seminar in a Philosophical School
PHIL 485 [WI]	Seminar in a Major Philosopher

Select one of the following courses:

PHIL 301	Business Ethics
PHIL 305	Ethics and the Media
PHIL 311	Ethics and Information Technology
PHIL 315	Engineering Ethics
PHIL 317	Ethics and Design Professions
PHIL 321	Biomedical Ethics
PHIL 322	Ethics of Human Enhancement
PHIL 323	Organizational Ethics
PHIL 325	Ethics in Sports Management
PHIL 330	Criminal Justice Ethics
PHIL 335	Global Ethical Issues
PHIL 340	Environmental Ethics

Philosophy, Technology & Science Concentration:

PHIL 111	Symbolic Logic I
PHIL 207	Symbolic Logic II
PHIL 231	Aesthetics: Philosophy of Art or PHIL 218 Philosophy of Mathematics
PHIL 351	Philosophy of Technology
PHIL 361	Philosophy of Science
PHIL 481 [WI]	Seminar in a Philosophical School
PHIL 485 [WI]	Seminar in a Major Philosopher

Total Credits 182.0-195.0

Sample Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 105	Critical Reasoning	3.0
UNIV H101	The Drexel Experience	1.0
Math elective		3.0-4.0
Term Credits		13.0-14.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHIL 212	Ancient Philosophy	3.0
Language elective*		4.0
Math elective		3.0-4.0
Term Credits		14.0-15.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 214	Modern Philosophy	3.0
Language elective		3.0-4.0
Natural Science elective		3.0-4.0
Social Science elective		3.0-4.0
Term Credits		15.0-18.0
Term 4		
ARTH 101	History of Art I: Ancient to Medieval	3.0
PHIL 215	Contemporary Philosophy	3.0
PHIL 251	Ethics	3.0
Diversity elective		3.0-4.0
Social Science elective		3.0-4.0
Term Credits		15.0-17.0
Term 5		

ARTH 102	History of Art II: Renaissance to Romanticism	3.0
PHIL 111	Symbolic Logic I	3.0
PHIL 211	Metaphysics: Philosophy of Reality	3.0
Diversity elective		3.0-4.0
Natural Science elective		3.0-4.0
Term Credits		15.0-17.0
Term 6		
COM 230	Techniques of Speaking	3.0
PHIL 207	Symbolic Logic II (Or any Professional Ethics elective PHIL 301-340)	3.0
PHIL 221	Epistemology: Philosophy of Knowledge	3.0
Social Science elective		3.0-4.0
Free elective		3.0
Term Credits		15.0-16.0
Term 7		
PHIL 231	Aesthetics: Philosophy of Art	3.0
Professional Ethics elective		3.0
Social Science elective		3.0-4.0
Free electives		9.0
Term Credits		18.0-19.0
Term 8		
PHIL 481 [WI]	Seminar in a Philosophical School	3.0
International Studies elective		3.0-4.0
Free electives		9.0
Term Credits		15.0-16.0
Term 9		
PHIL 485 [WI]	Seminar in a Major Philosopher	3.0
International Studies elective		3.0-4.0
Free electives		9.0
Term Credits		15.0-16.0
Term 10		
PHIL 421 [WI]	Seminar in Ancient Philosophy	3.0
PHIL 497 [WI]	Senior Essay I: Research & Thesis Development (or Philosophy elective PHIL 341-395)	3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Philosophy elective PHIL 341-395		3.0
Free electives		6.0
Term Credits		16.0
Term 11		
PHIL 431 [WI]	Seminar in Modern Philosophy	3.0
PHIL 498 [WI]	Senior Essay II: Argument Construction	3.0
or 481 [WI]	Seminar in a Philosophical School	
Philosophy Elective PHIL 341-395		3.0
Free electives		6.0
Term Credits		15.0
Term 12		
PHIL 461 [WI]	Seminar in Contemporary Philosophy	3.0
PHIL 499 [WI]	Senior Essay III: Defense	3.0
or 485 [WI]	Seminar in a Major Philosopher	
Free electives		10.0
Term Credits		16.0
Total Credit: 182.0-195.0		

* Students must complete two consecutive courses in a foreign language and must reach the 201 level. This may require incoming students to complete preliminary classes.

Minor in Philosophy

This minor is intended for undergraduates seeking to broaden and enhance their education by attaining a firm grounding in philosophy. The minor requires seven carefully-selected classes, plus one of the

senior seminars. Students who have completed 30.0 credits may apply for the philosophy minor by submitting the Application for Admission to Minor Program form, available online at the Drexel Central (<http://www.drexel.edu/src>) website.

Required Courses

PHIL 101	Introduction to Western Philosophy	3.0
Select one of the following:		3.0
PHIL 105	Critical Reasoning	
PHIL 111	Symbolic Logic I	
Select three Philosophy Foundations Electives:		9.0
PHIL 207	Symbolic Logic II *	
PHIL 211	Metaphysics: Philosophy of Reality	
PHIL 212	Ancient Philosophy	
PHIL 214	Modern Philosophy	
PHIL 215	Contemporary Philosophy	
PHIL 221	Epistemology: Philosophy of Knowledge	
PHIL 231	Aesthetics: Philosophy of Art	
PHIL 241	Social & Political Philosophy	
PHIL 251	Ethics	
Select one Philosophy Elective:		3.0
PHIL 341	Philosophy of the Environment	
PHIL 351	Philosophy of Technology	
PHIL 355	Philosophy of Medicine	
PHIL 361	Philosophy of Science	
PHIL 371	Philosophy of Social Sciences	
PHIL 381 [WI]	Philosophy in Literature	
PHIL 385	Philosophy of Law	
PHIL 391	Philosophy of Religion	
PHIL 395	Advanced Topics in Logic **	
Select one Professional Ethics Elective:		3.0
PHIL 301	Business Ethics	
PHIL 305	Ethics and the Media	
PHIL 311	Ethics and Information Technology	
PHIL 315	Engineering Ethics	
PHIL 317	Ethics and Design Professions	
PHIL 321	Biomedical Ethics	
PHIL 322	Ethics of Human Enhancement	
PHIL 323	Organizational Ethics	
PHIL 325	Ethics in Sports Management	
PHIL 330	Criminal Justice Ethics	
PHIL 335	Global Ethical Issues	
PHIL 340	Environmental Ethics	
Select one Philosophy Seminar Elective:		3.0
PHIL 421 [WI]	Seminar in Ancient Philosophy	
PHIL 425 [WI]	Seminar in Medieval Philosophy	
PHIL 431 [WI]	Seminar in Modern Philosophy	
PHIL 461 [WI]	Seminar in Contemporary Philosophy	
Total Credits		24.0

* Requires PHIL 111 - Propositional Logic

** Requires PHIL 207 - Predicate Logic

Additional Information

For more information about the Drexel philosophy minor, please visit or contact the program director:

Dr. Peter Amato
 Director of Programs in Philosophy
 Department of English and Philosophy

MacAlister 5030

215-895-1353

peterama@drexel.edu (peterma@drexel.edu)

Co-op/Career Opportunities

Opportunities

No major prepares students for success in as wide a variety of careers as a philosophy major does. Because philosophical work helps students develop superior reasoning, communication, and analytical skills, a philosophy major can be an ideal choice for students in pre-med or pre-law. It is also particularly valuable as a preparation for graduate study in philosophy, and in fields related to philosophy such as critical media studies, public policy, and science, technology, and society (STS). The Drexel philosophy major is an excellent preparation for success in any field of endeavor that values thoughtful reflection, logical thinking, and clear communication. Philosophy majors graduate into a wide range of successful careers in business, industry, law, government, and service organizations and agencies as well as many fields of graduate study and research.

In only its first five years, the Drexel philosophy BA program has graduated students into careers including the law, public policy, and academic philosophy taking them to The Law School of the University of Pennsylvania, The New School, and Northeastern University.

Co-op Experiences

Philosophy students at Drexel are encouraged to seek out interesting co-op opportunities related to the skills and interests they are developing through their philosophical studies and potential career options they would like to explore. These can be as broad as the difference between an ethics-related co-op that has the student shadowing an ethicist working for a hospital's board of institutional review, to a student who is interested in aesthetics and politics working with the Philadelphia Mural Arts Program in liaison with community groups. Students in philosophy who are pre-law frequently pursue law-related co-ops and co-ops at public and private agencies and organizations that employ lawyers and law students. Students in philosophy who are thinking about careers in academia have the full gamut of writing, editing, and publishing co-ops available to them, as well as research related co-ops they can develop by working with professors. While academically-oriented co-ops and co-ops in the Humanities generally pay less than those in the sciences, business, law, and engineering—if they pay at all—they are still enormously valuable as a way for students to develop a sense of what various careers might actually be like and how they work.

For detailed information on co-op and career opportunities, visit the Drexel Steinbright Career Development Center web page. For further information about co-op and career prospects related to philosophy, contact the Drexel philosophy program director:

Dr. Peter Amato
 Director of Programs in Philosophy
 Department of English and Philosophy
 MacAlister 5030
 215-895-1353

peterama@drexel.edu

Accelerated/Dual Degrees

About the Programs

Drexel University offers undergraduates the opportunity to apply for graduate programs while completing their undergraduate programs, allowing students to complete their master's degrees in a shorter amount of time.

Two accelerated/dual degrees are available:

- BA in Philosophy and MS in Public Policy
- BA in Philosophy and MS in Science, Technology & Society

The accelerated-degree program provides an opportunity to simultaneously earn both a BA degree and an MS degree (two diplomas are awarded) in the time normally required to finish a bachelor's degree alone.

Admission Requirements

Students who meet the standard eligibility requirement for accelerated programs should consult with their advisor and work on an individual plan of study to submit with the Change of Curriculum form.

BA in Philosophy and MS in Public Policy Degree Requirements

College of Arts and Sciences Requirements - PHIL-BA

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 105	Critical Reasoning	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Two Studies in Diversity Electives		6.0
Two International Studies Electives		6.0
Two Mathematics Electives		6.0
Two Natural Science Electives		6.0
Four Social and Behavioral Science Electives		12.0
Select two of the following:		6.0
ARTH 101	History of Art I: Ancient to Medieval	
ARTH 102	History of Art II: Renaissance to Romanticism	
ARTH 103	History of Art: Modern Art	

Language Requirement

Any two (2) consecutive foreign language courses (completing level 201) 8.0

Major Requirements - All Concentrations

COM 230	Techniques of Speaking	3.0
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 211	Metaphysics: Philosophy of Reality	3.0
PHIL 212	Ancient Philosophy	3.0
PHIL 214	Modern Philosophy	3.0
PHIL 215	Contemporary Philosophy	3.0
PHIL 221	Epistemology: Philosophy of Knowledge	3.0
PHIL 251	Ethics	3.0
PHIL 421 [WI]	Seminar in Ancient Philosophy	3.0
PHIL 431 [WI]	Seminar in Modern Philosophy	3.0
PHIL 461 [WI]	Seminar in Contemporary Philosophy	3.0

Professional Ethics Elective

Select one of the following: 3.0

PHIL 301	Business Ethics	
PHIL 305	Ethics and the Media	

PHIL 315	Engineering Ethics
PHIL 317	Ethics and Design Professions
PHIL 321	Biomedical Ethics
PHIL 322	Ethics of Human Enhancement
PHIL 323	Organizational Ethics
PHIL 325	Ethics in Sports Management
PHIL 330	Criminal Justice Ethics
PHIL 335	Global Ethical Issues
PHIL 340	Environmental Ethics
Thesis or Non-Thesis Option	9.0
Thesis Option:	
PHIL 497 [WI]	Senior Essay I: Research & Thesis Development
PHIL 498 [WI]	Senior Essay II: Argument Construction
PHIL 499 [WI]	Senior Essay III: Defense
Non-Thesis Option:	
PHIL 481 [WI]	Seminar in a Philosophical School
PHIL 485 [WI]	Seminar in a Major Philosopher
Select one of the following:	
PHIL 341	Philosophy of the Environment
PHIL 351	Philosophy of Technology
PHIL 355	Philosophy of Medicine
PHIL 361	Philosophy of Science
PHIL 371	Philosophy of Social Sciences
PHIL 381 [WI]	Philosophy in Literature
PHIL 385	Philosophy of Law
PHIL 391	Philosophy of Religion
PHIL 395	Advanced Topics in Logic
Electives	51.0
Free Electives *	
Concentration Option	21.0
General Philosophy Concentration:	
PHIL 111	Symbolic Logic I
PHIL 231	Aesthetics: Philosophy of Art
PHIL 481 [WI]	Seminar in a Philosophical School
PHIL 485 [WI]	Seminar in a Major Philosopher
Select one of the following:	
PHIL 207	Symbolic Logic II
PHIL 301	Business Ethics
PHIL 305	Ethics and the Media
PHIL 311	Ethics and Information Technology
PHIL 315	Engineering Ethics
PHIL 317	Ethics and Design Professions
PHIL 321	Biomedical Ethics
PHIL 322	Ethics of Human Enhancement
PHIL 323	Organizational Ethics
PHIL 325	Ethics in Sports Management
PHIL 330	Criminal Justice Ethics
PHIL 335	Global Ethical Issues
PHIL 340	Environmental Ethics
Select two of the following:	
PHIL 341	Philosophy of the Environment
PHIL 351	Philosophy of Technology
PHIL 355	Philosophy of Medicine
PHIL 361	Philosophy of Science
PHIL 371	Philosophy of Social Sciences
PHIL 381 [WI]	Philosophy in Literature
PHIL 385	Philosophy of Law
PHIL 391	Philosophy of Religion
PHIL 395	Advanced Topics in Logic

* Philosophy students are encouraged to choose the General Philosophy Concentration to complete the accelerated program, but may also opt for concentrations in Ethical Theory and Practice, Philosophy and Law, or Philosophy, Technology and Science.

Public Policy Required Courses

REQUIRED COURSES

BUSN 502	Essentials of Economics	3.0
ECON 616	Public Finance and Cost Benefit Analysis	3.0
Track One		
Choose a statistics 2-course track		
STAT 601	Business Statistics	
COM 705	Data Analysis in Communication	
Track Two:		
STAT 610	Statistics for Business Analytics	
ECON 550	Econometrics	
INFO 680	US Government Information	3.0
PLCY 503	Theory and Practice of Policy Analysis	3.0
PLCY 504	Methods of Policy Analysis	3.0
PLCY 506	Institutional Dynamics of the Policy Process	3.0
PLCY 507	Nonprofit Organizations	3.0
CASE STUDY COURSES		
PLCY 510	Introduction to Case Study Research (FTF)	1.0
PLCY 511	Case Study Literature Review (ONL)	1.0
PLCY 512	Case Study Document Review (ONL)	1.0
PLCY 513	Case Study Interviews (ONL)	1.0
PLCY 515	Case Study Colloquium (FTF)	1.0
PLCY 516	Case Study Research II ((ONL-3 times))	3.0
PLCY 517	Case Study Final Project	1.0
ELECTIVE COURSES (Required and approved)		
		9.0
Total Credits		45.0

BA in Philosophy and MS in Public Policy Sample Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 105	Critical Reasoning	3.0
UNIV H101	The Drexel Experience	1.0
Math Elective		3.0
Diversity Elective		3.0
Term Credits		16.0
Term 2		Credits
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHIL 212	Ancient Philosophy	3.0
PHIL 111	Symbolic Logic I	3.0
Math Elective		3.0
Language Elective		4.0
Term Credits		17.0
Term 3		Credits
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 207	Symbolic Logic II	3.0
PHIL 214	Modern Philosophy	3.0
Language Elective		4.0
Social Science Elective		4.0
Term Credits		17.0
Term 4		Credits
ARTH 101	History of Art I: Ancient to Medieval	3.0

PHIL 215	Contemporary Philosophy	3.0
PHIL 251	Ethics	3.0
Natural Science Elective		3.0
Professional Ethics Elective		3.0
Social Science Elective		3.0
Term Credits		18.0

Term 5		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
COM 230	Techniques of Speaking	3.0
PHIL 211	Metaphysics: Philosophy of Reality	3.0
Social Science Elective		3.0
Natural Science Elective		3.0
Diversity Elective		3.0
Term Credits		18.0

Term 6		
PHIL 231	Aesthetics: Philosophy of Art	3.0
Philosophy Elective (PHIL 341-395)		3.0
Free Elective (UG)		3.0
PHIL 421 [WI]	Seminar in Ancient Philosophy	3.0
PHIL 481 [WI]	Seminar in a Philosophical School	3.0
International Studies Elective		3.0
Term Credits		18.0

Term 7		
UNIV H201	Looking Forward: Academics and Careers	1.0
PHIL 431 [WI]	Seminar in Modern Philosophy	3.0
PHIL 485 [WI]	Seminar in a Major Philosopher	3.0
Philosophy Elective (PHIL 341-395)		3.0
Social Science Elective		3.0
Free Elective		3.0
Term Credits		16.0

Term 8		
PHIL 497 [WI]	Senior Essay I: Research & Thesis Development	3.0
Free Elective (UG)		9.0
PLCY 504	Methods of Policy Analysis	3.0
PLCY 510	Introduction to Case Study Research	1.0
Term Credits		16.0

Term 9		
PHIL 498 [WI]	Senior Essay II: Argument Construction	3.0
Free Electives (UG)		6.0
International Study Elective		3.0
PLCY 503	Theory and Practice of Policy Analysis	3.0
PLCY 511	Case Study Literature Review	1.0
Term Credits		16.0

Term 10		
PHIL 221	Epistemology: Philosophy of Knowledge	3.0
PHIL 499 [WI]	Senior Essay III: Defense	3.0
Free Electives (UG)		6.0
BUSN 502	Essentials of Economics	3.0
PLCY 512	Case Study Document Review	1.0
Term Credits		16.0

Term 11		
Free Electives (UG)		6.0
STAT 601	Business Statistics	3.0
Public Policy Required Elective		3.0
PLCY 513	Case Study Interviews	1.0
Term Credits		13.0

Term 12		
PLCY 506	Institutional Dynamics of the Policy Process	3.0
ECON 616	Public Finance and Cost Benefit Analysis	3.0
PLCY 515	Case Study Colloquium	1.0
Public Policy Required Elective		3.0

Free Electives		6.0
Term Credits		16.0

Term 13		
INFO 680	US Government Information	3.0
STAT 610	Statistics for Business Analytics	3.0
Free Electives (UG)		6.0
Case Study Research (x3)		3.0
Term Credits		15.0

Term 14		
PLCY 507	Nonprofit Organizations	3.0
Public Policy Required Elective		3.0
PLCY 517	Case Study Final Project	1.0
Free Electives (UG)		6.0
Term Credits		13.0

Total Credit: 225.0

BA in Philosophy and MS in Science, Technology & Society Degree Requirements

College of Arts and Sciences Requirements - PHIL-BA

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 105	Critical Reasoning	3.0
UNIV H101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Two Studies in Diversity Electives		6.0
Two International Studies Electives		6.0
Two Mathematics Electives		6.0
Two Natural Science Electives		6.0
Four Social and Behavioral Science Electives		12.0
Select two of the following:		6.0
ARTH 101	History of Art I: Ancient to Medieval	
ARTH 102	History of Art II: Renaissance to Romanticism	
ARTH 103	History of Art: Modern Art	

Language Requirement

Any two (2) consecutive foreign language courses (completing level 201)	8.0
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Major Requirements - All Concentrations

COM 230	Techniques of Speaking	3.0
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 211	Metaphysics: Philosophy of Reality	3.0
PHIL 212	Ancient Philosophy	3.0
PHIL 214	Modern Philosophy	3.0
PHIL 215	Contemporary Philosophy	3.0
PHIL 221	Epistemology: Philosophy of Knowledge	3.0
PHIL 251	Ethics	3.0
PHIL 421 [WI]	Seminar in Ancient Philosophy	3.0
PHIL 431 [WI]	Seminar in Modern Philosophy	3.0
PHIL 461 [WI]	Seminar in Contemporary Philosophy	3.0

Professional Ethics Elective

Select one of the following:		3.0
PHIL 301	Business Ethics	
PHIL 305	Ethics and the Media	
PHIL 315	Engineering Ethics	
PHIL 317	Ethics and Design Professions	
PHIL 321	Biomedical Ethics	
PHIL 322	Ethics of Human Enhancement	
PHIL 323	Organizational Ethics	
PHIL 325	Ethics in Sports Management	
PHIL 330	Criminal Justice Ethics	

PHIL 335	Global Ethical Issues	
PHIL 340	Environmental Ethics	
Thesis or Non-Thesis Option		9.0
Thesis Option:		
PHIL 497 [WI]	Senior Essay I: Research & Thesis Development	
PHIL 498 [WI]	Senior Essay II: Argument Construction	
PHIL 499 [WI]	Senior Essay III: Defense	
Non-Thesis Option:		
PHIL 481 [WI]	Seminar in a Philosophical School	
PHIL 485 [WI]	Seminar in a Major Philosopher	
Select one of the following:		
PHIL 341	Philosophy of the Environment	
PHIL 351	Philosophy of Technology	
PHIL 355	Philosophy of Medicine	
PHIL 361	Philosophy of Science	
PHIL 371	Philosophy of Social Sciences	
PHIL 381 [WI]	Philosophy in Literature	
PHIL 385	Philosophy of Law	
PHIL 391	Philosophy of Religion	
PHIL 395	Advanced Topics in Logic	
Electives		51.0
Free Electives		
Concentration Option *		21.0
General Philosophy Concentration:		
PHIL 111	Symbolic Logic I	
PHIL 231	Aesthetics: Philosophy of Art	
PHIL 481 [WI]	Seminar in a Philosophical School	
PHIL 485 [WI]	Seminar in a Major Philosopher	
Select one of the following:		
PHIL 207	Symbolic Logic II	
PHIL 301	Business Ethics	
PHIL 305	Ethics and the Media	
PHIL 311	Ethics and Information Technology	
PHIL 315	Engineering Ethics	
PHIL 317	Ethics and Design Professions	
PHIL 321	Biomedical Ethics	
PHIL 322	Ethics of Human Enhancement	
PHIL 323	Organizational Ethics	
PHIL 325	Ethics in Sports Management	
PHIL 330	Criminal Justice Ethics	
PHIL 335	Global Ethical Issues	
PHIL 340	Environmental Ethics	
Select two of the following:		
PHIL 341	Philosophy of the Environment	
PHIL 351	Philosophy of Technology	
PHIL 355	Philosophy of Medicine	
PHIL 361	Philosophy of Science	
PHIL 371	Philosophy of Social Sciences	
PHIL 381 [WI]	Philosophy in Literature	
PHIL 385	Philosophy of Law	
PHIL 391	Philosophy of Religion	
PHIL 395	Advanced Topics in Logic	
Total Credits		182.0

* Philosophy students are encouraged to choose the General Philosophy Concentration to complete the accelerated program, but may also opt for concentrations in Ethical Theory and Practice, Philosophy and Law, or Philosophy, Technology and Science.

STS Required Courses:

BASIC REQUIREMENTS

SCTS 501	Introduction to Science, Technology and Society	3.0
SCTS 502	Research Methods	3.0
SCTS 503	Advanced Research Methods	3.0
SCTS 504	Science, Technology & Society Theories	3.0
ADVANCED REQUIREMENTS		
Ethics, Values, Identities, and Culture		6.0
Select two of the following:		
SCTS 600	Contemporary Feminist Theory	
SCTS 610	Material Culture	
SCTS 614	Technology, Progress, and Determinism	
SCTS 615	The Biopolitics of Health	
SCTS 620	Medicine, Technology and Science	
SCTS 650	Global Subjects of Biocapital	
SCTS 651	Transnational Science & Technology	
INFO 679	Information Ethics	
PBHL 824	Public Health Ethics	
Science and Technology Policy		3.0
Select one of the following:		
SCTS 570	Environmental Policy	
SCTS 571	Science and Technology Policy	
SCTS 641	Risk and Disaster Policy	
SCTS 643	Contemporary Stem Workforces: Organizations of Labor in Lab, Shop and Clinic	
SCTS 645	War and Technoscience	
COM 650	Telecommunications Regulation and Policy	
PLCY 509	Sustainability & Public Policy	
INFO 725	Information Policy	
Science, Technology & Society Lab		3.0
Select one of the following:		
SCTS 703	Connected Mobility Lab	
SCTS 705	Identity and Intersectionality	
SCTS 710	Special Topics in Science, Technology and Society Lab	
Thesis/Project and Electives *		21.0
SCTS 798	Master's Research	
Suggested Electives **		
SCTS 584	Historiography of Science	
SCTS 639	Politics of Life	
SCTS 640	STS Perspectives on Risk and Disaster	
SCTS 660	Theoretical and Sociological Aspects of Measurement	
SCTS 665	Advanced Topics in Philosophy of Science	
SCTS 697	Internship in Science, Technology and Society	
SCTS 790	Special Topics in Science, Technology & Society	
SCTS 799	Independent Study in Science, Technology and Society	
COM 701	Contemporary Social Theory	
COM 704	Research Methods in Communication	
COM 705	Data Analysis in Communication	
COM 720	Critical Theory	
COM 801	Seminar in Contemporary Theory	
MGMT 602	Managing Technology Innovation	
PBHL 516	Introduction to Public Health	
PLCY 504	Methods of Policy Analysis	
PSY 612	Psychology of Human-Computer Interaction Design	
PSY 712	History and Systems	
Total Credits		45.0

BA in Philosophy and MS in Science, Technology & Society Sample Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 105	Critical Reasoning	3.0

UNIV H101	The Drexel Experience	1.0
Math Elective		3.0
Diversity Elective		3.0
Term Credits		16.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHIL 111	Symbolic Logic I	3.0
PHIL 212	Ancient Philosophy	3.0
Math Elective		3.0
Language Elective		4.0
Term Credits		17.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 207	Symbolic Logic II	3.0
PHIL 214	Modern Philosophy	3.0
Language Elective		4.0
Social Science Elective		4.0
Term Credits		17.0
Term 4		
ARTH 101	History of Art I: Ancient to Medieval	3.0
PHIL 215	Contemporary Philosophy	3.0
PHIL 251	Ethics	3.0
Natural Science Elective		3.0
Professional Ethics Elective		
Social Science Elective		
Term Credits		12.0
Term 5		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
COM 230	Techniques of Speaking	3.0
PHIL 211	Metaphysics: Philosophy of Reality	3.0
Social Science Elective		3.0
Natural Science Elective		3.0
Diversity Elective		3.0
Term Credits		18.0
Term 6		
PHIL 231	Aesthetics: Philosophy of Art	3.0
PHIL 421 [WI]	Seminar in Ancient Philosophy	3.0
PHIL 481 [WI]	Seminar in a Philosophical School	3.0
Philosophy Elective (PHIL341-395)		3.0
International Studies Elective		3.0
Free Elective (UG)		3.0
Term Credits		18.0
Term 7		
UNIV H201	Looking Forward: Academics and Careers	1.0
PHIL 431 [WI]	Seminar in Modern Philosophy	3.0
PHIL 485 [WI]	Seminar in a Major Philosopher	3.0
Philosophy Elective (PHIL341-395)		3.0
Social Science Elective		3.0
Free Elective (UG)		3.0
Term Credits		16.0
Term 8		
PHIL 497 [WI]	Senior Essay I: Research & Thesis Development	3.0
SCTS 501	Introduction to Science, Technology and Society	3.0
Free Electives		9.0
Term Credits		15.0
Term 9		
SCTS 502	Research Methods	3.0
PHIL 498 [WI]	Senior Essay II: Argument Construction	3.0
International Studies Elective		3.0

Free Elective (UG)		9.0
Term Credits		18.0
Term 10		
PHIL 221	Epistemology: Philosophy of Knowledge	3.0
PHIL 499 [WI]	Senior Essay III: Defense	3.0
Free Electives		6.0
SCTS 503	Advanced Research Methods	3.0
Term Credits		15.0
Term 11		
SCTS 600	Contemporary Feminist Theory	3.0
SCTS 504	Science, Technology & Society Theories	3.0
SCTS 645	War and Technoscience	3.0
Free Electives (UG)		9.0
Term Credits		18.0
Term 12		
SCTS 570	Environmental Policy	3.0
SCTS 639	Politics of Life	3.0
STS Elective		3.0
Free Electives		6.0
Term Credits		15.0
Term 13		
SCTS 571	Science and Technology Policy	3.0
SCTS 665	Advanced Topics in Philosophy of Science	3.0
STS Elective		3.0
Free Elective		6.0
Term Credits		15.0
Term 14		
SCTS 612	Medical and Healthcare Ethics	3.0
SCTS 798	Master's Research	3.0
SCTS 799	Independent Study in Science, Technology and Society	3.0
Free Electives		6.0
Term Credits		15.0
Total Credit: 225.0		

Philosophy Faculty

Stacey Ake, PhD (*Pennsylvania State University*). Associate Teaching Professor. Ethics, semiotics, existentialism

Peter Amato, PhD (*Fordham University*) Director, *Philosophy*. Teaching Professor. Ethics, Marxism, Continental philosophy.

Jacques N. Catudal, PhD (*Temple University*). Associate Professor. Epistemology, aesthetics, philosophy of religion.

Nathan Hanna, PhD (*Syracuse University*). Assistant Professor. Ethics; philosophy of law; political philosophy.

Adam Knowles, PhD (*The New School for Social Research*). Assistant Teaching Professor. Continental philosophy, phenomenology, Ancient Greek philosophy, ethics and feminism, drawing especially on Plato, Aristotle, Nietzsche, Heidegger, Irigaray and Derrida.

Carol Mele, PhD (*University of Pennsylvania*). Associate Teaching Professor. Ethics, medical ethics, critical reasoning.

Flavia Padovani, PhD (*University of Geneva*). Assistant Professor. History and philosophy of science, philosophy of science, epistemology, logic.

Marilyn Gaye Piety, PhD (*McGill University*). Associate Professor. History of philosophy, philosophy of religion, critical reasoning, Kierkegaard.

Andrew Smith, PhD (*SUNY, Stony Brook*). Assistant Professor. Social and political philosophy, ethics, American philosophy.

Physics

Major: Physics

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 40.0801

Standard Occupational Classification (SOC) code: 19-2012

About the Program

Drexel's undergraduate program provides a solid foundation in physics suitable for graduate study or to branch out into other scientific or technical disciplines. The physics program offers an innovative curriculum in a top-notch learning environment: small class sizes, personal input from faculty, and close interaction with researchers who are leaders in their fields. Students explore the span of universal phenomenon—from the farthest reaches of astrophysics and cosmology, to molecular biophysics and subatomic particle physics—providing a solid foundation for continued study and exploration. Most undergraduates actively participate in research projects, including co-authoring publications and presenting results at conferences.

Virtually every course in the physics major is designed to extend the students' ability to handle real-world problems solved by state-of-the-art techniques. An important feature of the program is the large number of electives, which allow a student to pursue topics of special interest. There are numerous elective courses in areas as diverse as biophysics and cosmology, nanoscience and particle physics. Students can also choose electives to meet teacher certification requirements.

The Laboratory for High-Performance Computational Physics is a venue for students to become proficient in numerical techniques, parallel processing, electronic communication, and the basic computer languages and software relevant to advanced studies and research in physics.

The Department of Physics (<http://www.drexel.edu/coas/academics/departments-centers/physics>) conducts a broad array of outreach activities including the Kaczmarczik Lecture Series, public observing nights at the Lynch Observatory (<http://www.physics.drexel.edu/observatory>), and demonstrations in grade school performed by the Drexel Chapter of the Society of Physics Students (<http://www.drexel.edu/coas/academics/departments-centers/physics/student-organizations/society-physics-students>) (SPS).

In addition to the physics major, the Department also offers a minor in physics as well as a minor in astrophysics (p. 146) and a minor in biophysics (p. 147).

Degree Requirements

Core Physics Requirements

PHYS 105	Computational Physics I	3.0
PHYS 113	Contemporary Physics I	5.0
PHYS 114	Contemporary Physics II	5.0
PHYS 115	Contemporary Physics III	5.0
PHYS 128	Introduction to Experimental Physics	3.0
PHYS 217	Thermodynamics	4.0
PHYS 311	Classical Mechanics I	4.0
PHYS 317	Statistical Mechanics	3.0

PHYS 321	Electromagnetic Fields I	4.0
PHYS 322	Electromagnetic Fields II	4.0
PHYS 326	Quantum Mechanics I	4.0
PHYS 327	Quantum Mechanics II	4.0
PHYS 328 [WI]	Advanced Laboratory	3.0
PHYS 491	Senior Research I	3.0
PHYS 492	Senior Research II	3.0
PHYS 493 [WI]	Senior Research III	3.0
PHYS 408	Physics Seminar (To be taken 3 times.)	3.0
Method Classes: Complete 12.0 credits from the following *		12.0

MATH 322	Complex Variables	
MATH 323	Partial Differential Equations	
MATH 331	Abstract Algebra I	
MATH 401	Elements of Modern Analysis I	
PHYS 160	Introduction to Scientific Computing	
PHYS 226	Instrumentation for Scientists I	
PHYS 227	Instrumentation for Scientists II	
PHYS 232	Observational Astrophysics	
PHYS 305	Computational Physics II	
PHYS 324	Topics in Mathematical Physics	
PHYS 325	Computational Physics III	
PHYS 405	Advanced Computational Physics	
Subject Courses: Complete 15.0 credits from the following: **		15.0

HNRS 301	Colloquium II (Special Relativity)	
PHYS 231	Introductory Astrophysics	
PHYS 233	Introduction to Relativity	
PHYS 262	Introduction to Biophysics	
PHYS 330	Introduction to Nuclear Physics	
PHYS 312	Classical Mechanics II	
PHYS 428	Quantum Mechanics III	
PHYS 431	Galactic Astrophysics	
PHYS 432	Cosmology	
PHYS 452	Solid State Physics	
PHYS 453	Nanoscience	
PHYS 461	Biophysics	
PHYS 462	Computational Biophysics	
PHYS 463	Single Molecule Methods	
PHYS 471	Nonlinear Dynamics	
PHYS 476	Particle Physics	

Math and Technical Requirements

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	3.0-4.0
or MATH 261	Linear Algebra	
MATH 210	Differential Equations	4.0
MATH 291	Complex and Vector Analysis for Engineers	4.0

Sciences

CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III (OR Any Bio OR an ENGR class at 200 or higher)	5.0
CS 171	Computer Programming I	3.0
or CS 143	Computer Programming Fundamentals	

General Education

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV S101	The Drexel Experience	1.0
Liberal electives		9.0

Technical elective ***	3.0
Business elective	4.0
Free electives	24.0
Total Credits	180.0-181.0

* At least 6 credits must have a PHYS subject code

** Except for PHYS 480, courses at the 400 level and above will also be accepted.

*** Technical electives can be any course in BIO, CHEM, ENVS, GEO, MATH, PHYS, or any course from the College of Engineering.

Sample Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
PHYS 113	Contemporary Physics I	5.0
PHYS 128	Introduction to Experimental Physics	3.0
UNIV S101	The Drexel Experience	1.0
	Term Credits	16.0
Term 2		
CS 143	Computer Programming Fundamentals	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
PHYS 114	Contemporary Physics II	5.0
	Term Credits	15.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 200	Multivariate Calculus	4.0
PHYS 105	Computational Physics I	3.0
PHYS 115	Contemporary Physics III	5.0
	Term Credits	16.0
Term 4		
CHEM 101	General Chemistry I	3.5
MATH 201 or 261	Linear Algebra	4.0
MATH 291	Complex and Vector Analysis for Engineers	4.0
PHYS 217	Thermodynamics	4.0
	Term Credits	15.5
Term 5		
CHEM 102	General Chemistry II	4.5
MATH 210	Differential Equations	4.0
PHYS 311	Classical Mechanics I	4.0
Subject course *		3.0
	Term Credits	15.5
Term 6		
One of the following:		3.0-5.0
CHEM 103	General Chemistry III	
Any Biology (BIO) course		
Any ENGR course 200-level or higher		
PHYS 326	Quantum Mechanics I	4.0
Method course *		3.0
Free elective		3.0
	Term Credits	13.0-15.0
Term 7		
PHYS 317	Statistical Mechanics	3.0
PHYS 327	Quantum Mechanics II	4.0
Method course		3.0
Business elective		3.0

Liberal studies elective	3.0
Term Credits	16.0

Term 8

PHYS 321	Electromagnetic Fields I	4.0
Two Subject courses		6.0
Technical elective		3.0
Free elective		3.0
Term Credits		16.0

Term 9

PHYS 322	Electromagnetic Fields II	4.0
PHYS 328 [WI]	Advanced Laboratory	3.0
Method course		3.0
Liberal studies elective		3.0
Business elective		3.0
Term Credits		16.0

Term 10

PHYS 408	Physics Seminar	1.0
PHYS 491	Senior Research I	3.0
UNIV S201	Looking Forward: Academics and Careers (Recommended only. For students pursuing graduate study.)	1.0
Subject course		3.0
Liberal studies elective		3.0
Free elective		3.0
Term Credits		14.0

Term 11

PHYS 408	Physics Seminar	1.0
PHYS 492	Senior Research II	3.0
Subject course		3.0
Free electives		6.0
Term Credits		13.0

Term 12

PHYS 408	Physics Seminar	1.0
PHYS 493 [WI]	Senior Research III	3.0
Method course		3.0
Free electives		7.0
Term Credits		14.0

Total Credit: 180.0-182.0

* See degree requirements (p. 130).

Co-op/Career Opportunities

Students who complete a degree in physics have many options. Some enter graduate school with the intention of obtaining a master's or a PhD. Others attend medical school. Engineering is yet another option, and graduates of an undergraduate physics program can enter this field with an unusually solid background in fundamental physical principles, mathematics, and computation. It is also possible for physics graduates to work in business and finance; for example, Wall Street employs many analysts trained in such "hard sciences" as physics. Many Drexel physics graduates proceed directly into graduate schools, or medical or other professional programs. Physics graduates have attended some of the best graduate programs in the United States, including Columbia, Harvard, and CalTech. Other graduates have found jobs in engineering and business, and with such government agencies as the National Bureau of Standards. Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) for more detailed information on co-op and post-graduate opportunities.

Minor in Physics

Physics is a science that studies the natural phenomena at all scales, from that of the universe to elementary particles. This minor exposes the students to some of the basic principles of physics and would easily complement any other discipline—from engineering to other sciences.

The minor in physics requires a total of 10.0 credits from the elective list in addition to the prerequisite and core courses.

Because of the overlap in requirements between the astrophysics minor (p. 146) and the physics minor, students cannot minor in both.

Required Prerequisite Courses *

PHYS 113	Contemporary Physics I
PHYS 114	Contemporary Physics II
PHYS 115	Contemporary Physics III

Required Courses

PHYS 311	Classical Mechanics I	4.0
PHYS 321	Electromagnetic Fields I	4.0
PHYS 217	Thermodynamics	4.0
PHYS 326	Quantum Mechanics I	4.0

Electives

Select at least 10 credits from PHYS courses at the 300 level or above	10.0
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Total Credits	26.0
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* PHYS 101, PHYS 102 and PHYS 201 will also satisfy the prerequisite requirements.

Physics Faculty

Alexey Aprelev, PhD (*St Petersburg State University*). Assistant Teaching Professor. Experimental biophysics.

Shyamalendu Bose, PhD (*University of Maryland*). Professor. Nanoscience, high-temperature superconductivity, theory of surfaces and interfaces, disordered systems, electron and X-ray spectroscopies of solids.

Luis R. Cruz Cruz, PhD (*MIT*). Associate Professor. Computational studies of confinement effects on the folding of amyloidogenic proteins, spatial correlations of neurons in the brain, firing dynamics of neuronal networks, fluid flow through porous media.

N. John DiNardo, PhD (*University of Pennsylvania*) *Senior Vice Provost for Academic Affairs*. Professor. Vibrational and electron dynamics at semiconductor surfaces and interfaces, metal-semiconductor interfaces, polymer surfaces and interfaces, diamond-like carbon thin films, and protein and cell interactions with biomaterials surfaces.

Michelle Dolinski, PhD (*University of California, Berkeley*). Assistant Professor. Neutrino physics, rare nuclear decays, cryogenic detector technologies.

Frank A. Ferrone, PhD (*Princeton University*). Professor. Experimental and theoretical protein dynamics, kinetics of biological self-assembly, including sickle cell and Alzheimer's disease, sickle cell testing and diagnostic devices.

Robert Gilmore, PhD (*Massachusetts Institute of Technology*). Professor. Applications of compact and non-compact Lie algebras for problems in nuclear, atomic, and molecular physics; nonlinear dynamics and chaos and the analysis of chaotic data.

David M. Goldberg, PhD (*Princeton University*) *Associate Dean for Research and Graduate Education, Associate Department Head for Undergraduate Studies*. Professor. Theoretical and computational cosmology, extragalactic astrophysics, gravitational lensing.

Maher Harb, PhD (*University of Toronto*). Assistant Professor. Solid state physics, ultrafast electron diffraction, time-resolved X-ray diffraction, ultrafast lasers, nanofabrication, nano/microfluidics, instrument development, vacuum technologies.

Goran Karapetrov, PhD (*Oregon State University*). Associate Professor. Experimental solid state physics, scanning probe microscopy, nanoscale catalysis, mesoscopic superconductivity.

Rachael M. Kratzer, PhD (*Drexel University*). Assistant Teaching Professor. Quasars, active galactic nuclei

Charles Lane, PhD (*California Institute of Technology*). Professor. Experimental tests of invariance principles and conservation laws, neutrino oscillations and properties.

Teck-Kah Lim, PhD (*University of Adelaide*). Professor. Structures and dynamics of small nuclear and molecular systems, spin-polarized quantum systems, physics in two dimensions. Physics education.

Christina Love, PhD (*Temple University*). Assistant Teaching Professor. Educational methods and technology, STEM education, science literacy and outreach, particle physics, astrophysics.

Stephen L. W. McMillan, PhD (*Harvard University*) *Department Head*. Professor. Stellar dynamics, large-scale computations of stellar systems, and high-performance special-purpose computers.

Naoko Kurahashi Neilson, PhD (*Stanford University*). Assistant Professor. Neutrino physics, high energy astro-particle physics.

Russell Neilson, PhD (*Stanford University*). Assistant Professor. Dark matter, neutrino physics.

Gordon Richards, PhD (*University of Chicago*). Professor. Quasars, active galactic nuclei, supermassive black holes, galaxy evolution, sky surveys, infrared/X-ray/radio astronomy

Jonathan E. Spanier, PhD (*Columbia University*) *Associate Dean, Strategic Planning, College of Engineering*. Professor. Light-matter interactions in electronic materials, including ferroelectric semiconductors, complex oxide thin film science; laser spectroscopy, including Raman scattering.

Richard I Steinberg, PhD (*Yale University*). Professor. Neutrino physics.

Somdev Tyagi, PhD (*Brigham Young University*) *Associate Head of Non-Major Studies in Physics*. Professor. Nanobiophysics, Raman spectroscopy, magnetic materials.

Brigita Urbanc, PhD (*University of Ljubljana, Slovenia*). Associate Professor. Computational and experimental biophysics of protein folding and assembly, relevant to Alzheimer's and Parkinson's disease; discrete molecular dynamics of coarse-grained protein and lipid models.

Michel Vallières, PhD (*University of Pennsylvania*). Professor. Shell-model and mean field studies of nuclei on and off beta-stability, chaotic scattering, computational physics.

Michael Vogeley, PhD (*Harvard University*) Associate Department Head for Graduate Studies. Professor. Cosmology; galaxy formation and evolution; statistical analysis of large data sets; active galactic nuclei.

Jian-Min Yuan, PhD (*University of Chicago*). Professor. Protein folding, signal transduction pathways, computational biophysics, nonlinear dynamics and chaos in atomic and molecular systems, protein folding.

Emeritus Faculty

Leonard D. Cohen, PhD (*University of Pennsylvania*). Professor Emeritus.

Leonard X. Finegold, PhD (*University of London*). Professor Emeritus. Biological physics and granular physics.

Richard D. Haracz, PhD (*Wayne State University*). Professor Emeritus.

Frederick House, PhD (*University of Wisconsin*). Professor Emeritus.

Arthur P. Joblin, PhD (*Drexel University*). Professor Emeritus.

Donald C. Larson, PhD (*Harvard University*). Professor Emeritus.

Arthur E. Lord, PhD (*Columbia University*). Professor Emeritus.

James McCray, PhD (*California Institute of Technology*). Professor Emeritus.

T. S. Venkataraman, PhD (*Worcester Polytechnic Institute*). Professor Emeritus. Material engineering and physics.

Political Science

Major: Political Science

Degree Awarded: Bachelor of Arts (BA)

Calendar Type: Quarter

Total Credit Hours: 181.0

Co-op Options: One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 45.1001

Standard Occupational Classification (SOC) code: 19-3094

About the Program

The political science program in the Department of Politics (<http://www.drexel.edu/coas/academics/departments-centers/politics>) helps students cultivate perspective, develop critical thinking and communication skills, and understand the economic, social, and political systems within which we live and work. Our curriculum builds on the department's research focuses and strengths. These include public policy, environmental politics, international organizations, human rights, and law and society. This flexible program allows students to shape a curriculum that meets their needs, whether they are preparing for public service, the business world, graduate school in political science, an MBA or other business program, or law school.

Degree Offered

The department offers a Bachelor of Arts (BA) in political science. Students may choose a substantive 'track' that best fits their needs and future goals. Our current tracks are: American Politics and Policy, International Politics, and Law and Politics.

The Bachelor of Arts (BA) provides a flexible course of study, which includes foreign language and allows for options in the fulfillment of humanities, social science, math, and science requirements.

Degree Requirements

General Education Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
CIVC 101	Introduction to Civic Engagement	1.0
Two Math courses		6.0-8.0
Two Science courses*		6.0-8.0

Foundation Requirements

Studies in Diversity electives		6.0
Three Consecutive Foreign Language courses (must complete level 201)**		11.0-12.0
Humanities/Fine Arts electives		12.0
Social Science electives		12.0
International Studies electives		6.0

Core Political Science Requirements

PSCI 110	American Government I	4.0
PSCI 120	History of Political Thought	4.0
PSCI 140	Introduction to Comparative Political Analysis	4.0
PSCI 150	International Politics	4.0

Political Science Research Methods Sequence

PSCI 131 [WI]	Research Design for Political Science	4.0
PSCI 231	Qualitative and Mixed-Methods Research in Political Science	4.0
PSCI 232	Quantitative Research Methods in Political Science	4.0

Intermediate Courses

Select four of the following courses:

PSCI 200	The Public Policy Process	
PSCI 211	American Government II	
PSCI 220	Constitutional Law I	
PSCI 223	Comparative Political Thought	
PSCI 229	Theories of Justice	
PSCI 240	Comparative Government	
PSCI 250	American Foreign Policy	
PSCI 251	Global Governance	
PSCI 260 [WI]	Power in Protest: Social Movements in Comparative Perspective	
PSCI 270	Problems of Individual Liberty and Government Authority	
PSCI 330	Public Opinion & Propaganda	
PSCI 363	Constitutional Law II	

Political Science Electives *** 32.0

Free Electives 33.0

Total Credits 180.0-185.0

* Any Biology (BIO), Chemistry (CHEM), Geoscience (GEO), Nutrition (NFS), Physics (PHYS) or Environmental Science (ENVS) course.

** University requirement is two consecutive courses; the third language course, though listed here, is a departmental requirement.

*** Choose eight 200-level or above PSCI courses.

Sample Plan of Study

Term 1		Credits
UNIV H101	The Drexel Experience	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSCI 110	American Government I	4.0

PSCI 150	International Politics	4.0
Foreign Language course		4.0
Term Credits		16.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PSCI 120	History of Political Thought	4.0
PSCI 131 [W]	Research Design for Political Science	4.0
Foreign Language course		4.0
Term Credits		16.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSCI 140	Introduction to Comparative Political Analysis	4.0
Foreign Language course		3.0
Diversity Studies elective		3.0
Social Science elective		3.0
Term Credits		16.0
Term 4		
PSCI 232	Quantitative Research Methods in Political Science	4.0
Choose one intermediate course		4.0
Mathematics course		3.0
Diversity Studies elective		3.0
Free elective		3.0
Term Credits		17.0
Term 5		
PSCI 231	Qualitative and Mixed-Methods Research in Political Science	4.0
Choose one intermediate course		4.0
Social Science elective		3.0
Mathematics course		3.0
Free elective		3.0
Term Credits		17.0
Term 6		
Choose one intermediate course		4.0
Political Science elective		4.0
Humanities/Fine Arts elective		3.0
Science elective		3.0
Free elective		3.0
Term Credits		17.0
Term 7		
Political Science elective		4.0
Free electives		9.0
Term Credits		13.0
Term 8		
Choose one intermediate course		4.0
Political Science elective		4.0
Humanities/Fine Arts elective		3.0
Social Science elective		3.0
Term Credits		14.0
Term 9		
Social Science elective		3.0
Humanities/Fine Arts elective		3.0
Political Science elective		4.0
Free elective		3.0
Term Credits		13.0
Term 10		
UNIV H201	Looking Forward: Academics and Careers	1.0
Social Science elective		3.0
Humanities/Fine Arts elective		3.0
Political Science elective		4.0

Free elective	3.0
Term Credits	
Term 11	
International Area Studies elective	3.0
Political Science electives	8.0
Free elective	3.0
Term Credits	
Term 12	
Political Science elective	4.0
International Area Studies elective	3.0
Free electives	6.0
Term Credits	
Total Credit: 180.0	

Accelerated BA in Political Science and MS in Science, Technology & Society

About the Program

Drexel University permits undergraduate students to apply for graduate programs while completing their undergraduate programs, allowing students to complete their master's degrees in a shorter amount of time.

The accelerated-degree program provides an opportunity to simultaneously earn both a BA degree and an MS degree in Science, Technology & Society (<http://catalog.drexel.edu/graduate/collegeofartsandsocieties/sciencetechnologyandsociety>) (two diplomas are awarded) in five years.

Students entering the program must:

- have and maintain a minimum of 3.0 grade point average throughout the program
- have no fewer than 90.0 earned credits
- have no more than 120.0 registered credits

The Department of Politics would especially like to encourage its own majors to consider the accelerated degree program in Science, Technology & Society. If you are currently enrolled in a 4+1 (4COP Accelerated Program) degree program, you are required to fill out the Accelerated Degree Level Conversion Form. After obtaining all the required signatures, please direct the form to the Assistant Director for Graduate Studies Office, Randell 240.

For more information about the accelerated BA/MS program, contact:
 STS Program Director
 Macalister Hall, 3025
 215.895.2463

Recommended Plan of Study

Students should work closely with faculty advisors in the Science, Technology & Society program to schedule an individualized plan of study for their accelerated degree completion.

Dual Bachelor's Degree & MSTS Degree 225.0 minimum credits

Term 1		Credits
UNIV H101	The Drexel Experience	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSCI 110	American Government I	4.0
PSCI 150	International Politics	4.0

Foreign language course		4.0
Term Credits		16.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PSCI 120	History of Political Thought	4.0
PSCI 131 [WI]	Research Design for Political Science	4.0
Foreign language course		4.0
Term Credits		16.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSCI 140	Introduction to Comparative Political Analysis	4.0
Foreign language course (must complete through level 201)		3.0
Diversity Studies elective		3.0
Social Science elective		3.0
Term Credits		16.0
Term 4		
PSCI 232	Quantitative Research Methods in Political Science	4.0
Choose one PSCI intermediate course		4.0
Mathematics course		3.0
Diversity Studies elective		3.0
Free elective		3.0
Term Credits		17.0
Term 5		
PSCI 231	Qualitative and Mixed-Methods Research in Political Science	4.0
Choose one PSCI intermediate course		4.0
Social science elective		3.0
Mathematics course		3.0
Free elective		3.0
Term Credits		17.0
Term 6		
Choose one PSCI intermediate course		4.0
Political Science elective		4.0
Science course		3.0
Humanities/fine arts elective		3.0
Free elective		3.0
Term Credits		17.0
Term 7		
Political Science elective		4.0
Science course		3.0
Free electives		6.0
Term Credits		13.0
Term 8		
Choose one PSCI intermediate course		4.0
Political Science elective		4.0
Humanities/fine arts elective		3.0
Social science elective		3.0
SCTS 501	Introduction to Science, Technology and Society	3.0
Term Credits		17.0
Term 9		
SCTS 502	Research Methods	3.0
SCTS Ethics Values, Identities, & Culture course		3.0
Social science elective		3.0
Political Science elective		4.0
Humanities/fine arts elective		3.0
Science course		3.0
Term Credits		19.0
Term 10		
UNIV H201	Looking Forward: Academics and Careers	1.0
SCTS 503	Advanced Research Methods	3.0

SCTS Ethics Values, Identities, & Culture course		3.0
Political Science elective		4.0
Social Science elective		3.0
Humanities/fine arts elective		3.0
Term Credits		17.0
Term 11		
SCTS 504	Science, Technology & Society Theories	3.0
SCTS graduate elective		3.0
International studies elective		3.0
Free elective		3.0
Term Credits		12.0
Term 12		
Political Science elective		4.0
International studies elective		3.0
SCTS Science and Technology Policy course		3.0
Science, Technology, & Society Lab		3.0
SCTS elective		3.0
Term Credits		16.0
Term 13		
Political Science electives		8.0
Free elective		3.0
SCTS Electives		6.0
Term Credits		17.0
Term 14		
Free Electives		6.0
SCTS electives		9.0
Term Credits		15.0

Total Credit: 225.0

Co-Op/Career Opportunities

Political science majors have a wide variety of co-op experiences from which to choose. Business and public utilities offer many lucrative possibilities, and local, state, and federal governments; museums and archives; and law firms present many additional interesting co-op placements. Pre-law students, for example, are especially eager to see the inside of a law office, whether the co-op job they receive is clerical or a more challenging paralegal assignment. These practical experiences in the “real” world can reinforce the lessons of the classroom, sharpen skills, and establish important contacts. Sample co-op positions include:

- Law clerk/paralegal, Joe Davidson, Attorney-at-Law, Philadelphia
- Research analyst, Legislative Office for Research Liaison, Harrisburg, PA
- Legislative intern, Corporate Public Affairs Division, Philadelphia Electric Company
- Assistant lobbyist, Government Relations Office, Drexel University
- Education intern, Philadelphia Museum of Art
- Researcher, Philadelphia Chamber of Commerce
- Assistant, Office of the Governor, Harrisburg, PA

Career Opportunities

The flexible programs allow students to shape a curriculum that meets their needs, whether they are preparing for the business world, graduate school in history or political science, the Department's Masters Program in Science, Technology, and Society (<http://drexel.edu/coas/academics/departments-centers/science-technology-society>), an MBA or other business program, or law school.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Politics Faculty

Phillip Ayoub, PhD (*Cornell University*). Assistant Professor. International relations, comparative politics, transnational social movements, marginalized groups

Scott Barclay, PhD (*Northwestern University*) *Department Head, Politics*. Professor. Judicial systems, civil rights, public policy and administration.

Zoltan Buzas, PhD (*Ohio State University*). Assistant Professor. International relations theory, international security, race and politics, diplomatic history.

George Ciccarriello-Maher, PhD (*University of California, Berkeley*). Associate Professor. Colonialism, social movements, political theory.

Audrey Comstock, PhD (expected 2015) (*Cornell University*). Post-Doctoral Fellow. International law, international LGBT politics, foreign aid, African politics

Rose Corrigan, PhD (*Rutgers University*). Associate Professor. Women, public law, American politics and policy.

Richardson Dilworth, PhD (*Johns Hopkins University*) *Director, Center for Public Policy*. Professor. American political development, urban politics, public policy.

Erin R. Graham, PhD (*Ohio State University*). Assistant Professor. International institutions, international relations theory, global environmental politics.

Amelia Hoover Green, PhD (*Yale University*). Assistant Professor. Dynamics of conflict-related violence; intra-armed group politics and socialization; statistics in human rights.

Christian Hunold, PhD (*University of Pittsburgh*). Associate Professor. Environmental policy; comparative politics; urban wildlife; political theory.

Alison Kenner, PhD (*Rensselaer Polytechnic Institute*). Assistant Professor. Science, technology, and health; environmental health problems; cities and place; feminist theory; medical anthropology; digital humanities

Julie Mostov, PhD (*New York University*) *Vice Provost for Global Initiatives*. Professor. Modern political thought, democratic theory, nationalism, gender studies, South Eastern Europe and the Balkans.

Joel E. Oestreich, PhD (*Brown University*) *Director of the Global Studies major*. Associate Professor. International organizations, international finance, development, and human rights.

Elva Orozco-Mendoza, PhD (*University of Massachusetts*). Assistant Teaching Professor. Political freedom and action in the thought of Hanna Arendt; Feminist theory and feminist methodology; Protest politics; Theories of Violence; Identity politics, race, and gender in Latin American politics

Gwen Ottinger, PhD (*University of California, Berkeley*). Assistant Professor. Social studies of science and technology, environmental justice, science and engineering ethics, citizen science, environmental ethics.

Joshua Plencner, PhD (*University of Oregon*). Assistant Teaching Professor. American politics, race and racism, visual politics, political theory

William L. Rosenberg, PhD (*Temple University*). Professor. Behavioral politics, public opinion, and political communication.

Chloe Silverman, PhD (*University of Pennsylvania*). Associate Professor. Parent advocacy for autism, neurodiversity, and pollinator health research.

Jose Tapia, PhD (*New School for Social Research*). Associate Professor. The crises and fluctuations of the economy and the relation between these fluctuations and health conditions; quantitative aspects of social science.

Psychology

Major: Psychology

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 183.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 42.0101

Standard Occupational Classification (SOC) code: 19-3031; 19-3032; 19-3039

About the Program

Psychology seeks the answers to a broad variety of questions regarding the behavior, thoughts, and emotions of individuals. These questions range from the biochemical basis of memory and the effects of stress on health to understanding the causes of emotional problems or such experiences as falling in love. These questions are studied by using scientific research techniques both in the laboratory and the "real" world. The answers are applied in fields such as business, the health sciences, law, education, counseling, and the design of useful and usable technologies.

One strength of the psychology program at Drexel is its emphasis on psychological statistics and research methodology. Psychology majors are well trained in research data analysis and find employment opportunities in research and corporate settings more readily. One other opportunity available to Drexel psychology undergraduates is the cooperative education/internship programs, through which students mix periods of full-time, career-related employment with their academic studies. This allows students to have "hands on" experience in a variety of clinical settings throughout the Philadelphia metropolitan region, and makes them more competitive for employment after graduation.

Combined Bachelors/Masters Degree

There is an accelerated MS program entitled the Psychology BS/MS Scholars program to which undergraduates may apply. For more information, visit the Drexel University Department of Psychology (<http://www.drexel.edu/coas/academics/departments-centers/psychology>) homepage.

Additional Information

To schedule an appointment students should contact the Psychology department's academic advisor:

Tara McNair

Academic Advisor
 Psychology Department
 3141 Chestnut Street
 215-895-0487
 tym22@drexel.edu

Degree Requirements

College Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
COM 230	Techniques of Speaking	3.0
Select one of the following:		8.0
MATH 101 & MATH 102	Introduction to Analysis I and Introduction to Analysis II	
MATH 121 & MATH 122	Calculus I and Calculus II	
PSCI 100	Introduction to Political Science	4.0
UNIV H101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Economics elective		4.0
Fine Arts elective		3.0
History electives		6.0
Philosophy elective		3.0
Sociology (SOC) course		3.0
Anthropology (ANTH) course		3.0
Two English (ENGL) courses, 200-level or above		6.0
Select one of the following sequences:		8.0
Biology		
BIO 107	Cells, Genetics & Physiology	
BIO 108	Cells, Genetics and Physiology Laboratory	
BIO 109	Biological Diversity, Ecology & Evolution	
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	
Chemistry		
CHEM 111	General Chemistry I	
CHEM 112	General Chemistry II	
Physics		
PHYS 103 & PHYS 104	General Physics I and General Physics II	

Other Courses

Free electives	51.0
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Departmental Requirements

General Psychology Requirements

PSY 111	Pre-Professional General Psychology I *	3.0
PSY 112	Pre-Professional General Psychology II *	3.0

100-Level Requirements

Select two of the following:		6.0
PSY 120	Developmental Psychology	
PSY 140	Approaches to Personality	
PSY 150	Introduction to Social Psychology	

Required Psychology Courses

PSY 212	Physiological Psychology	3.0
PSY 325	Psychology of Learning	3.0
PSY 240 [WI]	Abnormal Psychology	3.0
PSY 280	Psychological Research I	3.0
PSY 264	Computer-Assisted Data Analysis I	3.0
PSY 265	Computer-Assisted Data Analysis II	3.0
PSY 290	History and Systems of Psychology	3.0
PSY 330	Cognitive Psychology	3.0
PSY 360 [WI]	Experimental Psychology	3.0

PSY 380	Psychological Testing and Assessment	3.0
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Advanced Psychology Electives (See Term Master Schedule for additional course offerings)

Select four of the following:		12.0
PSY 210	Evolutionary Psychology	
PSY 213	Sensation and Perception	
PSY 222	Psychological Problems of Modern Youth	
PSY 225	Child Psychopathology	
PSY 242	Psychology of Disability	
PSY 244	Culture and Personality	
PSY 245 [WI]	Sports Psychology	
PSY 250 [WI]	Industrial Psychology	
PSY 252	Death and Dying	
PSY 254	Psychology of Sexual Behavior	
PSY 305	Science and Pseudoscience in Psychology	
PSY 310	Drugs & Human Behavior	
PSY 322	Advanced Developmental Psychology	
PSY 332	Human Factors and Cognitive Engineering	
PSY 336	Psychology of Language	
PSY 337	Human-Computer Interaction	
PSY 342	Counseling Psychology	
PSY 345	Narrative Psychology	
PSY 350	Advanced Social Psychology	
PSY 352	Environmental Psychology	
PSY 355	Health Psychology	
PSY 356	Women's Health Psychology	
PSY 357	The Psychology of Eating Disorders and Obesity	
PSY 370	Forensic Psychology	
PSY 371	Law and Psychology	
PSY 410	Neuropsychology	
PSY 450	Autism Spectrum Disorders	
PSY 463	Memory	

Senior Seminar Sequence OR Psychology Electives **

PSY 490 [WI]	Psychology Senior Thesis I	4.0
PSY 491 [WI]	Psychology Senior Thesis II	4.0
PSY 492 [WI]	Psychology Senior Thesis III	4.0

Total Credits	180.0
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* Students with AP psychology, or transfer students with PSY 101 credit, should check the AP Student Placement Exam Crosswalk (http://www.drexel.edu/provost/policies/pdf/supporting/ap_crosswalk.pdf) or check with their advisor.

** Students who do not wish to elect the research seminar sequence are required to take four additional advanced psychology electives instead.

Sample Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSY 111	Pre-Professional General Psychology I	3.0
MATH 121 or 101	Calculus I Introduction to Analysis I	4.0
UNIV H101	The Drexel Experience	1.0
Select one of the following:		4.0
CHEM 111	General Chemistry I	
PHYS 103	General Physics I	
BIO 107 & BIO 108	Cells, Genetics & Physiology	
Term Credits		15.0

Term 2

ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PSY 112	Pre-Professional General Psychology II	3.0
MATH 102 or 122	Introduction to Analysis II Calculus II	4.0
CIVC 101	Introduction to Civic Engagement	1.0
Select one of the following:		4.0
CHEM 112	General Chemistry II	
PHYS 104	General Physics II	
BIO 109	Biological Diversity, Ecology & Evolution	
Select one of the following:		3.0
PSY 120	Developmental Psychology	
PSY 140	Approaches to Personality	
PSY 150	Introduction to Social Psychology	
	Term Credits	18.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 240 [WI]	Abnormal Psychology	3.0
Select one of the following:		3.0
PSY 120	Developmental Psychology	
PSY 150	Introduction to Social Psychology	
PSY 140	Approaches to Personality	
Anthropology (ANTH) elective		3.0
Fine Arts elective		3.0
	Term Credits	15.0
Term 4		
PSCI 100	Introduction to Political Science	4.0
PSY 264	Computer-Assisted Data Analysis I	3.0
PSY 290	History and Systems of Psychology	3.0
Sociology (SOC) elective		3.0
English (ENGL) course, 200-level or above		3.0
	Term Credits	16.0
Term 5		
COM 230	Techniques of Speaking	3.0
PSY 265	Computer-Assisted Data Analysis II	3.0
PSY 330	Cognitive Psychology	3.0
English (ENGL) course, 200-level or above		3.0
Philosophy (PHIL) elective		3.0
UNIV H201	Looking Forward: Academics and Careers	1.0
	Term Credits	16.0
Term 6		
PSY 212	Physiological Psychology	3.0
PSY 280	Psychological Research I	3.0
PSY 360 [WI]	Experimental Psychology	3.0
Psychology Elective		3.0
Economics (ECON) elective		4.0
	Term Credits	16.0
Term 7		
PSY 325	Psychology of Learning	3.0
PSY 380	Psychological Testing and Assessment	3.0
Psychology Elective		3.0
History elective		3.0
Free Elective		3.0
	Term Credits	15.0
Term 8		
Psychology elective *		3.0
History elective		3.0
Free electives		9.0
	Term Credits	15.0
Term 9		
Psychology elective *		3.0

Free electives		12.0
	Term Credits	15.0
Term 10		
PSY 490 [WI]	Psychology Senior Thesis I (or adv. PSY elective (3 cr). (If electives are chosen, 12.0 credits in total are required.))	4.0
Free electives		9.0
	Term Credits	13.0
Term 11		
PSY 491 [WI]	Psychology Senior Thesis II (or adv. PSY elective (3 cr). (If electives are chosen, 12.0 credits in total are required.))	4.0
Free electives		9.0
	Term Credits	13.0
Term 12		
PSY 492 [WI]	Psychology Senior Thesis III (or adv. PSY elective (6 cr). (If electives are chosen, 12.0 credits in total are required.))	4.0
Free electives		9.0
	Term Credits	13.0
Total Credit:		180.0

* See degree requirements (p. 137).

Co-op/Career Opportunities

Some graduates seek employment immediately after receiving their bachelor's degrees. They are well trained to work as research assistants in consulting firms and medical settings or to provide front-line services in mental health and educational settings. Other graduates go on to professional schools in law, business, medicine, and other health professions. Still others pursue graduate training in psychology and related fields. Students build skills and knowledge that provide a foundation for advanced study, create opportunities for future growth, and can be used to improve the quality of life for others.

Co-Op Experiences

Drexel University has long been known for its co-operative education programs, through which students mix periods of full-time, career-related employment with their studies. Co-op/internship employment is an option for psychology majors. Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Psychology

The minor in psychology is intended to meet the needs of students who recognize that an understanding and analysis of individual psychological processes is an important component of their education. The minor may also be of interest to students who have an interest in a double major but are unable to satisfy all of the requirements in two major fields.

Entry into the minor requires that PSY 101 General Psychology (or an equivalent introductory course) be taken as a prerequisite. Students who have completed and who are interested in a minor in Psychology are expected to meet with a Psychology Department faculty member to discuss the selection of courses appropriate to their major and their own personal interests. No more than three courses that are required for a student's major can count towards fulfilling requirements for the minor.

Required Prerequisite

PSY 101	General Psychology I (or equivalent)
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Required Courses

Select eight of the following:	24.0
PSY 120	Developmental Psychology
PSY 140	Approaches to Personality

PSY 150	Introduction to Social Psychology
PSY 210	Evolutionary Psychology
PSY 212	Physiological Psychology
PSY 213	Sensation and Perception
PSY 240 [WI]	Abnormal Psychology
PSY 245 [WI]	Sports Psychology
PSY 250 [WI]	Industrial Psychology
PSY 252	Death and Dying
PSY 264	Computer-Assisted Data Analysis I
PSY 265	Computer-Assisted Data Analysis II
PSY 290	History and Systems of Psychology
PSY 310	Drugs & Human Behavior
PSY 322	Advanced Developmental Psychology
PSY 325	Psychology of Learning
PSY 330	Cognitive Psychology
PSY 332	Human Factors and Cognitive Engineering
PSY 337	Human-Computer Interaction
PSY 340	Psychological Testing and Assessment
PSY 350	Advanced Social Psychology
PSY 360 [WI]	Experimental Psychology
PSY 380	Psychological Testing and Assessment
PSY 410	Neuropsychology
PSY 442	Theories & Practices in Clinical Psychology
PSY 480	Special Topics in Psychology

Total Credits

24.0

Psychology Faculty

Cathy Bolton, PhD (*Drexel University*). Assistant Teaching Professor. Program Evaluation in healthcare, supportive housing, and government-based social services; Design of performance metrics for quality assessment and clinical outcomes; Implementing Systems and Change Leadership to sustain Compliance with Regulatory Bodies.

Meghan Butryn, PhD (*Drexel University*). Associate Research Professor. Treatment and prevention of obesity and eating disorders, behavioral treatment, acceptance and commitment therapy.

Dorothy Charbonnier, PhD (*SUNY Stony Brook*). Assistant Teaching Professor. The nature of the creative process and writing.

Douglas L. Chute, PhD (*University of Missouri*) *Louis and Bessie Stein Fellow*; *Faculty coordinator of ePsychology*. Professor. Neuropsychology and rehabilitation; technological applications for the cognitively compromised and those with acquired brain injuries.

Brian Daly, PhD (*Loyola University, Chicago*) *Director, Practicum Training*. Assistant Professor. Pediatric neuropsychology, intervention with at-risk youth.

Paige Davis, PhD (*Durham University, England*). Assistant Teaching Professor. The development of imagination in children; private speech; theory of mind and executive functioning; mental state commentary and mind minded parenting; audio verbal hallucinations.

David DeMatteo, PhD, JD (*MCP Hahnemann University; Villanova University School of Law*) *Director of the JD-PhD Program in Law and Psychology*. Associate Professor. Psychopathy, forensic mental health assessment, drug policy; offender diversion.

Evan M. Forman, PhD (*University of Rochester*) *Director of Graduate Studies*. Professor. Clinical psychology: mechanisms and measurement of psychotherapy outcome, cognitive-behavioral and acceptance based psychotherapies, the development and evaluation of acceptance-based

interventions for health behavior change (for problems of obesity and cardiac disease) as well as mood and anxiety disorders; neurocognition of eating.

Jennifer Gallo, PhD (*Drexel University*) *Director, Neuropsychology Concentration*. Associate Teaching Professor. Neuropsychology of aging and dementia; neurocognitive correlates of goal-directed activities; behavioral and psychological symptoms associated with dementia

Pamela Geller, PhD (*Kent State University*). Associate Professor. Stressful life events and physical and mental health outcomes, particularly in the area of women's reproductive health (e.g. pregnancy, pregnancy loss, infertility, medical education).

Maureen Gibney, PsyD (*Widener University*). Associate Teaching Professor. Clinical psychopathology; neuropsychological evaluation and intervention with the elderly.

Naomi Goldstein, PhD (*University of Massachusetts*) *Co-Director of the JD-PhD Program; Stoneleigh Foundation Fellow*. Associate Professor. Forensic psychology; juvenile justice; Miranda rights comprehension; false confessions; juvenile justice treatment outcome research; anger management intervention development; child and adolescent behavior problems.

Kirk Heilbrun, PhD (*University of Texas at Austin*) *Interim Department Head*. Professor. Forensic psychology, juvenile and adult criminality, violence risk assessment, forensic psychological assessment, treatment of mentally disordered offenders, academic-sports mentoring.

James D. Herbert, PhD (*University of North Carolina*) *Dean, Graduate College; Executive Vice Provost*. Professor. Assessment and treatment of anxiety disorders; acceptance and mindfulness-based psychotherapies; the role of empiricism in clinical psychology; evidence-based practice in behavioral health.

Adrienne Juarascio, PhD (*Drexel University*). Assistant Research Professor. Enhancing treatment outcomes for eating disorders and obesity; Acceptance-based behavioral treatments; Evaluating mechanisms of action in behavioral treatments

Marlin Killen, PhD (*Trident University International*) *Faculty Coordinator of ePsychology; Online Learning Council Fellow*. Associate Teaching Professor. Authentic teaching methods in Psychology as well as student persistence behavior.

John Kounios, PhD (*University of Michigan*) *Director, PhD Program in Applied Cognitive and Brain Sciences*. Professor. Cognitive neuroscience, especially creativity, problem solving, and cognitive enhancement.

Michael Lowe, PhD (*Boston College*). Professor. Prevention and treatment of eating disorders and obesity; effects of appetitive responsiveness and dietary restraint on eating regulation; psychobiology of obesity-proneness; empirical foundations of unconscious processes.

Dan Mirman, PhD (*Carnegie Mellon University*). Assistant Professor. Recognition, comprehension, and production of spoken words; organization and processing of semantic knowledge; computational models of brain and behavior; statistical methods for analysis of time course data

Arthur Nezu, PhD, DHLL, ABPP (*State University of New York at Stony Brook*). Distinguished Professor. Behavioral medicine applications of problem-solving therapy and other cognitive-behavior therapies (e.g., to decrease emotional and psychosocial risk factors; improve

adherence), particularly with regard to patients with cardiovascular disease; assessment.

Christine Maguth Nezu, PhD (*Fairleigh Dickinson University*). Professor. Cognitive-behavioral assessment and treatment for mood, anxiety, personality disorders, and coping with chronic illness; mind/body studies; stress and coping; developmental disabilities and comorbid behavioral and emotional disorders; spirituality and psychology.

Karol Osipowicz, PhD (*Thomas Jefferson University*) Assistant Director of Undergraduate Studies. Assistant Teaching Professor. The application of advanced neuroimaging to the study of human brain function and anatomy.

Nancy Raitano Lee, PhD (*University of Denver*). Assistant Professor. Neuropsychological and neuroanatomic correlates of intellectual and developmental disabilities; Verbal memory and language difficulties in Down syndrome and other genetic disorders; Comorbid autism spectrum disorder symptoms in youth with genetic disorders; Neuroanatomic correlates of individual differences in typical and atypical cognition

Diana Robins, PhD (*University of Connecticut*) Research Program Leader, *Early Detection and Intervention Program, AJ Drexel Autism Institute*. Associate Professor. Autism screening, early detection of autism

Ludo Scheffer, PhD (*University of Pennsylvania*) Director of Undergraduate Studies; Chair Senate Committee on Academic Affairs. Teaching Professor. Meta-cognitive development, writing, and computers; Language and literacy development in the early years in the context of family and schooling; Youth-at-risk; School violence and bullying; Program/intervention effectiveness

Maria Schultheis, PhD (*Drexel University*) Director of Clinical Training. Associate Professor. Clinical Neuropsychology and rehabilitation following neurological compromise (brain injury, stroke, multiple sclerosis), application of technologies in psychology. Specialization in the use of virtual reality (VR) simulation, and evaluation of the demands of driving after disability.

Jennifer Schwartz, PhD (*Idaho State University*) Director of Psychological Services Center. Associate Teaching Professor. Adult psychopathology; evidence-based clinical practice; competency-based training; competency-based clinical supervision.

Chris Sims, PhD (*Rensselaer Polytechnic Institute*). Assistant Professor. Learning and decision-making under uncertainty; visual memory and perceptual expertise; sensorimotor control and motor learning; computational models of cognition.

Julia Sluzenski, PhD (*Temple University*). Assistant Teaching Professor. Spatial and episodic memory, memory loss across the lifespan, developmental psychology.

Mary Spiers, PhD (*University of Alabama at Birmingham*) Director MS and BS/MS Programs. Associate Professor. Clinical neuropsychology and medical psychology; memory and practical applications for memory disorders in the elderly; cognitive health of women.

J. Michael Williams, PhD (*University of Vermont*). Associate Professor. Memory disorder; traumatic brain injury; auditory neglect; neuropsychological assessment; recovery and rehabilitation of brain function; functional magnetic resonance imaging.

Fengqing (Zoe) Zhang, PhD (*Northwestern University*). Assistant Professor. Neuroimaging data analysis; Data mining; Bayesian inference; High dimensional data analysis

Eric A Zillmer, PsyD (*Florida Institute of Technology*) Carl R. Pacifico Professor of Neuropsychology and the Director of Athletics. Professor. Psychological assessment (neuropsychological, cognitive, personality), psychiatric and neurological disorders, behavioral medicine, neurogerontology, mathematical modeling, sports psychology, psychology of genocide.

Emeritus Faculty

Donald Bersoff, JD, PhD (*Yale University, New York University*). Professor Emeritus. Law and psychology; mental health law.

Thomas T. Hewett, PhD (*University of Illinois at Urbana-Champaign*). Professor Emeritus. Human computer interaction and cognitive engineering; development of computing environments to support knowledge, workers, and high performance experts.

Myrna Shure, PhD (*Cornell University*). Professor Emeritus. Child development, problem-solving interventions with children, prevention programs.

Sociology

Major: Sociology

Degree Awarded: Bachelor of Arts (BA)

Calendar Type: Quarter

Total Credit Hours: 182.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 45.1101

Standard Occupational Classification (SOC) code: 19-3041

About the Program

The sociology major at Drexel University has three components: theory, methods, substantive coursework and features specialized coursework relating to social justice issues.

Sociology is the systematic study of societies. Society is the sum total of individual and group interaction and relations, from small groups and families to global networks and complex social organizations. The discipline covers a wide variety of fields of inquiry. Sociologists examine structural relations—how human society is organized from small groups to large institutions—and is committed to developing a *critical understanding* of these relationships. Thus the sociology major stresses theory, research methods, quantitative and qualitative data analysis as applied to a wide variety of substantive areas including but not limited to social inequality, political power, gender, class, race, ethnicity, family, crime, technology and environmental change as well as a wide variety of social and political movements connected with social change. The stress on *critical understanding* means that sociology majors will strive not only to develop strong analytic abilities but an intellectual and ethical engagement reflected in sociologically informed thinking and action. The research and analytical skills developed in our program are sought after by a wide variety of professions.

Specialized social justice coursework is typically carried out in connection with community groups and organizations. It is a way through which the Sociology Program and Drexel University as a whole seeks to become

practically engaged with the wider community while promoting social justice.

For more information about the sociology major, visit the Department of Sociology (<http://www.drexel.edu/coas/academics/departments-centers/sociology>) web page.

Degree Requirements

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Four Humanities/Fine Arts Courses		12.0
Two Mathematics Courses		6.0
Two Science Courses		6.0
Two Consecutive Foreign Language Courses *		8.0

Social and Behavioral Sciences

SOC 101	Introduction to Sociology	12.0
Social and Behavioral Sciences Electives (9.0 credits)		

International Studies

Two International Studies Courses	6.0
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Studies in Diversity

Two Studies in Diversity Courses	6.0
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Sociology Core Requirements

Required Major Seminar	12.0
SOC 395	Seminar in Sociology (4-credit course, must be taken at least 3 times)

Theory Sequence

SOC 355 [WI]	Classical Social Theory	8.0
SOC 356	Contemporary Social Theory	

Methods Sequence

SOC 250	Research Methods I	16.0
SOC 350	Research Methods II	
SOC 364	Computer-Assisted Data Analysis	
SOC 365	Computer-Assisted Data Analysis II	

Required Sociology Electives

Select at least 10 of the following: (At least four must be at the 300-level and one must be at the 400-level.) 40.0

SOC 115	Social Problems
SOC 210	Race, Ethnicity and Social Inequality
SOC 215	Sociology of Work
SOC 220	Wealth and Power
SOC 221	Sociology of the Family
SOC 222	Sex and Society
SOC 230	Gender and Society
SOC 235	Sociology of Health and Illness
SOC 240	Urban Sociology
SOC 245	Sociology of the Future
SOC 268	Sociology of Sport
SOC 270	Theory of Applied and Community Sociology
SOC 271	Sociology of Aging
SOC 276	Global Climate Change
SOC 310	Topics in Political Sociology
SOC 312	Topics in Sociology of Science and Technology
SOC 315	HIV/AIDS and Africa
SOC 320	Sociology of Deviant Behavior
SOC 325	Introduction to Urban and Environmental Planning
SOC 326	Cities and Sustainability

SOC 330	Development and Underdevelopment in the Global South
SOC 340	Globalization
SOC 341	Environmental Movements in America
SOC 345	Sociology of the Environment
SOC 346	Environmental Justice
SOC 347	Introduction to Environmental Policy Analysis
SOC 349	Sociology of Disasters
SOC 370	Practicum in Applied and Community Sociology
SOC 380	Special Topics in Sociology
SOC 430	Politics of Life
SOC 444	Social Movements
SOC 480	Advanced Special Topics in Sociology
SOC 490	Sociology Research Seminar I: Research Design
SOC 491	Sociology Research Seminar II: Data Acquisition and Analysis
SOC 492	Sociology Research Seminar III: Practicum in Sociological Research
SOC 499	Independent Studies in Sociology

Free Electives	38.0
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Total Credits	182.0
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* At least one foreign language course must be at the 200-level. In addition, the department recommends students take 2 additional foreign language courses as free electives.

Sample Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
SOC 101	Introduction to Sociology	3.0
SOC 395	Seminar in Sociology	4.0
UNIV H101	The Drexel Experience	1.0
Foreign Language Course		4.0
Term Credits		15.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Social and Behavioral Science Elective		3.0
Foreign Language Course		4.0
Mathematics Course		3.0
Term Credits		14.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
SOC 355 [WI]	Classical Social Theory	4.0
Diversity Studies Elective		3.0
Science Elective *		3.0
Foreign Language Course		4.0
Term Credits		17.0
Term 4		
SOC 250	Research Methods I	4.0
Sociology Elective		4.0
Mathematics Course		3.0
Foreign Language Course		4.0
Term Credits		15.0
Term 5		
Sociology Required Electives		8.0
Science Elective *		3.0
Free Elective		3.0
Term Credits		14.0
Term 6		
SOC 364	Computer-Assisted Data Analysis	4.0
Sociology Required Elective		4.0

Social and Behavioral Sciences Elective		3.0
Diversity Studies Elective		3.0
Free Elective		3.0
Term Credits		17.0
Term 7		
Sociology Required Elective		4.0
Sociology Required Elective (at 300 Lv)		4.0
Social and Behavioral Sciences Elective		3.0
Free Elective		3.0
Term Credits		14.0
Term 8		
SOC 395	Seminar in Sociology	4.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Sociology Required Elective		4.0
Sociology Required Elective (at 300 Lv)		4.0
Free Elective		3.0
Term Credits		16.0
Term 9		
SOC 350	Research Methods II	4.0
Sociology Required Elective (at 300 Lv)		4.0
Humanities/Fine Arts Elective		3.0
International Studies Elective		3.0
Free Elective		3.0
Term Credits		17.0
Term 10		
SOC 395	Seminar in Sociology	4.0
SOC 365	Computer-Assisted Data Analysis II	4.0
Humanities/Fine Arts Elective		3.0
Free Elective		4.0
Term Credits		15.0
Term 11		
SOC 356	Contemporary Social Theory	4.0
Sociology Required Elective (at 300 Lv)		4.0
Humanities/Fine Arts Elective		3.0
Free Elective		3.0
Term Credits		14.0
Term 12		
Sociology Required Elective (at 400 Lv)		4.0
International Studies Elective		3.0
Humanities/Fine Arts Elective		3.0
Free Elective		4.0
Term Credits		14.0
Total Credit: 182.0		

* See degree requirements (p. 141).

Co-op/Career Opportunities

An undergraduate degree in sociology is excellent preparation for law school, medical school, or for graduate work in such fields as sociology, history, gerontology, or political science.

Outside of academics, sociologists work in a wide variety of settings. Some serve as statistical analysts for market research firms, health care agencies, and government. Others are involved in urban planning, survey research, public relations, agency management, trend analysis, or criminal justice. There are sociologists of religion working for national church organizations, and sociologists specializing in gerontology who are engaged in research or administration for agencies concerned with the aged.

Co-op Experiences

Some recent co-op positions held by sociology students include the following:

- Research Coordinator, West Philadelphia Community Center
- Counselor, Camden Youth Program
- Research Analyst, Philadelphia Stock Exchange
- Case Investigator, Howard County Police Department
- Assistant Copy Editor, Philadelphia Newspapers, Inc.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Sociology

The sociology minor is designed to give students specializing in other fields a broader knowledge of contemporary social issues and the ability to analyze them in a reasoned fashion. For students majoring in such fields as business and engineering, the minor helps develop skills in critical thinking that go beyond the acquisition of specialized, professional techniques. For students majoring in another area of the liberal arts, the minor offers the opportunity to place the issues raised in the major discipline within a larger social context.

Please note: No more than three courses that are required for a student's major can count towards fulfilling requirements for the minor.

Required Courses *

SOC 355 [WJ]	Classical Social Theory	4.0
or SOC 356	Contemporary Social Theory	
Select five of the following: **		20.0
SOC 115	Social Problems	
SOC 210	Race, Ethnicity and Social Inequality	
SOC 215	Sociology of Work	
SOC 220	Wealth and Power	
SOC 221	Sociology of the Family	
SOC 222	Sex and Society	
SOC 230	Gender and Society	
SOC 235	Sociology of Health and Illness	
SOC 240	Urban Sociology	
SOC 245	Sociology of the Future	
SOC 250	Research Methods I	
SOC 268	Sociology of Sport	
SOC 271	Sociology of Aging	
SOC 276	Global Climate Change	
SOC 310	Topics in Political Sociology	
SOC 312	Topics in Sociology of Science and Technology	
SOC 315	HIV/AIDS and Africa	
SOC 320	Sociology of Deviant Behavior	
SOC 326	Cities and Sustainability	
SOC 330	Development and Underdevelopment in the Global South	
SOC 340	Globalization	
SOC 341	Environmental Movements in America	
SOC 345	Sociology of the Environment	
SOC 346	Environmental Justice	
SOC 347	Introduction to Environmental Policy Analysis	
SOC 349	Sociology of Disasters	
SOC 350	Research Methods II	
SOC 370	Practicum in Applied and Community Sociology	
SOC 430	Politics of Life	
SOC 444	Social Movements	

SOC T380	Special Topics in SOC	
SOC T480	Special Topics in Sociology	
SOC I499	Independent Study in SOC	
Total Credits		24.0

- * No more than three courses that are required for a student's major can count towards fulfilling requirements for the minor.
- ** Students must take at least three elective courses at the 300 or 400 level.

The sociology major at Drexel University has three components: theory, methods, substantive coursework and features specialized coursework relating to social justice issues.

Sociology is the systematic study of societies. Society is the sum total of individual and group interaction and relations, from small groups and families to global networks and complex social organizations. The discipline covers a wide variety of fields of inquiry. Sociologists examine structural relations—how human society is organized from small groups to large institutions—and is committed to developing a *critical understanding* of these relationships. Thus the sociology major stresses theory, research methods, quantitative and qualitative data analysis as applied to a wide variety of substantive areas including but not limited to social inequality, political power, gender, class, race, ethnicity, family, crime, technology and environmental change as well as a wide variety of social and political movements connected with social change. The stress on *critical understanding* means that sociology majors will strive not only to develop strong analytic abilities but an intellectual and ethical engagement reflected in sociologically informed thinking and action. The research and analytical skills developed in our program are sought after by a wide variety of professions.

Specialized social justice coursework is typically carried out in connection with community groups and organizations. It is a way through which the Sociology Program and Drexel University as a whole seeks to become practically engaged with the wider community while promoting social justice.

The Science, Technology, and Society (STS) program systemically investigates the social dimensions of science, technology and medicine. Faculty from a range of disciplines contribute to a curriculum that features a broad set of perspectives, all grounded in a foundation of critical thinking, research methods, and writing and presentation skills. The STS program emphasizes three interrelated areas: environment and sustainability; health and medicine; and information, identities and networks. The STS Lab course is a unique feature of the curriculum—it prepares students to work as a team to address meaningful science and technology related topics. Working with a faculty adviser, graduate students develop an individualized plan of study that allows them to pursue their interests in depth.

STS students are independent, out-of-the-box thinkers who are dedicated to understanding the intersections of society, science, medicine and technology. While STS students vary widely in their professional and educational backgrounds and career ambitions, they share a common commitment to a critical approach to our world's most pressing technoscientific challenges.

Prospective students for the MS in STS see this educational opportunity as a crucial factor in their skill development and career advancement. They are recent college graduates in the social sciences, humanities, natural sciences, and engineering; middle and high school teachers; and professionals in businesses, city and state government offices, and

area hospitals. Students can attend full time or part time and complete all coursework in the evening.

Requirements: Accelerated Program in Sociology BA and Science Technology & Society MS

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV H101	The Drexel Experience	1.0
UNIV H201	Looking Forward: Academics and Careers	1.0
Four Humanities/Fine Arts Courses		12.0
Two Mathematics Courses		6.0
Two Science Courses		6.0
Two Consecutive Foreign Language Courses		8.0
Social and Behavioral Sciences		12.0
SOC 101	Introduction to Sociology	
Social and Behavioral Sciences Electives (9 credits)		
International Studies		6.0
Two International Studies Courses		
Studies in Diversity		6.0
Two Studies in Diversity Courses		
Sociology Core Requirements		
Required Major Seminar		12.0
SOC 395	Seminar in Sociology (4.0 credit course, must be taken at least 3 times)	
Theory Sequence		8.0
SOC 355 [WI]	Classical Social Theory	
SOC 356	Contemporary Social Theory	
Methods Sequence		16.0
SOC 250	Research Methods I	
SOC 350	Research Methods II	
SOC 364	Computer-Assisted Data Analysis	
SOC 365	Computer-Assisted Data Analysis II	
Required Sociology Electives		
Select at least 10 of the following: (At least 4 must be at the 300-level and 1 must be at the 400-level)		40.0
SOC 115	Social Problems	
SOC 210	Race, Ethnicity and Social Inequality	
SOC 215	Sociology of Work	
SOC 220	Wealth and Power	
SOC 221	Sociology of the Family	
SOC 222	Sex and Society	
SOC 230	Gender and Society	
SOC 235	Sociology of Health and Illness	
SOC 240	Urban Sociology	
SOC 245	Sociology of the Future	
SOC 268	Sociology of Sport	
SOC 270	Theory of Applied and Community Sociology	
SOC 271	Sociology of Aging	
SOC 276	Global Climate Change	
SOC 310	Topics in Political Sociology	
SOC 312	Topics in Sociology of Science and Technology	
SOC 315	HIV/AIDS and Africa	
SOC 320	Sociology of Deviant Behavior	
SOC 325	Introduction to Urban and Environmental Planning	
SOC 326	Cities and Sustainability	
SOC 330	Development and Underdevelopment in the Global South	

SOC 340	Globalization	
SOC 341	Environmental Movements in America	
SOC 345	Sociology of the Environment	
SOC 346	Environmental Justice	
SOC 347	Introduction to Environmental Policy Analysis	
SOC 349	Sociology of Disasters	
SOC 370	Practicum in Applied and Community Sociology	
SOC 380	Special Topics in Sociology	
SOC 430	Politics of Life	
SOC 444	Social Movements	
SOC 480	Advanced Special Topics in Sociology	
SOC 490	Sociology Research Seminar I: Research Design	
SOC 491	Sociology Research Seminar II: Data Acquisition and Analysis	
SOC 492	Sociology Research Seminar III: Practicum in Sociological Research	
SOC 499	Independent Studies in Sociology	
Free Electives		36.0
Total Credits		180.0

*At least one foreign language course must be at the 200-level. In addition, the department recommends students take 2 additional foreign language courses as free electives.

Basic Requirements

SCTS 501	Introduction to Science, Technology and Society	3.0
SCTS 502	Research Methods	3.0
SCTS 503	Advanced Research Methods	3.0
SCTS 504	Science, Technology & Society Theories	3.0

Advanced Requirements

Ethics, Values, Identities, and Culture	6.0
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Select two of the following:

INFO 679	Information Ethics	
PBHL 824	Public Health Ethics	
SCTS 600	Contemporary Feminist Theory	
SCTS 610	Material Culture	
SCTS 612	Medical and Healthcare Ethics	
SCTS 614	Technology, Progress, and Determinism	
SCTS 615	The Biopolitics of Health	
SCTS 620	Medicine, Technology and Science	
SCTS 650	Global Subjects of Biocapital	
SCTS 651	Transnational Science & Technology	

Science and Technology Policy	3.0
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Select one of the following:

COM 650	Telecommunications Regulation and Policy	
INFO 725	Information Policy	
PLCY 509	Sustainability & Public Policy	
SCTS 570	Environmental Policy	
SCTS 571	Science and Technology Policy	
SCTS 641	Risk and Disaster Policy	
SCTS 643	Contemporary Stem Workforces: Organizations of Labor in Lab, Shop and Clinic	
SCTS 645	War and Technoscience	

Science, Technology & Society Lab	3.0
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Select one of the following:

SCTS 703	Connected Mobility Lab	
SCTS 705	Identity and Intersectionality	
SCTS 710	Special Topics in Science, Technology and Society Lab	

Thesis/Project and Electives *	21.0
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SCTS 798	Master's Research	
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Suggested Electives **

COM 701	Contemporary Social Theory	
COM 704	Research Methods in Communication	

COM 705	Data Analysis in Communication	
COM 720	Critical Theory	
COM 801	Seminar in Contemporary Theory	
MGMT 602	Managing Technology Innovation	
PBHL 516	Introduction to Public Health	
PLCY 510	Introduction to Case Study Research	
PSY 612	Psychology of Human-Computer Interaction Design	
PSY 712	History and Systems	
SCTS 584	Historiography of Science	
SCTS 639	Politics of Life	
SCTS 640	STS Perspectives on Risk and Disaster	
SCTS 660	Theoretical and Sociological Aspects of Measurement	
SCTS 665	Advanced Topics in Philosophy of Science	
SCTS 697	Internship in Science, Technology and Society	
SCTS 790	Special Topics in Science, Technology & Society	
SCTS 799	Independent Study in Science, Technology and Society	
Total Credits		45.0

Sample Plan of Study: Accelerated Program in Sociology BA and Science Technology & Society MS

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
SOC 101	Introduction to Sociology	3.0
SOC 395	Seminar in Sociology	4.0
UNIV H101	The Drexel Experience	1.0
Math Elective		3.0
Term Credits		14.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
Social and Behavioral Sciences Course		3.0
Math Elective		3.0
Foreign Language Elective		4.0
International Studies Course		3.0
Term Credits		17.0
Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
SOC 355 [WI]	Classical Social Theory	4.0
Foreign Language Elective		4.0
International Studies Elective		3.0
Science Elective		3.0
Term Credits		17.0
Term 4		
SOC 250	Research Methods I	4.0
SOC 115	Social Problems	4.0
SOC 210	Race, Ethnicity and Social Inequality	4.0
Humanities/Fine Arts Course		3.0
Term Credits		15.0
Term 5		
SOC 230	Gender and Society	4.0
SOC 268	Sociology of Sport	4.0
SOC 356	Contemporary Social Theory	4.0
Diversity Elective		3.0
Term Credits		15.0
Term 6		
SOC 364	Computer-Assisted Data Analysis	4.0
SOC 240	Urban Sociology	4.0
Social and Behavioral Science Elective		3.0

Science Elective		3.0
Diversity Elective		3.0
Term Credits		17.0
Term 7		
UNIV H201	Looking Forward: Academics and Careers	1.0
SOC 395	Seminar in Sociology	4.0
Humanities/Fine Arts Elective		3.0
SOC 276	Global Climate Change	3.0
SOC 312	Topics in Sociology of Science and Technology	4.0
Free Elective		3.0
Term Credits		18.0
Term 8		
SOC 350	Research Methods II	4.0
SOC 346	Environmental Justice	4.0
SOC 395	Seminar in Sociology	4.0
SCTS 501	Introduction to Science, Technology and Society	3.0
Free Elective		3.0
Term Credits		18.0
Term 9		
SCTS 502	Research Methods	3.0
SOC 395	Seminar in Sociology	4.0
SOC 349	Sociology of Disasters	4.0
Free Elective		3.0
Science Course		3.0
Term Credits		17.0
Term 10		
SOC 365	Computer-Assisted Data Analysis II	4.0
SOC 370	Practicum in Applied and Community Sociology	4.0
Free Electives (UG)		3.0
Humanities/Fine Arts Course		3.0
SCTS 503	Advanced Research Methods	3.0
Term Credits		17.0
Term 11		
SCTS 504	Science, Technology & Society Theories	3.0
SCTS 645	War and Technoscience	3.0
SCTS 600	Contemporary Feminist Theory	3.0
Free Elective (UG)		6.0
Term Credits		15.0
Term 12		
SCTS 570	Environmental Policy	3.0
SCTS 639	Politics of Life	3.0
Free Elective (UG)		6.0
STS Elective		3.0
Term Credits		15.0
Term 13		
SCTS 571	Science and Technology Policy	3.0
SCTS 665	Advanced Topics in Philosophy of Science	3.0
STS Elective		3.0
Free Elective		6.0
Term Credits		15.0
Term 14		
SCTS 612	Medical and Healthcare Ethics	3.0
SCTS 798	Master's Research	3.0
SCTS 799	Independent Study in Science, Technology and Society	3.0
Free Electives (UG)		6.0
Term Credits		15.0

Total Credit: 225.0

Sociology Faculty

Susan Bell, PhD (*Brandeis University*) *Department Head, Sociology*. Professor. The interaction between patient cultures and embodied

health movements; changing culture and structure of biomedicine; the experience of illness, women's health, and narrative representations of the politics of cancer, medicine, and women's bodies.

Robert J. Brulle, PhD (*George Washington University*). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

Mary Ebeling, PhD (*University of Surrey*) *Director, Women's and Gender Studies*. Associate Professor. Science and technology studies; emerging technologies and biocapital; media and democratic cultures; radical social movements; sociology of markets; political sociology; and ethnographic methodologies.

Julia Hall, PhD (*University of Pennsylvania*). Professor. Criminal justice and juvenile justice reform, including community based alternatives to incarceration, correctional education and programming, reentry and reintegration, restorative justice, and issues relating to special needs offenders, including the el

Kelly Joyce, PhD (*Boston College*) *Director, Master's Program in Science Technology & Society*. Professor. Science, medicine and technology; aging and technology; qualitative social science methods; healthcare and medicine.

Emmanuel F. Koku, PhD (*University of Toronto*). Associate Professor. Social network analysis; qualitative/quantitative research; medical sociology; social epidemiology; social demography; sociology of development; communication and information technology; community and urban sociology.

Diamantino Machado, PhD (*Temple University*). Teaching Professor. Globalization, political economy, political sociology, philosophy of social science, postmodernism and social reflection.

Elizabeth McGhee Hassrick, PhD (*University of Chicago*). Assistant Research Professor. Social network interventions that promote positive outcomes for people with ASD, their families and communities

Kevin Mobey, PhD (*University of California-San Diego*). Assistant Teaching Professor. The social and cultural studies of biomedicine/health, particularly as those domains intersect with and through the institutions of race/sexuality/gender, social movements/community advocacy, HIV/AIDS, racial health disparities, science and technological studies, and Black Studies

David Ridgway, MS (*St. Joseph's University*) *Faculty fellow of the Sigma Phi Epsilon fraternity*. Instructor. The correlations between poverty and public welfare, especially theories of the perpetuation of poverty; Sociology of crime; police practices and police procedure

Mimi Sheller, PhD (*New School for Social Research*) *Director, Center for Mobilities Research and Policy*. Professor. Sustainable mobility and mobility justice: new cultures and infrastructures of travel, transport, mobile communication, and urbanism; Caribbean Studies: history, culture and political theory of the region, including intersections of race, ethnicity, gender, sexuality and class.

Diane Sicotte, PhD (*Arizona State University*). Associate Professor. Sociology of environmental injustice: inequalities in the citing of environmental hazards; community-based research in neighborhoods dealing with industrial hazards; sociology of the environment; urban sociology; social inequalities.

Minor in Africana Studies

The minor in Africana studies was created to provide the opportunity for undergraduate students throughout the University to gain an understanding of and background in the history and cultures of peoples of African descent in North and South America, the Caribbean, and Africa.

This interdisciplinary minor includes courses in anthropology, history, literature, music, political science, and sociology, and provides an opportunity for directed study in areas of particular interest to the students. The Africana studies minor has intrinsic intellectual value and helps prepare individuals to become contributors to an increasingly pluralistic society. At the same time, this minor allows students interested in business, the sciences, engineering, government, and social services to present to prospective employers a unique academic background.

Required Courses

AFAS 101	Introduction to Africana Studies	3.0
AFAS 201	Cross Currents in Africana Studies	3.0
Select six of the following: *		18.0
AFAS 250	African American Herstories	
AFAS 260	Race, Politics and Religion	
AFAS 301	Politics of Hip Hop	
AFAS 385	Rum, Rice and Revolution: Caribbean History	
AFAS 401	Urban Social Justice Practicum I	
AFAS 402	Urban Social Justice Practicum II	
AFAS I299	Independent Study in AFAS	
AFAS T280	Special Topics in Africana Studies	
AFAS T380	Special Topics in Africana Studies	
ANTH 101	Introduction to Cultural Diversity	
ANTH 310	Societies In Transition: The Impact of Modernization and the Third World	
ENGL 203 [WI]	Post-Colonial Literature I (WI)	
ENGL 204	Post-Colonial Literature II	
ENGL 325	Topics in World Literature **	
HIST 216	Freedom in America	
HIST 215	American Slavery	
MUSC 107	Jazz Ensembles	
MUSC 333	Afro-American Music USA	
PSCI 354	United States & the Third World	
PSCI 372	City in United States Political Development	
WGST 240	Women and Society in a Global Context	
WGST T280	Special Topics in Women's and Gender Studies ***	
Total Credits		24.0

* Students take an additional 18.0 credits including-but not limited to-the following courses. (Students must check with the Program Director for approval prior to making substitutions.)

** With a focus on the Caribbean, Latin America or the Diaspora.

*** With a focus on race or the Diaspora.

Minor in Arabic

About the Program

In our globalized world, intercultural and multilingual communication is an indispensable asset for the 21st century citizen and worker. As part of the Department of Global Studies and Modern Languages, we offer language instruction rooted in communication and embedded in authentic cultural contexts. Language study opens a world of opportunities for our students, from co-ops and study abroad programs to engagement with global communities here in Philadelphia. Media and technology, as well

as travel and commerce, make the study of languages more crucial than ever, for tackling global challenges such as climate change and inequality demand that our students communicate across languages and cultures.

The Arabic minor requires 24 credits of language study above Arabic 103. 24.0
Students can choose from the following courses.

ARBC 201	Arabic IV
ARBC 202	Arabic V
ARBC 203	Arabic VI
ARBC 301	Arabic VII
ARBC 302	Arabic VIII
ARBC 303	Arabic IX
ARBC 411	Arabic - Introduction to Arabic Stylistics
ARBC 471	Arabic Civilization

Minor in Astrophysics

Astrophysics brings together many disparate areas of physics—gravitational physics govern the evolution of galaxies and clusters, nuclear physics dominates the cores of stars, electromagnetism governs the radiation that we use to observe these objects. Students majoring in mathematics and computer science, as well as other disciplines, are often fascinated by the questions raised by astrophysics.

Because of the overlap in requirements between the astrophysics minor and the physics minor, (p. 131) students cannot minor in both.

Admission requirements: Consultation with the Physics Department.

Required Prerequisite Courses

PHYS 113 & PHYS 114 & PHYS 115	Contemporary Physics I and Contemporary Physics II and Contemporary Physics III
OR	
PHYS 101 & PHYS 102 & PHYS 201	Fundamentals of Physics I and Fundamentals of Physics II and Fundamentals of Physics III

Required Courses

PHYS 217	Thermodynamics	4.0
PHYS 231	Introductory Astrophysics	3.0
PHYS 232	Observational Astrophysics	3.0
PHYS 311	Classical Mechanics I	4.0
PHYS 321	Electromagnetic Fields I	4.0
PHYS 431	Galactic Astrophysics	3.0
PHYS 432	Cosmology	3.0
Total Credits		24.0

Minor in Bioinformatics

The bioinformatics minor examines the application of computer technology and programming to biological fields such as genomics or proteomics. This multidisciplinary program is designed for students majoring in biomedical engineering, biological sciences, computer science, information systems, or mathematics. Combination with other majors is possible through consultation with the program director. The minor is divided among courses in biology, programming and computation, human-computer interface design, databases, and statistics.

Students must complete a minimum of 24 credits of coursework as follows:

Core Courses

BIO 331	Bioinformatics I	3.0
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BIO 332	Bioinformatics II	3.0
Two Senior Research Project Courses *		

* Until research project courses are developed specifically for this minor, the department will accept whatever research project(s) the student has taken as part of their major under the number for that major.

Area-specific courses

In each of the following five areas, the requirements of a student's major cover some of the competencies for Bioinformatics, while the remaining requirements will be fulfilled within the minor itself.

A plan of study is determined by an Advisor in the Department of Biology based on the student's major field of study. Thus, the requirements for completing the minor are determined on a case-by-case basis. Possible options for area-specific courses include the following:

Bioscience

BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
BIO 449	Recombinant DNA Laboratory	5.0

Programming and Computation

CS 171	Computer Programming I	3.0
CS 172	Computer Programming II	3.0
CS 260	Data Structures	3.0

Human/Computer Interface Design

CS 337	The Psychology of Human-Computer Interaction	3.0
INFO 110	Human-Computer Interaction I	3.0

Databases

CS 461	Database Systems	3.0
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0

Statistics

MATH 310	Probability and Statistics	4.0
MATH 311	Probability and Statistics I	4.0
MATH 312	Probability and Statistics II	4.0
MATH 410	Scientific Data Analysis I	3.0
MATH 411	Scientific Data Analysis II	3.0

Minor in Biophysics

About the Program

Biophysics is the study of the complexity of life using tools provided by physics. It attempts to construct mathematical frameworks that explain among many other topics, how organisms obtain energy from the environment, how complex structures appear in the cell and how these relate to function. In essence, biophysics looks for principles that describe observed patterns and propose predictions based on these principles.

Admissions Requirements

Consultation and approval of the program director and completion of one of the prerequisite sequences. Students who have completed the PHYS 152, PHYS 153, PHYS 154 sequence will also be accepted into the minor provided they have an A- average in those courses and have completed MATH 121 and MATH 122.

Program Requirements

Required Pre-requisites

PHYS 113	Contemporary Physics I	
PHYS 114	Contemporary Physics II	
PHYS 115	Contemporary Physics III	
OR		
PHYS 101	Fundamentals of Physics I	
PHYS 102	Fundamentals of Physics II	
PHYS 201	Fundamentals of Physics III	

Core Requirements

PHYS 217	Thermodynamics	3.0-4.0
or CHEM 253	Thermodynamics and Kinetics	
or ENGR 210	Introduction to Thermodynamics	
PHYS 262	Introduction to Biophysics	3.0
PHYS 317	Statistical Mechanics	3.0
PHYS 321	Electromagnetic Fields I	4.0
PHYS 461	Biophysics	3.0
PHYS 462	Computational Biophysics	3.0
One course from the following:		4.5
BIO 122	Cells and Genetics	
BIO 141	Essential Biology	

One course from the following:

BIO 209	Cell, Molecular & Developmental Biology I	3.0-4.0
BIO 214	Principles of Cell Biology	
BIO 218	Principles of Molecular Biology	
CHEM 371	Chemistry of Biomolecules	

Total Credits	26.5-28.5
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Minor in Bioscience and Society

Designed for non-majors, the minor in bioscience and society is accessible to all students with an interest in biology. The minor includes a list of topical courses from which students can choose freely depending upon interest.

Required Courses *

Select one of the following options:	3.0-4.0	
BIO 100	Applied Cells, Genetics & Physiology	
or		
BIO 107	Cells, Genetics & Physiology	
& BIO 108	and Cells, Genetics and Physiology Laboratory	
Select one of the following options:	3.0-4.0	
BIO 101	Applied Biological Diversity, Ecology & Evolution	
or		
BIO 109	Biological Diversity, Ecology & Evolution	
& BIO 110	and Biological Diversity, Ecology and Evolution Laboratory	
ENVS 212	Evolution	4.0
Select four of the following: **	14.0	
BIO 112	Biotechnology for Society	
BIO 116	How Your Body Works-Or Not	
BIO 118	Basics of Cancer	
BIO 264	Ethnobotany	
BIO 284	Biology of Stress	
BIO 312	Genetically Modified Foods	
ENVS 260	Environmental Science and Society	
Total Credits	24.0-26.0	

* A grade of "C" or better must be earned for each course in this minor for the course to meet the requirement.

** Other courses may be substituted depending on yearly course offerings after consultation with an academic advisor in the Department of Biology.

Minor in Chinese

About the Program

In our globalized world, intercultural and multilingual communication is an indispensable asset for the 21st century citizen and worker. As part of the Department of Global Studies and Modern Languages, we offer language instruction rooted in communication and embedded in authentic cultural contexts. Language study opens a world of opportunities for our students, from co-ops and study abroad programs to engagement with global communities here in Philadelphia. Media and technology, as well as travel and commerce, make the study of languages more crucial than ever, for tackling global challenges such as climate change and inequality demand that our students communicate across languages and cultures.

The Chinese minor requires 24.0 credits of language study above Chinese 105. Students can choose from the following course options. 24.0

CHIN 201	Chinese IV
CHIN 202	Chinese V
CHIN 203	Chinese VI
CHIN 301	Chinese VII
CHIN 302	Chinese VIII
CHIN 303	Chinese IX
CHIN 411	Introduction to Chinese Stylistics
CHIN 431	Introduction to Chinese Literature
CHIN 451	Introduction to Business and Professional Chinese

Courses

CHIN 101 Chinese I 4.0 Credits

Introductory Mandarin Chinese. Includes listening, speaking, and reading, with individual audiolingual practice. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHIN 102 Chinese II 4.0 Credits

Continues CHIN 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 101 [Min Grade: C]

CHIN 103 Chinese III 4.0 Credits

Continues CHIN 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 102 [Min Grade: C]

CHIN 104 Chinese Speaking, Level II (Pinyin Only Track Option) 4.0 Credits

Chinese Speaking, Level II (Pinyin Only Track Option) includes listening, speaking, reading, and some writing solely using the Chinese phonetic system: pinyin. This course will continue to introduce standard (Mandarin) Chinese to students who have had little or no previous knowledge of the language. The course is designed to help students to continue acquiring the rudimentary knowledge of Chinese and develop basic skills in listening and speaking in the language. In this class, more emphasis will be given to the training of standard pronunciation and listening comprehension as well as some basic grammar and vocabulary usage. Students will be expected to work solely in recognizing and writing pinyin, placing a much heavier emphasis on learning Chinese as a spoken language.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 101 [Min Grade: C]

CHIN 105 Chinese Speaking, Level III (Pinyin Only Track Option) 4.0 Credits

Chinese Speaking, Level III (Pinyin Only Track Option) includes listening, speaking, reading, and some writing solely using the Chinese phonetic system: pinyin. This course will continue to introduce standard (Mandarin) Chinese to students who have had little or no previous knowledge of the language. The course is designed to help students to continue acquiring the rudimentary knowledge of Chinese and develop basic skills in listening and speaking in the language. Students will be expected to work solely in recognizing and writing pinyin, placing a much heavier emphasis on learning Chinese as a spoken language. This course is specifically designed for spoken language acquisition. Students who take Chinese Speaking, Level III will not be able to continue on to Chinese 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 104 [Min Grade: C]

CHIN 201 Chinese IV 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on CHIN 103.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 103 [Min Grade: C]

CHIN 202 Chinese V 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on CHIN 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 201 [Min Grade: C]

CHIN 203 Chinese VI 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on CHIN 202.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 202 [Min Grade: C]

CHIN 301 Chinese VII 3.0 Credits

Advanced Chinese. Includes reading, writing, and extensive conversational practice. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 203 [Min Grade: C]

CHIN 302 Chinese VIII 3.0 Credits

Continues CHIN 301. Covers techniques of translation and communication. Provides advanced practice in translation, comprehension, and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 301 [Min Grade: C]

CHIN 303 Chinese IX 3.0 Credits

Continues CHIN 302. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 302 [Min Grade: C]

CHIN 411 Introduction to Chinese Stylistics 3.0 Credits

Fourth year of Chinese. Provides advanced practice in translation, comprehension, and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: CHIN 303 [Min Grade: C]

CHIN 431 Introduction to Chinese Literature 3.0 Credits

Provides intensive reading, writing, and conversational practice in Chinese, based on selected texts in Chinese literature. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: CHIN 303 [Min Grade: C]

CHIN 451 Introduction to Business and Professional Chinese 3.0 Credits

Fourth year of Chinese. Provides intensive oral practice and written work in business, professional, and commercial Chinese. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: CHIN 303 [Min Grade: C]

CHIN 480 Chinese Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHIN I199 Independent Study in CHIN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN I299 Independent Study in CHIN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN I399 Independent Study in CHIN 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN I499 Independent Study in CHIN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN T180 Special Topics in Chinese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN T280 Special Topics in Chinese 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN T380 Special Topics in Chinese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN T480 Special Topics in Chinese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Minor in Computer Crime

Computers have created new opportunities for crime and have affected the requisite capacity to commit criminal acts. The minor in computer crime provides students with an overview of the behavioral, legal, technical, and administrative issues faced by the criminal justice system and security communities in addressing crime involving computers and related networking technologies. The curriculum exposes students to state-of-the-art solutions used within the public and private sectors to respond to and prevent computer crime

Required Courses

CJS 101	Introduction to Criminal Justice	3.0
CJS 200	Criminology	3.0
CJS 276	Introduction to Computer Crime	3.0
CJS 274	Sex, Violence, & Crime on the Internet	3.0
CJS 365	Computer Investigations and the Law	3.0
CJS 377	Intellectual Property Theft in the Digital Age	3.0

Additional Elective Courses

Select two of the following:		
CJS 265	Criminal Investigation	
CJS 266	Crime Prevention Planning	
CJS 267	Introduction to Security Studies	
CJS 273	Surveillance, Technology, and the Law	

CJS 362	Gender, Crime, and Justice	
CJS 375	Criminal Procedure	
CJS T380	Special Topics in Criminology and Justice Studies	
Total Credits		24.0

Minor in Ecology

The minor in ecology meets the needs of engineering, science, arts, applied arts, information, and business students interested in environmental science. Prior to taking ENVS 230 General Ecology, students are minimally expected to have had one term to a year of both general biology and general chemistry.

Required Courses

ENVS 212	Evolution	4.0
ENVS 230	General Ecology	3.0
ENVS 260	Environmental Science and Society	3.0
ENVS 284	Physiological and Population Ecology	3.0
ENVS 286	Community and Ecosystem Ecology	3.0
ENVS 328	Conservation Biology	3.0
Environmental Science elective		3.0
Field Course		4.0
Choose one of:		
ENVS 382	Field Botany of the New Jersey Pine Barrens	
ENVS 383	Ecology of the New Jersey Pine Barrens	
ENVS 388	Marine Field Methods	
Total Credits		26.0

Minor in French

About the Program

In our globalized world, intercultural and multilingual communication is an indispensable asset for the 21st century citizen and worker. As part of the Department of Global Studies and Modern Languages, we offer language instruction rooted in communication and embedded in authentic cultural contexts. Language study opens a world of opportunities for our students, from co-ops and study abroad programs to engagement with global communities here in Philadelphia. Media and technology, as well as travel and commerce, make the study of languages more crucial than ever, for tackling global challenges such as climate change and inequality demand that our students communicate across languages and cultures.

The French minor requires a minimum of 24 credits above French 103, including at least 12 credits above French 310, and at least one 400 level course. Students can choose from the following 300 and 400 level courses.

FREN 201	French IV	
FREN 202	French V	
FREN 310	Advanced Writing and Speaking	
FREN 320	Introduction to Language for the Professions	
FREN 330	Introduction to Identities and Communities	
FREN 340	Introduction to Power and Resistance	
FREN 350	Introduction to Language, Media, and Society	
FREN 410	Advanced Grammar and Translation	
FREN 420	Advanced Studies in Language for the Professions	
FREN 430	Advanced Studies in Identities and Communities	
FREN 440	Advanced Studies in Power and Resistance	
FREN 450	Advanced Studies in Language, Media, and Society	

Courses

FREN 101 French I 4.0 Credits

Introductory French. Includes listening, speaking, reading, and writing. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

FREN 102 French II 4.0 Credits

Continues FREN 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 101 [Min Grade: C]

FREN 103 French III 4.0 Credits

Continues FREN 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 102 [Min Grade: C]

FREN 201 French IV 4.0 Credits

Intermediate French. Includes grammar review, listening, speaking, and reading, with individual audiolingual practice. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 103 [Min Grade: C]

FREN 202 French V 4.0 Credits

Continues FREN 201. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 201 [Min Grade: C]

FREN 203 French VI: Conversations & Composition 4.0 Credits

Provides intensive practice in comprehension and written and oral communication. Emphasizes development of writing skills and increased oral competence in everyday situations. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 202 [Min Grade: C]

FREN 310 Advanced Writing and Speaking 4.0 Credits

French 310 provides advanced practice in written and oral communication, including journalistic, professional, and creative writing. Examines contemporary cultural contexts through media and news. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 202 [Min Grade: C]

FREN 311 [WI] Introduction to French Stylistics 3.0 Credits

Provides advanced practice in comprehension and written and oral communication, based primarily on periodicals and contemporary media. Offered every term. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 203 [Min Grade: C]

FREN 312 [WI] French Stylistics 3.0 Credits

Continues FREN 311. Provides extensive study of the techniques of translation and communication. Offered all terms. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 311 [Min Grade: C]

FREN 313 [WI] Advanced French Stylistics 3.0 Credits

Continues FREN 312. Provides advanced training in oral and written communication in French. Particularly recommended for students who have pre-proficiency status, French minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 312 [Min Grade: C]

FREN 320 Introduction to Language for the Professions 3.0 Credits

This course provides an introduction to communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C]

FREN 330 Introduction to Identities and Communities 3.0 Credits

This course provides an introduction to the analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C]

FREN 331 Introduction to Studies in French Literature 3.0 Credits

Advanced French. Reading, writing, and extensive conversational practice, based on masterpieces of French literature.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 332 Studies in French Literature 3.0 Credits

Includes reading and oral and written analysis of representative texts in French literature, including familiarization with the historical and cultural contexts. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 333 Advanced French Literature 3.0 Credits

Continues FREN 332. Provides advanced study of French literature. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 340 Introduction to Power and Resistance 3.0 Credits

This course provides an introduction to the analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C]

FREN 350 Introduction to Language, Media, and Society 3.0 Credits

This course provides an introduction to the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C]

FREN 351 Introduction to Business and Professional French 3.0 Credits

Provides intensive oral practice and written work in business, professional, and commercial French. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 352 Business and Professional French 3.0 Credits

Advanced Business and Professional French. Advanced practice in oral and written French for business and the professions. Based on advanced texts, periodicals, and technical journals.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 353 Advanced Business and Professional French 0.5-20.0 Credits

Provides advanced study in business and professional terminology, with emphasis on the structure and protocols of the business world. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 160 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 371 Special Studies in French Civilization and Culture 3.0 Credits

Presents an integrated approach in French to the civilization, culture, history, and literature specific to the areas in which the language is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 410 Advanced Grammar and Translation 3.0 Credits

This course provides advanced grammar instruction and fosters translation and communication skills within a contemporary cultural context. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 411 [WI] Special Studies in Advanced French Stylistics 3.0 Credits

Particularly recommended for students who have proficiency status, French minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FREN 312 [Min Grade: C]

FREN 420 Advanced Studies in Language for the Professions 3.0 Credits

French 420 provides an advanced communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. The content of FREN 420 may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 430 Advanced Studies in Identities and Communities 3.0 Credits

French 430 provides an advanced analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of FREN 430 may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 431 [WI] Special Studies in Advanced French Literature 3.0 Credits

Particularly recommended for students who have proficiency status, French minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FREN 312 [Min Grade: C]

FREN 440 Advanced Studies in Power and Resistance 3.0 Credits

French 440 provides an advanced analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of FREN 440 may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 450 Advanced Studies in Language, Media, and Society 3.0 Credits

French 450 provides an advanced analysis of the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of FREN 450 may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 451 Special Studies in Advanced Business and Professional French 3.0 Credits

Continues FREN 353, with emphasis on the structure and protocols of the European Union. Particularly recommended for students who have proficiency status, French minors, and students interested in graduate study and/or international careers. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FREN 312 [Min Grade: D]

FREN 471 [WI] Special Studies in French Civilization 3.0 Credits

Presents an integrated approach, at the advanced level, to the civilization, culture, history, and literature of a given period specific to the areas in which French is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FREN 312 [Min Grade: C]

FREN 480 French Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

FREN I199 Independent Study in FREN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN I299 Independent Study in FREN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN I399 Independent Study in FREN 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN I499 Independent Study in FREN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN T180 Special Topics in French 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN T280 Special Topics in French 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN T380 Special Topics in French 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN T480 Special Topics in French 0.5-12.0 Credits

Recommended for French minors and for students with proficiency status.

Offered all terms. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 96 credits

Minor in German

About the Program

In our globalized world, intercultural and multilingual communication is an indispensable asset for the 21st century citizen and worker. As part of the Department of Global Studies and Modern Languages, we offer language instruction rooted in communication and embedded in authentic cultural contexts. Language study opens a world of opportunities for our students, from co-ops and study abroad programs to engagement with global communities here in Philadelphia. Media and technology, as well as travel and commerce, make the study of languages more crucial than ever, for tackling global challenges such as climate change and inequality demand that our students communicate across languages and cultures.

The German minor requires a minimum of 24 credits above German 103, including at least 12 credits above German 310, and at least one 400 level course. Students can choose from the following 300 and 400 level courses.

GER 201	German IV
GER 202	German V
GER 310	Advanced Writing and Speaking
GER 320	Introduction to Language for the Professions

GER 330	Introduction to Identities and Communities
GER 340	Introduction to Power and Resistance
GER 350	Introduction to Language, Media, and Society
GER 410	Advanced Grammar and Translation
GER 420	Advanced Studies in Language for the Professions
GER 430	Advanced Studies in Identities and Communities
GER 440	Advanced Studies in Power and Resistance
GER 450	Advanced Studies in Language, Media, and Society

Courses

GER 101 German I 4.0 Credits

Introductory German. Includes listening, reading, writing, and speaking. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GER 102 German II 4.0 Credits

Continues GER 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 101 [Min Grade: C]

GER 103 German III 4.0 Credits

Continues GER 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 102 [Min Grade: C]

GER 201 German IV 4.0 Credits

Intermediate German. Includes grammar review, listening, speaking, and reading. Recommended for students who wish to attain oral competence. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 103 [Min Grade: C]

GER 202 German V 4.0 Credits

Continues GER 201. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 201 [Min Grade: C]

GER 203 German VI: Conversation & Composition 4.0 Credits

Provides intensive practice in comprehension and written and oral communication. Emphasizes development of writing skills and increased oral competence in everyday situations. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 202 [Min Grade: C]

GER 310 Advanced Writing and Speaking 4.0 Credits

This course provides advanced practice in written and oral communication, including journalistic, professional, and creative writing. Examines contemporary cultural contexts through media and news. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 202 [Min Grade: C]

GER 311 [WI] Introduction to German Stylistics 3.0 Credits

Provides advanced practice in comprehension and written and oral communication, based primarily on periodicals and contemporary media. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 203 [Min Grade: C]

GER 312 [WI] German Stylistics 3.0 Credits

Continues GER 311. Provides extensive study of the techniques of translation and communication. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 311 [Min Grade: C]

GER 313 [WI] Advanced German Stylistics 3.0 Credits

Continues GER 312. Provides advanced training in oral and written communication in German. Particularly recommended for students who have pre-proficiency status, German minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 312 [Min Grade: C]

GER 320 Introduction to Language for the Professions 3.0 Credits

This course provides an introduction to communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

GER 330 Introduction to Identities and Communities 3.0 Credits

This course provides an introduction to the analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C]

GER 331 Introduction to Studies in German Literature 3.0 Credits

Advanced German. Reading, writing, and extensive conversational practice, based on masterpieces of German literature.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 332 Studies in German Literature 3.0 Credits

Includes reading and oral and written analysis of representative texts in German literature, including familiarization with the historical and cultural contexts. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 333 Advanced German Literature 3.0 Credits

Continues GER 332. Provides advanced study of German literature. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 340 Introduction to Power and Resistance 3.0 Credits

This course provides an introduction to the analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C]

GER 350 Introduction to Language, Media, and Society 3.0 Credits

This course provides an introduction to the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C]

GER 351 Introduction to Business and Professional German 3.0 Credits

Provides intensive oral practice and written work in business, professional, and commercial German. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 352 Business and Professional German 3.0 Credits

Advanced business and professional German. Advanced practice in oral and written German for business and the professions. Based on advanced texts, periodicals, and technical journals.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 353 Advanced Business and Professional German 3.0 Credits

Provides advanced study in business and professional terminology, with emphasis on the structure and protocols of the business world. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 371 Special Studies in German Civilization & Culture 3.0 Credits

Presents an integrated approach in German to the civilization, culture, history, and literature specific to the areas in which the language is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 410 Advanced Grammar and Translation 3.0 Credits

German 410 provides advanced grammar instruction and fosters translation and communication skills within a contemporary cultural context. The content of GER 410 may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 411 [WI] Special Studies in Advanced German Stylistics 3.0 Credits

Continues GER 313. Particularly recommended for students who have proficiency status, German minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: GER 312 [Min Grade: C]

GER 420 Advanced Studies in Language for the Professions 3.0 Credits

This course provides advanced communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 430 Advanced Studies in Identities and Communities 3.0 Credits

This course provides an advanced analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 431 [WI] Special Studies in Advanced German Literature 3.0 Credits

Continues GER 333. Particularly recommended for students who have proficiency status, German minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: GER 312 [Min Grade: C]

GER 440 Advanced Studies in Power and Resistance 3.0 Credits

This course provides an advanced analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 450 Advanced Studies in Language, Media, and Society 3.0 Credits

This course provides an advanced analysis of the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 451 Special Studies in Advanced Business and Professional German 3.0 Credits

Continues GER 353, with emphasis on the structure and protocols of the European Union. Particularly recommended for students who have proficiency status, German minors, and students interested in graduate study and/or international careers. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: GER 312 [Min Grade: C]

GER 471 [WI] Special Studies in German Civilization 3.0 Credits

Presents an integrated approach, at the advanced level, to the civilization, culture, history, and literature of a given period specific to the areas in which German is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: GER 312 [Min Grade: C]

GER 480 German Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GER I199 Independent Study in GER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER I299 Independent Study in GER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER I399 Independent Study in GER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER I499 Independent Study in GER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER T180 Special Topics in German 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER T280 Special Topics in Germany 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER T380 Special Topics in German 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER T480 Special Topics in German 0.5-12.0 Credits

Recommended for German minors and for students with proficiency status. Offered all terms. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Minor in Human Factors and Ergonomics

Note: Effective Fall 2015, students will no longer be accepted into this minor.

This minor is intended to meet the needs of the students who have an interest in any type of design and who recognize the importance of taking account of human characteristics, both strengths and weaknesses, in the design of artifacts intended for human use (e.g., equipment, computer software, consumer products, and even entire work environments).

The minor should also be of particular interest to students who have an interest in doing graduate work in human factors, ergonomics, industrial design, etc.

Entry into the minor requires that general psychology (or an equivalent introductory course) be taken as a prerequisite. Students who have completed PSY 101 and who are interested in a minor in Psychology are expected to meet with a Psychology Department faculty member to discuss the selection of appropriate courses. No more than three

courses that are required for a student's major can count towards fulfilling requirements for the minor.

Required Prerequisite

General Psychology course (PSY 101 or equivalent)

Required Courses

PSY 212	Physiological Psychology	3.0
PSY 213	Sensation and Perception	3.0
PSY 250 [WI]	Industrial Psychology	3.0
PSY 330	Cognitive Psychology	3.0
PSY 332	Human Factors and Cognitive Engineering	3.0
PSY 337	Human-Computer Interaction	3.0
PSY 360 [WI]	Experimental Psychology	3.0
BMES 330	Biological Rhythm in Pharmacology and Toxicology	3.0
Select one course from the following:		
BMES 350	Med & Bio Effects Of Light	
BMES 411	Chronoengineering I: Biological Rhythms in Health and Performance	
BMES 412	Chronoengineering II: Sleep Functions in Health and Performance	
PSY 150	Introduction to Social Psychology	
PSY 230	Psychology of Learning	
PSY 310	Drugs & Human Behavior	
PSY 340	Psychological Testing and Assessment	
PSY 350	Advanced Social Psychology	
Total Credits		24.0

Minor in Italian

Note: Effective Fall 2015, students will no longer be accepted into this minor.

About the Program

In our globalized world, intercultural and multilingual communication is an indispensable asset for the 21st century citizen and worker. As part of the Department of Global Studies and Modern Languages, we offer language instruction rooted in communication and embedded in authentic cultural contexts. Language study opens a world of opportunities for our students, from co-ops and study abroad programs to engagement with global communities here in Philadelphia. Media and technology, as well as travel and commerce, make the study of languages more crucial than ever, for tackling global challenges such as climate change and inequality demand that our students communicate across languages and cultures.

The Italian language is a prominent Romance language spoken mostly in Italy, by approximately 60 million people. Italian is also spoken by substantial populations outside of Italy, including in Switzerland, South America (particularly Brazil, Uruguay, and Argentina), and former colonial regions in Africa (Somalia, Libya, and Eritrea).

All Italian language courses are oral-intensive (with additional hours required in the Language Lab) and all include individual oral examinations at the end of each term. In Western languages, enrollments are limited to 15 to 18 students in the first three years of study; fourth-year courses use a seminar format, with a usual enrollment of four to eight students.

Please contact Kate Hughes, Associate Director of the Department of Global Studies and Modern Languages, for more information about the Italian minor: khughes@drexel.edu

Courses

ITAL 101 Italian I 4.0 Credits

Introductory Italian. Includes listening, speaking, reading, and writing. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ITAL 102 Italian II 4.0 Credits

Continues ITAL 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 101 [Min Grade: C]

ITAL 103 Italian III 4.0 Credits

Continues ITAL 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 102 [Min Grade: C]

ITAL 201 Italian IV 4.0 Credits

Intermediate Italian. Includes grammar review, listening, speaking, and reading. Recommended for students who wish to attain oral competence based on standard usage. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 103 [Min Grade: C]

ITAL 202 Italian V 4.0 Credits

Continues ITAL 201. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 201 [Min Grade: C]

ITAL 203 Italian VI: Conversation and Composition 4.0 Credits

Provides intensive practice in comprehension and written and oral communication. Emphasizes development of writing skills and increased oral competence in everyday situations. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 202 [Min Grade: C]

ITAL 310 Advanced Grammar and Translation 4.0 Credits

Provides advanced practice in written and oral communication, including journalistic, professional, and creative writing. Examines contemporary cultural contexts through media and news. Taught in Italian.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 202 [Min Grade: C]

ITAL 311 [WI] Introduction to Italian Stylistics 3.0 Credits

Provides advanced practice in comprehension and written and oral communication, based primarily on periodicals and contemporary media. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 203 [Min Grade: C]

ITAL 312 [WI] Italian Stylistics 3.0 Credits

Continues ITAL 311. Provides extensive study of the techniques of translation and communication. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 311 [Min Grade: C]

ITAL 313 [WI] Advanced Italian Stylistics 3.0 Credits

Continues ITAL 312. Provides advanced training in oral and written communication in Italian. Particularly recommended for students who have pre-proficiency status, Italian minors and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 331 Introduction to Italian Literature Studies 3.0 Credits

Advanced Italian. Reading, writing, and extensive conversational practice, based on masterpieces of Italian literature.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 333 Advanced Italian Literature 3.0 Credits

Continues ITAL 332. Provides advanced study of Italian literature. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 351 Introduction to Business and Professional Italian 3.0 Credits

Provides intensive oral practice and written work in business, professional, and commercial Italian. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 352 Business and Professional Italian 3.0 Credits

Advanced business and professional Italian. Advanced practice in oral and written Italian for business and the professions. Based on advanced texts, periodicals, and technical journals.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 371 Special Studies in Italian Civilization and Culture 3.0 Credits

Presents an integrated approach in Italian to the civilization, culture, history, and literature specific to the areas in which the language is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 411 [WI] Special Studies in Advanced Italian Stylistics 3.0 Credits

Continues ITAL 313. Particularly recommended for students who have proficiency status, Italian minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 431 [WI] Special Studies in Advanced Italian Literature 3.0 Credits

Continues ITAL 333. Particularly recommended for students who have proficiency status, Italian minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 451 Special Studies in Advanced Business and Professional Italian 3.0 Credits

Continues ITAL 353, with emphasis on the structure and protocols of the European Union. Particularly recommended for students who have proficiency status, Italian minors, and students interested in graduate study and/or international careers. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 471 [WI] Special Studies in Italian Civilization 3.0 Credits

Presents an integrated approach, at the advanced level, to the civilization, culture, history, and literature of a given period specific to the areas in which Italian is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 480 Italian Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ITAL I199 Independent Study in ITAL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL I299 Independent Study in ITAL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL I399 Independent Study in ITAL 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL I499 Independent Study in ITAL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL T180 Special Topics in Italian 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL T280 Special Topics in ITAL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL T380 Special Topics in Italian 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL T480 Special Topics in Italian 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 96 credits

Minor in Japanese

About the Program

In our globalized world, intercultural and multilingual communication is an indispensable asset for the 21st century citizen and worker. As part of the Department of Global Studies and Modern Languages, we offer language instruction rooted in communication and embedded in authentic cultural contexts. Language study opens a world of opportunities for our students, from co-ops and study abroad programs to engagement with global communities here in Philadelphia. Media and technology, as well as travel and commerce, make the study of languages more crucial than ever, for tackling global challenges such as climate change and inequality demand that our students communicate across languages and cultures.

The Japanese minor requires 24.0 credits of language study above Japanese 105. Students can choose from the following course options. 24.0

JAPN 201	Japanese IV
JAPN 202	Japanese V
JAPN 203	Japanese VI
JAPN 204	Japanese Writing III
JAPN 301	Japanese VII
JAPN 302	Japanese VIII

JAPN 303	Japanese IX
JAPN 411	Introduction to Japanese Stylistics
JAPN 451	Introduction to Business and Professional Japanese

Courses

JAPN 101 Japanese I 4.0 Credits

Introductory Japanese. Includes listening and speaking, with individual audiolingual practice. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JAPN 102 Japanese II 4.0 Credits

Continues JAPN 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 101 [Min Grade: C]

JAPN 103 Japanese III 4.0 Credits

Continues JAPN 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 102 [Min Grade: C]

JAPN 104 Japanese Writing I 3.0 Credits

This course focuses on reading and writing in the Japanese language.

The course introduces the basic elements of the Japanese writing systems, which include Katakana, Hiragana and Kanji.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 101 [Min Grade: C] and JAPN 102 [Min Grade: C]

JAPN 105 Japanese Writing II 3.0 Credits

This course focuses on reading and writing in the Japanese language.

The course builds on lessons from Japanese Writing I.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 104 [Min Grade: C]

JAPN 201 Japanese IV 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on Japanese 103.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 103 [Min Grade: C]

JAPN 202 Japanese V 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on JAPN 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 201 [Min Grade: C]

JAPN 203 Japanese VI 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on JAPN 202.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 202 [Min Grade: C]

JAPN 204 Japanese Writing III 3.0 Credits

This course focuses on reading and writing in the Japanese language.

The course builds on lessons from Japanese Writing I and II.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 105 [Min Grade: C]

JAPN 301 Japanese VII 3.0 Credits

Advanced Japanese. Provides reading, writing, and extensive conversational practice. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 203 [Min Grade: C]

JAPN 302 Japanese VIII 3.0 Credits

Provides advanced practice in translation, comprehension, and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 301 [Min Grade: C]

JAPN 303 Japanese IX 3.0 Credits

Continues JAPN 302. Offered as needed and with sufficient enrollment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 302 [Min Grade: C]

JAPN 411 Introduction to Japanese Stylistics 3.0 Credits

Fourth year of Japanese. Provides advanced practice in comprehension and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: JAPN 303 [Min Grade: C]

JAPN 451 Introduction to Business and Professional Japanese 3.0 Credits

Fourth year of Japanese. Provides intensive oral practice and written work in business, professional, and commercial Japanese. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: JAPN 303 [Min Grade: C]

JAPN 480 Japanese Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JAPN I199 Independent Study in JAPN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN I299 Independent Study in JAPN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN I399 Independent Study in JAPN 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN I499 Independent Study in JAPN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN T180 Special Topics in Japanese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN T280 Special Topics in Japanese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JAPN T380 Special Topics in Japanese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JAPN T480 Special Topics in JAPN 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

The Louis Stein Minor in Judaic Studies

The Louis Stein Minor in Judaic Studies, housed within the College of Arts and Sciences, is designed to give students the opportunity to explore and understand the history, culture, politics, and religion of the Jewish people. Through interdisciplinary coursework and directed field study, students investigate the Jewish experience from both a contemporary and a historical perspective.

The Louis Stein Minor in Judaic Studies requires 24.0 credits: 11.0 from required courses, and 13.0 from electives. Students can apply a maximum of 6.0 credits toward the minor from field study under the supervision of the academic advisor.

Required Courses

JUDA 201	Jewish Literature and Civilization *	3.0
JUDA 202	Jewish Life and Culture in the Middle Ages **	4.0
JUDA 203	Modern Jewish History †	4.0
Minor electives		13.0
Total Credits		24.0

* Offered concurrently with ENGL 350 Jewish Literature and Civilization.

** Offered concurrently with HIST 253 Jewish Life and Culture in the Middle Ages.

† Offered concurrently with HIST 249 Modern Jewish History.

Courses offered as electives have included:

- JUDA 211 American Jewish Experience
- JUDA 212 [WI (<http://catalog.drexel.edu/undergraduate/collegeofartsandsciences/judaicstudies>)] Contemporary Jewish Life
- JUDA 213 Jewish Cultural Tapestry
- JUDA 214 Language and Cultural Diversity in the USA
- JUDA 215 Reconstructing History After Genocide
- JUDA 216 Yiddish Literature and Culture
- JUDA 280 Special Topics in Judaic Studies
- JUDA 298 Field Work in Judaic Studies
- JUDA I299 Independent Study in Judaic Studies
- ANTH 120 Biblical Archeology of Israel and Jordan
- ANTH 380 Special Topics in Anthropology (When offered as Archeology of the Middle East)
- HBRW 101 Introduction to Hebrew I
- HBRW 102 Introduction to Hebrew II
- HBRW 103 Introduction to Hebrew III
- HBRW 201 Intermediate Hebrew IV
- HBRW 202 Intermediate Hebrew V
- HBRW 203 Intermediate Hebrew VI
- ENGL 395 [WI (<http://catalog.drexel.edu/undergraduate/collegeofartsandsciences/judaicstudies>)] Special Studies in Literature (When offered as Jewish Women in Literature and History)
- ENGL 323 Literature and Other Arts (When offered as Holocaust Testimonies)
- ENGL 345 American Ethnic Literature (When offered as Jewish American Writers)
- ENGL 325 Topics as World Literature (When offered as Israeli Literature & Culture, or as Yiddish Literature & Culture)
- LANG 180 Special Topics in Languages (When offered as Yiddish Language I)
- LANG 180 Special Topics in Languages (When offered as Yiddish Language II)

For more information about the Louis Stein Minor in Judaic Studies, please contact:

Kathleen Carll
Associate Director
Judaic Studies Program
215-895-6388
judaicstudies@drexel.edu

Professor Rakhmiel Peltz
Director of Judaic Studies
215-895-1499

rakhmiel.peltz@drexel.edu

The Judaic Studies Program offices are located in Room 331 of Hagerty Library.

Courses

JUDA 201 Jewish Literature and Civilization 3.0 Credits

This course explores the origins of the Jewish people and their core narratives and beliefs that have become the foundations of Jewish civilization and religion, introducing the first five books of the Torah, the Jewish Bible and analyzing its influence. Major events of the Jewish lifecycle and calendar are examined.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 202 Jewish Life and Culture in the Middle Ages 4.0 Credits

This course is an introductory survey of the history of the Jewish people, their civilization, religion and contacts with other cultures in medieval times. Topics will include the rise of Christianity and Islam, the Talmud, Jewish mysticism and the growth of Ashkenazic and Sephardic Jewry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 203 Modern Jewish History 4.0 Credits

This course is an exploration of the social, cultural, political and religious forces that have shaped Jewry the world over from the 18th to the 20th centuries. Topics will include Emancipation and Enlightenment, modern religious movements, socialism, Hebrew and Yiddish literature, the Holocaust, Zionism and the state of Israel.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 211 American Jewish Experience 3.0 Credits

The course explores communal organization of Jews in America from colonial times until today. Topics include westward expansion, urban neighborhoods, American Jewish religion and culture, and Jewish contributions to American culture. The study of this ethno-religious group elucidates historical issues, such as the immigration legacy, minority rights, discrimination, and intermarriage.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 212 [WI] Contemporary Jewish Life 3.0 Credits

The course will analyze Jewish social, cultural, and religious activities since the 1970s through four ethnographic community studies and documentary films, aiming to understand the meaning that Jews derive from their beliefs, rituals, and institutions. We will stress identity development over the lifespan and historical issues since the Holocaust and the establishment of the State of Israel.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 213 Jewish Cultural Tapestry 3.0 Credits

The course examines the different customs and traditions of Jews in various parts of the world throughout history. How do minorities develop and maintain their group identity? How have the Jews evolved both diversity and uniformity of practice and ideology? The focus will be on the geography and history of folk traditions: language, religious practice, foodways, dress, and music. The class will examine the phenomenon of diaspora, the dispersion of a people from its homeland, and will analyze the shared religious culture and the parallel, local specific culture.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 214 Language and Cultural Diversity in the USA 3.0 Credits

Starting with research on communication patterns of men and women, moving on to the language diversity of African Americans, and then emphasizing the cultural production of various immigrant groups, the predominance of a rich array of languages and cultures will be shown to pertain to most periods of American history. The Yiddish language-based immigrant culture of American Jews will be treated as a case study, dwelling on the rich Yiddish literature created, as well as language-based cultural institutions, such as the press, theater, radio, klezmer music, and film.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 215 Reconstructing History After Genocide 3.0 Credits

The course explores educational restitution to peoples who are victims of genocide. After conceptualizing the world's responsibility to maintain its cultures and help victims of genocide to recover their history, the class will compare educational efforts to document life before the destruction in places such as Rwanda, the former Yugoslavia and among Native Americans. Our main focus will be the politics of teaching about Polish Jewry, the largest community of Jews before WW II that was destroyed by the Nazis in the Holocaust. Students will evaluate sources that describe Jewish life in one city, Lublin, Poland.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 216 Yiddish Literature & Culture 3.0 Credits

The course describes the major Jewish culture during the past thousand years. In a lively course stressing the arts and everyday family life, students will be introduced to the multi-faceted Yiddish language and culture. Through study and meetings with community members, students learn how Yiddish both reflects and gives meaning to life. Texts will include English translations of proverbs, folktales, folksongs, prayers, epics, personal diaries, memoirs, drama, films, memorial literature, modern fiction and poetry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 280 Special Topics in Judaic Studies 3.0 Credits

In this course, students will explore specific areas not covered in the regularly offered Judaic Studies courses. The course will be taught by teaching faculty members of the Judaic Studies Program, Drexel professors who are members of the Judaic Studies Faculty Committee, or by visiting professors. This is a three-credit elective course for the Louis Stein Judaic Studies Minor. It may also be used as a free elective course for a variety of students.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

JUDA 298 Field Work in Judaic Studies 3.0 Credits

In this course, students will do independent fieldwork within a Jewish communal organization in the USA or abroad, or ethnographic or archeological fieldwork. The plan of the work, weekly time commitment, and periodic reports will be agreed upon in advance by the student and Professor Peltz, Director of Judaic Studies, or another Drexel Judaic Studies faculty member. This is a three-credit elective course for the Louis Stein Judaic Studies Minor. It may also be used as a free elective course for a variety of students.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

JUDA I199 Independent Study in JUDA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA I299 Independent Study in JUDA 3.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

JUDA I399 Independent Study in JUDA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA I499 Independent Study in JUDA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA T180 Special Topics in Judaic Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA T280 Special Topics in Judaic Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA T380 Special Topics in Judaic Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA T480 Special Topics in Judaic Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Minor in Korean

About the Program

In our globalized world, intercultural and multilingual communication is an indispensable asset for the 21st century citizen and worker. As part of the Department of Global Studies and Modern Languages, we offer language instruction rooted in communication and embedded in authentic cultural contexts. Language study opens a world of opportunities for our students, from co-ops and study abroad programs to engagement with global communities here in Philadelphia. Media and technology, as well as travel and commerce, make the study of languages more crucial than ever, for tackling global challenges such as climate change and inequality demand that our students communicate across languages and cultures.

The Korean minor requires 24 credits of language study above Korean 103

KOR 101	Korean I	4.0
KOR 102	Korean II	4.0
KOR 103	Korean III	4.0
KOR 201	Korean IV	4.0
KOR 202	Korean V	4.0
KOR 203	Korean VI	4.0
KOR 301	Korean VII	3.0
KOR 302	Korean VIII	3.0
KOR 303	Korean IX	3.0
KOR T280	Special Topics in Korean	12.0
KOR T380	Special Topics in Korean	12.0

Minor in Neuroscience

About the Program

The Neuroscience minor allows students from a vast array of disciplines the opportunity for formalized study in Neuroscience. This interdisciplinary minor integrates content from cellular, molecular, and systems neurobiology with neuropsychology, providing students with a strong foundation in basic principles of neurobiology and neuropsychology. This minor is a collaborative effort between Biology and Psychology, but is open to students in any major with an interest gaining a deeper understanding of the biological and cognitive principles underlying brain function.

Required Courses

BIO 348	Neuroscience: From Cells to Circuits	3.0
BIO 349	Behavioral Neuroscience	3.0
PSY 312	Cognitive Neuroscience	3.0
PSY 410	Neuropsychology	3.0

Biology and Psychology Electives *

Select 2 BIO courses		6.0
BIO 414	Behavioral Genetics	
BIO 461	Neurobiology of Autism Disorders	
BIO 462	Biology of Neuron Function	
BIO 463	Molecular Mechanisms of Neurodegeneration	
BIO 465	Neurobiology of Disease	
Select 2 PSY courses		6.0
PSY 212	Physiological Psychology	
PSY 213	Sensation and Perception	
PSY 310	Drugs & Human Behavior	
PSY 325	Psychology of Learning	
PSY 330	Cognitive Psychology	

PSY 336	Psychology of Language	
Total Credits		24.0

A grade of "C" or better must be earned for each course in this minor to meet the requirements.

* 3 credits of research in neuroscience as BIO 497 or PSY 499 can be substituted for 1 elective in either of the categories

Minor in Nonprofit Communication

About the Program

The minor in nonprofit communication is a 24.0 credit curriculum designed to familiarize students with general communication theory and practice while providing training in print and electronic communication skills peculiar to the nonprofit sector. In addition to conventional course work this minor will include a practicum in the form of a 3.0 credit independent study (COM I399) for one term in which students will provide service and consultation for an area of nonprofit organization as selected and coordinated by Drexel Edits (<http://www.drexel.edu/coas/academics/departments-centers/communication/drexel-edits>), the university's center for the support of nonprofit communication.

Core Courses

COM 181	Public Relations Principles and Theory	3.0
COM 375 [WI]	Grant Writing	3.0
COM 376	Nonprofit Communication	3.0
COM 377	Communication for Civic Engagement	3.0
COM 378	Public Service Campaigns	3.0
COM I399	Independent Study in COM	3.0
Choose at least 2 courses:		6.0

COM 160	Introduction to Journalism	
COM 265	Audio Journalism	
COM 270 [WI]	Business Communication	
COM 282 [WI]	Public Relations Writing	
COM 311	Dynamics of Interpersonal Communication	
COM 330	Professional Presentations	
COM 352	Social Media and Communication	
COM 363	Event Planning	
Total Credits		24.0

Minor in Politics

A Minor in Politics enriches almost every major. With a Minor in Politics, you can hone your analytical and critical thinking skills and take your understanding of political science and research methodology to your field of study.

Political science pairs well with economics, criminal justice, psychology, public health, history, anthropology, communications or education.

Required Courses

Select three of the following:		12.0
PSCI 100	Introduction to Political Science	
PSCI 110	American Government I	
PSCI 120	History of Political Thought	
PSCI 130	Research Design for Political Science	
PSCI 140	Introduction to Comparative Political Analysis	
PSCI 150	International Politics	

Political Science Electives

12.0 credits of any additional 200-level or higher PSCI courses.		12.0
Total Credits		24.0

Minor in Russian

About the Program

In our globalized world, intercultural and multilingual communication is an indispensable asset for the 21st century citizen and worker. As part of the Department of Global Studies and Modern Languages, we offer language instruction rooted in communication and embedded in authentic cultural contexts. Language study opens a world of opportunities for our students, from co-ops and study abroad programs to engagement with global communities here in Philadelphia. Media and technology, as well as travel and commerce, make the study of languages more crucial than ever, for tackling global challenges such as climate change and inequality demand that our students communicate across languages and cultures.

The Russian minor requires 24.0 credits of language study above Russian 103. Students can choose from the following course options. 24.0

RUSS 201	Russian IV
RUSS 202	Russian V
RUSS 203	Russian VI
RUSS 301	Russian VII
RUSS 302	Russian VIII
RUSS 303	Russian IX
RUSS 411	Introduction to Russian Stylistics
RUSS 431	Introduction to Russian Literature
RUSS 451	Introduction to Business & Professional Russian

Minor in Science, Technology and Society

The minor in Science, Technology and Society [STS] allows students to explore the cultural, ethical, historical, political, and institutional dimensions of science, medicine, and technology. By taking courses in different disciplines, students develop an interdisciplinary approach that empowers them to critically analyze the social dimensions of science, medicine, and technology. Science, technology and society (STS) programs, also called science and technology studies (STS), are growing in the US and worldwide. The ability to critically identify the values and incentives built into scientific knowledge and technology design and use is highly valued in settings such as health care organizations, government agencies, public policy realms, tech industries, and more.

For more information about this program, visit Drexel's Center for Science, Technology and Society (<http://drexel.edu/coas/academics/departments-centers/science-technology-society>) page.

Select 6 - 8 classes from the list below, with a minimum of 24 credits. At least 3 different subject areas must be represented among these classes. 24.0

ANTH 330	Media Anthropology
ANTH 345	Visual Anthropology
ANTH 355	Anthropology of Cyberspace
ANTH 360	Culture and the Environment
ARCH 315	Sustainable Built Environment I
BIO 112	Biotechnology for Society
BIO 312	Genetically Modified Foods
COM 240	New Technologies In Communication
COM 351	Computer Mediated Communication
COM 352	Social Media and Communication
ENGL 300 [WI]	Literature & Science

ENGL 302	Environmental Literature
ENGL 303	Science Fiction
ENGL 370	Topics in Literature and Medicine
INTR 310	Sustainability: History, Theory and Critic
HIST 283	Technology and Identity
HIST 285	Technology in Historical Perspective
HIST 287	History of Science: Ancient to Medieval
HIST 288	History of Science: Medieval to Enlightenment
HIST 289	History of Science: Enlightenment to Modernity
HIST 290	Technology and the World Community
HIST 291	Global History of Engineering
HIST 292	Technology in American Life
HIST 320	Disaster in Global History
HIST 321	Themes in Global Environmental History
HIST 340	History of Bodies in Science, Technology, and Medicine
HIST 341	Disabilities in History
HIST 385	Transnational History of Science, Technology and Environment
PHIL 111	Symbolic Logic I
PHIL 207	Symbolic Logic II
PHIL 311	Ethics and Information Technology
PHIL 321	Biomedical Ethics
PHIL 322	Ethics of Human Enhancement
PHIL 340	Environmental Ethics
PHIL 341	Philosophy of the Environment
PHIL 351	Philosophy of Technology
PHIL 355	Philosophy of Medicine
PHIL 361	Philosophy of Science
PSCI 331	Environmental Politics
PSCI 334	Politics of Environment and Health
PSCI 369	The Politics of Food
PSCI 371	Science, Technology, & Public Policy
PBHL 302	Introduction to the History of Public Health
PSY 332	Human Factors and Cognitive Engineering
PSY 337	Human-Computer Interaction
SOC 235	Sociology of Health and Illness
SOC 250	Research Methods I
SOC 312	Topics in Sociology of Science and Technology
SOC 326	Cities and Sustainability
SOC 341	Environmental Movements in America
SOC 345	Sociology of the Environment
SOC 346	Environmental Justice
SOC 349	Sociology of Disasters
WGST 225	Women & Human Rights Worldwide

Minor in Spanish

About the Program

In our globalized world, intercultural and multilingual communication is an indispensable asset for the 21st century citizen and worker. As part of the Department of Global Studies and Modern Languages, we offer language instruction rooted in communication and embedded in authentic cultural contexts. Language study opens a world of opportunities for our students, from co-ops and study abroad programs to engagement with global communities here in Philadelphia. Media and technology, as well as travel and commerce, make the study of languages more crucial than ever, for tackling global challenges such as climate change and inequality demand that our students communicate across languages and cultures.

The Spanish minor requires a minimum of 24 credits above SPAN 103, including at least 12 credits above SPAN 310, and at least one 400 level course. Students can choose from the following 300 and 400 level courses.

24.0

SPAN 201	Spanish IV
SPAN 202	Spanish V
SPAN 310	Advanced Writing and Speaking
SPAN 320	Introduction to Language for the Professions
SPAN 330	Introduction to Identities and Communities
SPAN 340	Introduction to Power and Resistance
SPAN 350	Introduction to Language, Media, and Society
SPAN 410	Advanced Grammar and Translation
SPAN 420	Advanced Studies in Language for the Professions
SPAN 430	Advanced Studies in Identities and Communities
SPAN 440	Advanced Studies in Power and Resistance
SPAN 450	Advanced Studies in Language, Media, and Society

Minor in Women's and Gender Studies

The minor in women's and gender studies is intended to give students a broad, interdisciplinary understanding of the ways in which gender interacts with race, age, class, and sexual orientation to shape human consciousness and the social, political, and cultural organization of society. In addition, the minor is intended to enrich the educational experience of students. It may also provide both men and women with tools for understanding and coping with the larger societal systems in which they must operate as both students and professionals.

Because business and industry are increasingly sensitive to issues such as sex discrimination, sexual harassment, equal pay for comparable work, parental leave, and day care, students with a minor in women's studies will have a definite edge over other applicants for managerial and policy-making positions.

Required Courses

WGST 101	Introduction to Women's and Gender Studies	3.0
WGST 201	Introduction to Feminisms	3.0

Choose one of the following three theory courses

WGST 301	Sex, Gender, Feminism: A Seminar in Feminist Theories	3.0
WGST 308	Queer Theory	
WGST 320	Masculinities	

Students must complete at least 15 credits of elective courses:

AFAS 255	Gender & Black Popular Culture	15.0
ANTH 215	Anthropology of Gender	
ANTH 365	Family and Kinship	
ARTH 340	Women in Art	
COM 246	Media and Identity	
CJS 274	Sex, Violence, & Crime on the Internet	
CJS 362	Gender, Crime, and Justice	
CJS 275	Issues in Domestic Violence	
ENGL 355 [WI]	Women and Literature	
GST 225	Women and Human Rights Worldwide	
GST 230	Women Arab Writers	
GST 235	African Francophone Women Writers	
HIST 208	Women in American History	
HIST 283	Technology and Identity	
PBHL 305	Women and Children: Health & Society	
PHIL 255	Philosophy of Sex & Love	
PSY 356	Women's Health Psychology	
SMT 254	Women & Minority Opportunities in Sport	
SMT 255	Legal Foundations of Title IX	
SOC 222	Sex and Society	
SOC 230	Gender and Society	
WGST 220	Writing on the Body	

WGST 225	Women & Human Rights Worldwide
WGST 230	Arab Women Writers
WGST 235	African Francophone Women Writers: Displacement. From One Continent To Another
WGST 240	Women and Society in a Global Context
WGST 255	Gender and Black Popular Culture
WGST 260	Gender and Judaism
WGST 270	Cigarettes and High Heels
WGST 275	Women's Health and Human Rights
WGST T280	Special Topics in Women's and Gender Studies
WGST I299	Independent Study in Women's and Gender Studies
WGST 301	Sex, Gender, Feminism: A Seminar in Feminist Theories
WGST 308	Queer Theory
WGST 320	Masculinities
WGST 324	Retail Intersections: Social & Cultural Issues
WGST T380	Special Topics in Women's and Gender Studies
WGST T480	Special Topics in Women's and Gender Studies
Total Credits 24.0	

Minor in Writing

The minor in writing invites students from all disciplines to develop their writing skills and further their abilities to think critically and creatively by encouraging them to make connections beyond the scope of their discipline.

Students who complete the writing minor will:

- obtain a strong background in theoretical perspectives and practices of writing and rhetoric, as well as reading;
- be able to select additional writing courses in a variety of areas of interest;
- achieve a better understanding of writing within their major fields of study;
- gain significant practice and experience in writing in many genres and rhetorical modes;
- be better positioned to succeed as writers in their future professional and personal endeavors.

Required Courses

ENGL 340 [WI]	Classical Rhetoric	3.0
WRIT 225 [WI]	Creative Writing	3.0
WRIT 312 [WI]	The Practice of Professional Writing	3.0
COM 210	Theory and Models of Communication	3.0
or ANTH 350	Anthropology of Language	
or PHIL 305	Ethics and the Media	

Reading Courses

Select one of the following:		3.0
ENGL 200 [WI]	Classical to Medieval Literature	
ENGL 201	Renaissance to the Enlightenment	
ENGL 202 [WI]	Romanticism to Modernism	
ENGL 203 [WI]	Post-Colonial Literature I	
ENGL 204	Post-Colonial Literature II	
ENGL 205 [WI]	American Literature I	
ENGL 206 [WI]	American Literature II	
ENGL 207 [WI]	African American Literature	
ENGL 211 [WI]	British Literature I	
ENGL 212	British Literature II	
ENGL 214	Readings in Fiction	
ENGL 215 [WI]	Readings in Poetry	
ENGL 216 [WI]	Readings in Drama	
PHIL 105	Critical Reasoning	

PSCI 330	Public Opinion & Propaganda	
WRIT 210 [WI]	The Peer Reader in Context	
Theoretical Perspectives on Writing Courses		
Select one of the following:		3.0
ANTH 330	Media Anthropology	
ANTH 350	Anthropology of Language *	
CJS 377	Intellectual Property Theft in the Digital Age	
COM 220	Qualitative Research Methods	
COM 355	Ethnography of Communication	
EDUC 236	Early Literacy I	
EDUC 256	Teaching Writing Grades 4-8	
EDUC 326	Language Arts Processes [WI]	
ENGL 340 [WI]	Classical Rhetoric	
PHIL 305	Ethics and the Media *	
PSCI 335	Political Communication	
PSY 336	Psychology of Language	
Writing in Practice Courses		
Select two of the following:		6.0
COM 160	Introduction to Journalism	
COM 270 [WI]	Business Communication	
COM 310 [WI]	Technical Communication	
COM 320 [WI]	Science Writing	
COM 335	Electronic Publishing	
CULA 412	Food Writing	
DSMR 233	Retail Image Analysis [WI]	
FASH 467	Style and the Media	
SCRIP 220	Playwriting I	
SCRIP 225	Playwriting II	
SCRIP 270	Screenwriting I [WI]	
SCRIP 275	Screenwriting II [WI]	
SCRIP 350	TV Comedy Practicum	
SCRIP 353	TV Drama Practicum	
TVPR 220	TV News Writing	
WRIT 220 [WI]	Creative Nonfiction Writing	
WRIT 301 [WI]	Writing Poetry	
WRIT 302 [WI]	Writing Fiction	
WRIT 303	Writing Humor and Comedy	
WRIT 304 [WI]	Special Topics in Writing	
WRIT 306	Writing About the Media	
WRIT 310	Literary Editing & Publication	
WRIT 400 [WI]	Writing in Cyberspace	
Total Credits		24.0

* Courses marked with an asterisk are also listed as options for the 4th required course for the minor. A student who elects to take one of these courses may not count it twice (once as a required course and once as an elective). For example, a student who chooses to take ANTH 350, "Anthropology of Language," as a required course may not take it again as one of the electives; however, this student could take PHIL 305, "Communication Ethics," as an elective.

Certificate in Medical Humanities

Certificate Level: Undergraduate

Admission Requirements: Current Drexel students only

Certificate Type: Certificate

Number of Credits to Completion: 18.0

Instructional Delivery: Campus

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 24.0103

Standard Occupational Classification (SOC) Code: 25-1199

The Certificate Program in Medical Humanities is designed for students majoring in any of the biological sciences, health professions including biomedical engineering, nursing and public health, the humanities, and the social sciences, with the aim of promoting dialogue and mutual appreciation for various approaches to health related issues.

The wide range of applicable courses within designated disciplines fosters an interdisciplinary context for investigating the many challenges within medicine and caregiving. This format, in turn, encourages students to explore illness, disability, dying and healing as *human* experiences and to evaluate some of the limitations of an exclusively scientific perspective on medical practice and research.

A three credit introductory seminar (HUM 315) and a concluding Capstone Seminar (ENGL 470) further provide intellectual cohesiveness and a sense of community among students enrolled in the program. Both co-directors of the program and other student advisors will help students choose courses best suited for their personal and professional interests. Note that most courses applicable to the program also fulfill humanities electives for other majors and that courses may change as departments offer more options.

Opportunities

Those students who successfully complete the program will receive a certificate in medical humanities. This certificate highlights the student's proficiency in an interdisciplinary approach to health related issues not easily attainable through isolated courses.

Additional information

For additional information, contact the program directors:

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Required Courses

HUM 315	Perspectives in Medical Humanities	3.0
ENGL 470	Capstone Seminar in Medical Humanities	3.0
Select one of the following literature courses:		3.0
ENGL 360 [WI]	Literature and Society (Portrayals of Mental Disorders)	
ENGL 370	Topics in Literature and Medicine (Illness and Healing in Literature)	
ENGL 370	Topics in Literature and Medicine (The Physician in Literature and Film)	
ENGL 370	Topics in Literature and Medicine (Health Matters in Drama)	
Select one of the following philosophy courses:		3.0
PHIL 251	Ethics	
PHIL 321	Biomedical Ethics	
PHIL 355	Philosophy of Medicine	
PHIL 361	Philosophy of Science	
Select two courses from the following:		6.0

AFAS T380	Special Topics in Africana Studies (Race, Disease, and History)	
AFAS T380	Special Topics in Africana Studies (HIV/Aids in Africa)	
ANTH 210 [WI]	Worldview: Science, Religion and Magic	
ANTH 220	Aging In Cross-Cultural Perspective	
ARTH 320	Art in the Age of Technology	
ARTH 465 [WI]	Special Topics in Art History	
BIO 212	Biotechnology	
BMES 338	Biomedical Ethics and Law	
ENVS 321	Environmental Health	
HIST 280	History of Science: Ancient to Medieval	
HIST 285	Technology in Historical Perspective	
PSY 242	Psychology of Disability	
PSY 244	Culture and Personality	
PSY 252	Death and Dying	
PSY 356	Women's Health Psychology	
SOC 120	Sociology of the Family	
SOC 125	Sociology of Aging	
SOC 225	Sociology of Technology & Aging	
SOC 235	Sociology of Health and Illness	
Total Credits		18.0

Philosophy in Science and Technology Certificate

Certificate Level: Undergraduate

Admissions Requirements: Current Drexel students only

Certificate Type: Undergraduate

Number of Credits to Completion: 18.0

Instructional Delivery: Online, Campus, Hybrid

Calendar Type: Quarter

The Certificate in Philosophy in Science and Technology provides an excellent opportunity for undergraduate students in all majors to deepen and broaden their educational experience by enhancing and exercising their philosophical skills in relation to some of the most central issues and ideas related to science and technology.

Required Courses

PHIL 101	Introduction to Western Philosophy	3.0
PHIL 105	Critical Reasoning	3.0
PHIL 107	Philosophy and Knowledge Organization	3.0
PHIL 351	Philosophy of Technology	3.0
PHIL 355	Philosophy of Medicine	3.0
Select one of the following:		3.0
PHIL 361	Philosophy of Science	
PHIL 371	Philosophy of Social Sciences	
Total Credits		18.0

Courses

PHIL 101 Introduction to Western Philosophy 3.0 Credits

Introduces the main methods and aims of Western Philosophy, involving the study of problems central to metaphysics, theory of knowledge, and ethics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 102 Introduction to Eastern Philosophy 3.0 Credits

Introduction to the main topics of study in Buddhist, Hindu and other systems of Eastern thought.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 105 Critical Reasoning 3.0 Credits

Introduces and develops the skills involved in reasoning effectively about experience, and being able to distinguish strong arguments from weak ones.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 107 Philosophy and Knowledge Organization 3.0 Credits

This course imparts knowledge and skills associated with organizing concepts. The context for the course is the history of knowledge organization, viewed philosophically, with special emphasis on the Platonic, Cartesian, Kantian, Comtean and Digital paradigms. Students will learn to recognize the classical principles of knowledge organization and how to apply them using a "logic of concepts." Students will also come to understand how and why knowledge is organized the way it is in the modern university.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 111 Symbolic Logic I 3.0 Credits

An introduction to the fundamental concepts of symbolic logic: argument, validity, soundness, provability, completeness, consistency, decidability, entailment, logical equivalence, logical truth, logical contradiction. Covers truth-functional connectives, rules of formation and translation, and rules of inference. Proof techniques studied include natural deduction, truth-tables, and/or truth-trees.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 207 Symbolic Logic II 3.0 Credits

Concentrates on syntax and semantics of quantification. Formation principles include A, E, I, and O statements (and square of opposition), domain of discourse, quantifier scope, multiple quantification, relations, and identity. Proof mechanics covered include natural deduction, instantiation, semantic tableaux, and possible-world counterexamples. Also explored are the completeness, consistency, and decidability of first-order systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHIL 111 [Min Grade: D]

PHIL 210 Philosophy of Sport 3.0 Credits

Studies theories about philosophical issues arising in sport, in areas including its personal, social, aesthetic, and political dimensions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 211 Metaphysics 3.0 Credits

Studies theories about the nature of reality and philosophical issues such as the nature of time, mind, personal identity, and free will.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D]

PHIL 212 Ancient Philosophy 3.0 Credits

Studies central works that have shaped Western Philosophy and culture from the Ancient Greek era and its legacy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 214 Modern Philosophy 3.0 Credits

Studies central works that have shaped Western Philosophy and culture from the Renaissance through the late Nineteenth Century.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 215 Contemporary Philosophy 3.0 Credits

Studies central works that have had important impacts upon Western Philosophy and culture from the Twentieth Century through the present.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 216 Philosophy of Time 3.0 Credits

In this course we will study philosophical problems surrounding the nature of time. We will consider questions like, "Does the present exist?"; "Does time have a direction?"; "Are events pre-determined?"; "Is time travel possible?"; etc. Students will read and discuss treatments of these issues in philosophy, literature, and film.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 218 Philosophy of Mathematics 3.0 Credits

This course introduces the student to a critical analysis of the fundamental concepts, principles, and assumptions of mathematics. Included will be a consideration of the reality of mathematical "objects" (numbers, sets, functions), the nature of mathematical knowledge, the relationship between logic and mathematics, and other topics which may include the discussion of mathematical concepts of continuity and infinity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 221 Epistemology 3.0 Credits

Studies theories about knowledge that bear upon philosophical issues concerned with the nature and status of knowledge claims as expressed in concepts like belief, truth, and justification.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D]

PHIL 231 Aesthetics 3.0 Credits

Studies theories about art and the nature of beauty that bear on philosophical issues concerned with artistic production, performance, and perception, such as arise in activities like painting, sculpture, film literature, music, and dance.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 241 Social & Political Philosophy 3.0 Credits

Studies theories about human social and political life that bear on philosophical issues such as the nature and scope of justice, the legitimacy of states, and the relationship between democracy, civil rights, and civil disobedience.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 251 Ethics 3.0 Credits

Studies theories about human conduct which bear upon the rightness and wrongness of actions, and the goodness and badness of ends, including the nature, scope, purposes, and varieties of moral and ethical theories.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 255 Philosophy of Sex & Love 3.0 Credits

This course investigates sexual activity and desire, and the morality of sexual behavior. It also examines various types of love and their links with sexuality. Figures studied include Plato, Aristotle, Augustine, Aquinas, Kant, Kierkegaard, Freud and Foucault. Topics include marriage, prostitution, pornography, homosexuality, perversion, rape, intentionality, irreplaceability, unconditionality, reciprocity, and exclusivity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 301 Business Ethics 3.0 Credits

Study of such moral issues as truth-telling, puffery, and lying in business communications; employer-employee relations; obligations to customers; obligations to foreign populations; and government contracts.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 305 Communication Ethics 3.0 Credits

Ethical analysis of current laws and legislation aimed at regulating speech in the context of mass communications (radio, television and film).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 311 Computer Ethics 3.0 Credits

Ethical analyses of current laws and pending legislation aimed at regulating computer use as well as Internet practices and content.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 315 Engineering Ethics 3.0 Credits

Provides critical reflection on the nature of engineering and technology and on the ethical obligations and responsibilities unique to the engineering profession. Topics include the social responsibilities of engineering, the nature of professionalism, professional autonomy, whistleblowing, conflicts of interest, organizational (dis)obedience, the ethics of risk assessment, and the place and purpose of engineering codes of ethics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BUSN or major is ECON or classification is Freshman or Sophomore

PHIL 317 Ethics and Design Professions 3.0 Credits

Examines ethical theories and their application to architecture; the ethics of architectural space and place; the logic of ethical reasoning applied to the practice of architecture; professional ethics and the social responsibility of architects; the ethics of safety and risk in the production of architectural structures; sustainable environmental architectural design.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

PHIL 321 Biomedical Ethics 3.0 Credits

Studies moral issues related to health and disease, patients' rights and professional responsibilities, informed consent, abortion, euthanasia, and biomedical research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 322 Ethics of Human Enhancement 3.0 Credits

Discussion of developments in health-care with the potential not only to treat disease, but also to improve human performance and cosmetically change the human body, thereby creating ethical considerations about the nature of health and disease and the proper scope and goals of health care.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HSAD 210 [Min Grade: D] or PHIL 251 [Min Grade: D]

PHIL 323 Organizational Ethics 3.0 Credits

This course focuses on the application of ethical theories and principles to organizational systems and decision-making. Emphasis will be placed on how ethical principles affect and are applied to organizational policy-making, leadership behavior, systems of communication, technology use, and other systems of organization.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

PHIL 325 Ethics in Sports Management 3.0 Credits

An introduction to various ethical issues in sports and sports management, such as leadership and coaching; gender and racial equity in sports; fair play and cheating; violence and competition; commercialization of sports; the relation of sports to cultural value systems; ethics of technology and sports performance.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

PHIL 330 Ethical Issues in Criminal Justice 3.0 Credits

Studies ethical issues in the policies and practices of criminal justice, and theories that bear upon issues such as the relationship of law to justice, the definition of crime, the use of deception and coercion in law enforcement, and the purposes and varieties of criminal punishment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 335 Global Ethical Issues 3.0 Credits

Offers an introduction to the ethical tensions of our age, globally construed. May address such issues as terrorism, genocide, religious exclusivism, nuclear proliferation, the regulation of the Internet, as well as culturally competing notions of right and wrong, and good and bad.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 340 Environmental Ethics 3.0 Credits

This course examines ethical questions about human relations with the nonhuman world. These questions will be informed by assessing sustainable practices, indigenous ways of life, environmental movements, and such issues as biodiversity loss and global climate change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 341 Philosophy of the Environment 3.0 Credits

Studies ecological issues from a philosophical standpoint stressing the implications of scientific and technological developments as they affect people's lives and choices.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 351 Philosophy of Technology 3.0 Credits

Studies technology from a philosophical standpoint stressing its role in shaping human existence and values, considering issues such as the control and distribution of information, housing and city planning, automation, and the uses of technology in medicine.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 355 Philosophy of Medicine 3.0 Credits

Examines the ideas of medicine, disease, and health from a philosophical perspective. Examines such concepts as gender, mental-illness, mind-body unity, aging and physical perfection as derived from both Eastern and Western traditions. Current health policy alternative treatment practices are also discussed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 361 Philosophy of Science 3.0 Credits

Studies natural scientific theory-construction and investigative methods from a philosophical standpoint, considering issues such as the nature and scope of experimental method, and the history and justification of theory change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D] or PHIL 102 [Min Grade: D] or PHIL 105 [Min Grade: D] or PHIL 107 [Min Grade: D] or PHIL 111 [Min Grade: D]

PHIL 371 Philosophy of Social Sciences 3.0 Credits

Studies social scientific theory-construction and investigative methods from a philosophical standpoint, considering issues such as the distinction between explanation and interpretation, and the history and justification of theory change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D] or PHIL 102 [Min Grade: D] or PHIL 105 [Min Grade: D] or PHIL 107 [Min Grade: D] or PHIL 111 [Min Grade: D]

PHIL 381 [WI] Philosophy in Literature 3.0 Credits

Studies philosophical issues such as the concept of the self, the nature and course of evil, the nature and scope of free will, and ideals in living as they appear in significant works of literature.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 385 Philosophy of Law 3.0 Credits

This course addresses philosophical issues in the law. Topics include the meaning of "law," the nature and logic of legal (in contrast to moral) concepts and principles, and competing conceptions of law (Natural Law, Positivism, Realism, Rights-Based, etc.). Authors may include Plato, Mill, Rawls, Hart, Dworkin and others.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 391 Philosophy of Religion 3.0 Credits

Studies various aspects of religious belief and experience from a philosophical standpoint, considering issues such as the definition and existence of God, the nature and course of evil, and the relationship between faith and reason in a religious life.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D] or PHIL 102 [Min Grade: D] or PHIL 105 [Min Grade: D] or PHIL 107 [Min Grade: D] or PHIL 111 [Min Grade: D]

PHIL 395 Advanced Topics in Logic 3.0 Credits

Specialized topics, from among: self-reference paradoxes, set theory, axiomatization of arithmetic, computability, Church-Turing thesis, Gödel's theorem, minds and machines, Turing test, artificial intelligence, definitions of truth, models and satisfaction, analyticity, syntax/semantics, ontological commitment, intention/extension, reference justifying deduction, nominalism/realism, multi-valued logic, intuitionism, modal logic, doxastic logic, and logic of moral discourse.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: PHIL 111 [Min Grade: D] and PHIL 207 [Min Grade: D]

PHIL 421 [WI] Seminar in Ancient Philosophy 3.0 Credits

Advanced study and discussion of the works of the leading philosophers and philosophical schools of Western antiquity. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 425 [WI] Seminar in Medieval Philosophy 3.0 Credits

Advanced study and discussion of the works of the leading philosophers and philosophical schools of the Medieval period. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 431 [WI] Seminar in Modern Philosophy 3.0 Credits

Advanced study and discussion of the works of the leading philosophers and philosophical schools of the Modern period (circa. 1500 A.D. to 1900 A.D.) on the European Continent and British Isles. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D]) and (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D])

PHIL 461 [WI] Seminar in Contemporary Philosophy 3.0 Credits

Advanced study and discussion of the works by leading philosophers from 1900 to present. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 465 [WI] Seminar in American Philosophy 3.0 Credits

Advanced study and discussion of works by leading American philosophers, including Peirce, James, Mead, Royce, C.I. Lewis, Quine, Davidson, Rorty and others. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 481 [WI] Seminar in a Philosophical School 3.0 Credits

Development of doctrines, theories, arguments and problems associated with one or more philosophical schools (or movements). Schools (or movements) may include Pythagoreanism, Platonism, Epicureanism, or recently, Positivism, Pragmatism, and Existentialism. This course is Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 485 [WI] Seminar in a Major Philosopher 3.0 Credits

Study of the works of a major philosopher such as Plato, Aristotle, Descartes, Locke, Hume, Kant, etc. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 497 [WI] Senior Essay I: Research & Thesis Development 3.0 Credits

Individual supervision. Selection of research topic for the senior argumentative essay; collection and analysis of hard-copy and electronic research material; construction of bibliography. Initial thesis formulation and drafting of argument sketch. Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHIL and classification is Senior.

PHIL 498 [WI] Senior Essay II: Argument Construction 3.0 Credits

Supervised construction of the main and supporting arguments of the senior essay involving drafting and re-drafting of the prose statement. Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHIL and classification is Senior.

Prerequisites: PHIL 497 [Min Grade: D]

PHIL 499 [WI] Senior Essay III: Defense 3.0 Credits

Individual Supervision. Defense of the senior essay thesis before the philosophy faculty and fellow senior philosophy majors. Written replies to main criticisms as determined by the faculty supervisor. Final submission of senior essay. Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHIL and classification is Senior.

Prerequisites: PHIL 498 [Min Grade: D]

PHIL I199 Independent Study in PHIL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL I299 Independent Study in PHIL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL I399 Independent Study in PHIL 1.0-12.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

PHIL I499 Independent Study in PHIL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL T180 Special Topics in Philosophy 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL T280 Special Topics in Philosophy 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL T380 Special Topics in Philosophy 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL T480 Special Topics in Philosophy 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Philosophy in Arts & Humanities Certificate

Certificate Level: Undergraduate

Admissions Requirements: Current Drexel students only

Certificate Type: Undergraduate

Number of Credits to Completion: 18.0

Instructional Delivery: Campus, Online, Hybrid

Calendar Type: Quarter

The Certificate in Philosophy in Arts and Humanities provides an excellent opportunity for undergraduate students in all majors to deepen and broaden their educational experience by enhancing and exercising their philosophical skills in relation to some of the most central issues and ideas related to the arts and the humanities.

Required Courses

PHIL 101	Introduction to Western Philosophy	3.0
PHIL 105	Critical Reasoning	3.0
PHIL 107	Philosophy and Knowledge Organization	3.0
PHIL 231	Aesthetics: Philosophy of Art	3.0
PHIL 381 [WI]	Philosophy in Literature	3.0
Select one of the following:		3.0
PHIL 385	Philosophy of Law	
PHIL 391	Philosophy of Religion	
Total Credits		18.0

Certificate in Writing and Publishing

Certificate Level: Undergraduate

Admission Requirements: Current Drexel students only

Certificate Type: Certificate

Number of Credits to Completion: 18.0

Instructional Delivery: Campus, Online, Hybrid

Calendar Type: Quarter

Expected Time to Completion: Not Applicable

About the program

The certificate in writing and publishing (CWP) offers the opportunity for both professional and personal development through a combination of available courses in professional writing, creative writing and publishing. The certificate enhances employment opportunities, opening a broad range of professional choices in cooperative employment and in the post-degree job market as skills are acquired. The CWP improves on-the-job performance, as the student develops writing skills and associated professional knowledge.

The program develops core competencies through the synergy of writing and publishing courses. The courses develop the student's skills in writing and publishing both through theory and practical application.

General requirements

The certificate in writing and publishing allows students to achieve certification in one or more of the following tracks:

- professional writing and publishing
- creative writing and publishing
- comprehensive writing and publishing

Each track requires the completion of a minimum of six courses (18.0 credits). Tracks can be designed to meet the professional needs and personal interests of the individual student.

Working with an advisor, students will choose not only the track but the courses within the track to develop an individually tailored program. Students can choose courses that will meet the general requirements of the program, while also satisfying their own professional and personal requirements.

Those students who have successfully completed this program will receive a certificate in writing and publishing. The transcript will indicate the completion of the CWP. This certification will indicate proficiency in written communication and familiarity with techniques in publishing in a variety of venues. The certificate program in writing and publishing highlights the student's acquisition of skills more than they would be in a list of courses on a transcript.

The completion of the certificate demonstrates the student's commitment to writing and publishing skills. It highlights writing skills of students majoring in business and technical areas; similarly, for students in the humanities and social sciences, it certifies writing and publishing skills, either in creative writing or professional writing.

Students meet with one of the two program co-directors to determine their track:

Harriet Levin Millan
Director, Certificate in Writing and Publishing
harriet.levin.millan@drexel.edu

Henry Israeli
Associate Director, Certificate in Writing and Publishing
hpi22@drexel.edu

Track Requirements

The professional writing and publishing track offers three options: business communication and publishing; technical communication and publishing; and journalism. This track is useful for business majors or students in technical or science areas who want to highlight their acquisition of writing skills. For students majoring in the humanities it provides an opportunity to develop areas of writing and publishing competencies in the professional arena. The creative writing and publishing track, is useful to all students as it encourages personal and professional development through creative writing and a knowledge of publishing. The comprehensive track is for students who do not wish to specialize in either of the other two tracks.

Note: Many majors already require one or more of the courses leading to the certificate in writing and publishing or list these courses as recommended electives

Professional Writing and Publishing Track

18.0 quarter credits

The professional writing and publishing track is useful for business majors or students in technical or science areas who want to highlight their acquisition of writing skills. For students majoring in the humanities it provides an opportunity to develop areas of writing and publishing competencies in the professional arena.

This track offers three focus options:

- business communication and publishing: for students interested in a career in business.
- technical communication and publishing: for students interested in engineering, science, information science and technology and careers in higher education.
- journalism: for students interested in global journalism and international affairs.

Business Communication and Publishing

Required Courses		
COM 270 [WI]	Business Communication	3.0
COM 350 [WI]	Document Design and Evaluation	3.0
or COM 375	Grant Writing	
or WRIT 312	The Practice of Professional Writing	
Select one of the following:		3.0
COM 320 [WI]	Science Writing	
COM 420	Technical and Science Editing	
COM T380	Special Topics in Communication Theory	
VSCM 480	Graphic Design Seminar: Design Perceptions [WI]	
Select one of the following:		3.0
COM 335	Electronic Publishing	
COM 340	Desktop Publishing	
VSCM 479	Graphic Design Seminar: Advanced Media (Bookmaking)	
WRIT 310	Literary Editing & Publication	
WRIT 400 [WI]	Writing in Cyberspace	
Select two of the following:		6.0
COM 160	Introduction to Journalism	
COM 315	Investigative Journalism	
COM 390 [WI]	Global Journalism	
CULA 412	Food Writing	
HNRS 301	Colloquium II *	
WRIT 210 [WI]	The Peer Reader in Context	
WRIT 220 [WI]	Creative Nonfiction Writing	
WRIT 225 [WI]	Creative Writing	
WRIT 301 [WI]	Writing Poetry	
WRIT 302 [WI]	Writing Fiction	
WRIT 303	Writing Humor and Comedy	
WRIT 304 [WI]	Special Topics in Writing	
WRIT 306	Writing About the Media	
WRIT 312 [WI]	The Practice of Professional Writing	
Total Credits		18.0

* By Director's permission only.

Technical Communication and Publishing

Required Courses		
COM 310 [WI]	Technical Communication	3.0
COM 375 [WI]	Grant Writing	3.0
or WRIT 312	The Practice of Professional Writing	
Select one of the following:		3.0
COM 320 [WI]	Science Writing	
COM 350 [WI]	Document Design and Evaluation	
COM 420	Technical and Science Editing	
COM T380	Special Topics in Communication Theory	
VSCM 480	Graphic Design Seminar: Design Perceptions [WI]	
Select one of the following:		3.0
COM 335	Electronic Publishing	
COM 340	Desktop Publishing	
VSCM 479	Graphic Design Seminar: Advanced Media (Bookmaking)	

WRIT 310	Literary Editing & Publication	
WRIT 400 [WI]	Writing in Cyberspace	
Select any two additional Certificate in Writing and Publishing courses, including but not limited to the following:		6.0
COM 160	Introduction to Journalism	
COM 315	Investigative Journalism	
COM 390 [WI]	Global Journalism	
CULA 412	Food Writing	
HNRS 301	Colloquium II *	
WRIT 210 [WI]	The Peer Reader in Context	
WRIT 220 [WI]	Creative Nonfiction Writing	
WRIT 301 [WI]	Writing Poetry	
WRIT 302 [WI]	Writing Fiction	
WRIT 303	Writing Humor and Comedy	
WRIT 304 [WI]	Special Topics in Writing	
WRIT 306	Writing About the Media	
WRIT 312 [WI]	The Practice of Professional Writing	
Total Credits		18.0

* By Director's permission only.

Journalism

Required Courses

COM 160	Introduction to Journalism	3.0
Select two of the following:		6.0
COM 261	Advanced Journalism	
COM 315	Investigative Journalism	
COM 390 [WI]	Global Journalism	
Select one of the following:		3.0
COM 335	Electronic Publishing	
COM 340	Desktop Publishing	
WRIT 310	Literary Editing & Publication	
WRIT 400 [WI]	Writing in Cyberspace	
Select any two additional Certificate in Writing and Publishing courses, including but not limited to the following:		6.0
COM 270 [WI]	Business Communication	
or COM 310 Technical Communication		
COM 320 [WI]	Science Writing	
COM 375 [WI]	Grant Writing	
COM 420	Technical and Science Editing	
CULA 412	Food Writing	
HNRS 301	Colloquium II *	
VSCM 479	Graphic Design Seminar: Advanced Media (Bookmaking)	
VSCM 480	Graphic Design Seminar: Design Perceptions [WI]	
WRIT 210 [WI]	The Peer Reader in Context	
WRIT 220 [WI]	Creative Nonfiction Writing	
WRIT 225 [WI]	Creative Writing	
WRIT 301 [WI]	Writing Poetry	
WRIT 302 [WI]	Writing Fiction	
WRIT 303	Writing Humor and Comedy	
WRIT 304 [WI]	Special Topics in Writing	
WRIT 306	Writing About the Media	
WRIT 312 [WI]	The Practice of Professional Writing	
Total Credits		18.0

* By Director's permission only.

Creative Writing and Publishing track

18.0 quarter credits

This track is designed for students who want to develop their creative writing skills either for personal development and expression, or because they recognize that creative writing develops imagination; sharpens clarity of expression; and enhances sensitivity to other people. Creative writing is a good pre-professional concentration for pre-law, pre-med, and the social sciences. The importance of creative writing has been recognized for engineering and for business.

Select three of the following (one of which must be a 200-level course):		9.0
WRIT 220 [WI]	Creative Nonfiction Writing	
WRIT 225 [WI]	Creative Writing	
WRIT 301 [WI]	Writing Poetry	
WRIT 302 [WI]	Writing Fiction	
WRIT 303	Writing Humor and Comedy	
WRIT 304 [WI]	Special Topics in Writing	
WRIT 306	Writing About the Media	
Select one of the following:		3.0
COM 335	Electronic Publishing	
COM 340	Desktop Publishing	
COM 350 [WI]	Document Design and Evaluation	
VSCM 479	Graphic Design Seminar: Advanced Media (Bookmaking)	
WRIT 310	Literary Editing & Publication	
WRIT 400 [WI]	Writing in Cyberspace	
WRIT 405	Internship in Literary Publishing *	
Select any two additional Certificate in Writing and Publishing courses, including but not limited to the following:		6.0
COM 160	Introduction to Journalism	
COM 261	Advanced Journalism	
COM 270 [WI]	Business Communication	
COM 310 [WI]	Technical Communication	
COM 315	Investigative Journalism	
COM 320 [WI]	Science Writing	
COM 350 [WI]	Document Design and Evaluation	
COM 375 [WI]	Grant Writing	
COM 390 [WI]	Global Journalism	
COM 420	Technical and Science Editing	
CULA 412	Food Writing **	
HNRS 301	Colloquium II **	
VSCM 480	Graphic Design Seminar: Design Perceptions [WI]	
WRIT 312 [WI]	The Practice of Professional Writing	
WRIT 210 [WI]	The Peer Reader in Context **	
Total Credits		18.0

* WRIT 405 must be taken twice if no other publishing course is taken.

** By Director's permission only.

Comprehensive Certificate track

18.0 quarter credits

The Comprehensive Track is designed for students whose majors and minors include writing courses (either as electives or required courses) and whose schedules allow for the additional credits to obtain certification.

Select two of the following:		6.0
COM 335	Electronic Publishing	
COM 340	Desktop Publishing	
VSCM 479	Graphic Design Seminar: Advanced Media	
WRIT 310	Literary Editing & Publication	
WRIT 400 [WI]	Writing in Cyberspace	
WRIT 405	Internship in Literary Publishing *	
Select two of the following: **		12.0

Creative Writing

Track A

WRIT 220 [WI] Creative Nonfiction Writing

Any 300-level writing (WRIT) course

Track B

WRIT 225 [WI] Creative Writing

Any 300-level writing (WRIT) course

Professional Writing

Track A

COM 310 [WI] Technical Communication

COM 420 Technical and Science Editing

or COM 375 Grant Writing

or VSCM 48 Graphic Design Seminar: Design Perceptions

Track B

COM 270 [WI] Business Communication

COM 375 [WI] Grant Writing

or COM 350 Document Design and Evaluation

or VSCM 48 Graphic Design Seminar: Design Perceptions

Journalism

COM 160 Introduction to Journalism 3.0

Select one of the following:

COM 315 Investigative Journalism

COM 390 [WI] Global Journalism

CULA 412 Food Writing

WRIT 210 [WI] The Peer Reader in Context ***

Total Credits 21.0

* WRIT 405 Must be taken twice.

** Students select two of the following course sequences from at least two different categories

*** By Director's permission only.

College of Computing & Informatics

The College of Computing & Informatics provides a University focal point for inquiry related to computation and information. The College addresses both theory and practice along dimensions that include technical, human, organizational, policy, and societal considerations. This broad expertise positions the College's education and research programs to address the complex, multi-disciplinary problems that are increasingly common as society becomes more dependent on information technology.

The academic programs of the College provide broad and deep coverage of computing & informatics. For more information about the College, please visit the College's website (<http://www.drexel.edu/cci>).

Majors

- Computer Science (BA, BS) (p. 175)
 - Computer Security Concentration (p. 185)
 - Game Programming and Development Concentration (p. 187)
- Computing and Security Technology (BS) (p. 188)
- Data Science (BS) (p. 195)
- Informatics (BS) (p. 201)
- Information Systems (BS) (p. 206)
- Information Technology (BS) (p. 212)
- Software Engineering (BS) (p. 218)

Minors

- Computer Science (p. 180)
- Data Science (p. 197)
- Emergency Management (p. 225)
- Human Centered Computing (p. 226)
- Informatics (p. 202)
- Information Systems (p. 207)
- Security Technology (p. 226)
- Software Engineering (p. 220)

Certificates

- Computing and Security Technology (p. 226)

About the College

The College of Computing & Informatics (<http://www.drexel.edu/cci>) (CCI) offers a number of undergraduate degrees in computer science, computing & security technology, data science, information systems, and software engineering. The degree programs are open to freshmen and transfers from other departments at Drexel and other universities. Students have access to the computing facilities available to all Drexel students.

The College educates professionals through its interdisciplinary programs to meet a wide range of needs in the computing and informatics fields to benefit all sectors of society.

Transfer admission for traditional undergraduate programs occurs in the fall term only due to the sequence of required courses. Internal transfer students can be admitted at any term. Admission to the BS

online completion program in computing & security technology is offered on a rolling basis. Please contact an undergraduate advisor (<http://cci.drexel.edu/resources/current-students/undergraduate/advising.aspx>) for more information.

Cooperative Education

Cooperative education emphasizes career management through experiential learning as an integral part of the education process. The co-op is based on employment in practical, major-related positions consistent with the interests, abilities, and aptitudes of the students.

For more general information on Drexel University's co-op opportunities, visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>).

Computer Science

Major: Computer Science

Degree Awarded: Bachelor of Science (BS) or Bachelor of Arts (BA)

Calendar Type: Quarter

Total Credit Hours: 186.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 11.0701

Standard Occupational Classification (SOC) code: 11-3021; 15-1111; 15-1131; 15-1132; 11-1199

About the Program

The College of Computing & Informatics' Bachelor of Science/Arts in Computer Science offers extensive exposure and hands-on practice in the core areas of the field, including programming paradigms and languages, algorithms, systems, networking, and software engineering. Students also select upper level tracks in areas such as artificial intelligence, security, graphics and vision, and human-computer interaction. The program's flexibility allows students to easily sample from areas in which they would like to apply their computing knowledge. This hands-on curriculum combined with co-op provides real-world experience that culminates in a full-year software project.

The programs of study in computer science are designed with the flexibility to prepare students for careers in a rapidly changing profession and to allow strong preparation for graduate education in the field. In addition to the courses in the major, the Bachelor of Science program emphasizes foundation courses in the sciences and in applied mathematics, leading to careers involving applications in science and engineering. The Bachelor of Arts degree emphasizes foundation courses in the humanities and the social sciences, leading to careers involving applications in those areas.

Core courses in all programs include programming and data structures, programming language concepts, computer systems architecture, and software methodology and engineering. Students also choose two other tracks from a list of possible specializations. Please contact your advisor (<http://cci.drexel.edu/resources/current-students/undergraduate/advising.aspx>) at the College of Computing & Informatics for a current list of computer science track and elective courses.

Concentrations

- Computer Security (p. 185)
- Game Programming and Development (p. 187)

Additional Information

For more information about this program, please visit the BS/BA in Computer Science web page (<http://drexel.edu/cci/programs/undergraduate-programs/bsba-computer-science>) on the College of Computing & Informatics' website.

Degree Requirements (BS)

The Bachelor of Science (BS) in Computer Science program emphasizes foundation courses in the sciences and in applied mathematics, leading to careers involving applications in science and engineering.

Computer Science Requirements

CS 164	Introduction to Computer Science	3.0
CS 171	Computer Programming I	3.0
or CS 175	Advanced Computer Programming I	
CS 172	Computer Programming II	3.0
or CS 176	Advanced Computer Programming II	
CS 260	Data Structures	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
CS 275	Web and Mobile App Development	3.0
CS 281	Systems Architecture	4.0
CS 283	Systems Programming	3.0
CS 350 [WI]	Software Design	3.0
CS 360	Programming Language Concepts	3.0
CS 451	Software Engineering	3.0
Computer Science track courses (see below)		18.0
Computer Science electives (see below)		6.0

Computing & Informatics Requirements

CI 101	Computing and Informatics Design I	2.0
CI 102	Computing and Informatics Design II	2.0
CI 103	Computing and Informatics Design III	2.0
CI 491 [WI]	Senior Project I	3.0
CI 492 [WI]	Senior Project II	3.0
CI 493 [WI]	Senior Project III	3.0

Mathematics Requirements

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 201	Linear Algebra	4.0
or MATH 261	Linear Algebra	
or ENGR 231	Linear Engineering Systems	
MATH 221	Discrete Mathematics	3.0
MATH 311	Probability and Statistics I	4.0
or MATH 410	Scientific Data Analysis I	
Mathematics elective (see below)		4.0

Science Requirements

Select one of the following lab science sequences:

BIO 122	Cells and Genetics
& BIO 124	and Evolution & Organismal Diversity
& BIO 126	and Physiology and Ecology

Or

CHEM 101	General Chemistry I
& CHEM 102	and General Chemistry II
& CHEM 103	and General Chemistry III

Or

PHYS 101	Fundamentals of Physics I
& PHYS 102	and Fundamentals of Physics II
& PHYS 201	and Fundamentals of Physics III

Science electives (see below)

Arts & Humanities Requirements

COM 230	Techniques of Speaking	3.0
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ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 311	Ethics and Information Technology	3.0
Writing & Communication electives (see below)		6.0
Arts & Humanities, Business, or Social Studies electives (see below) *		24.0
University Requirements		
UNIV CI101	The Drexel Experience	2.0
or CI 120	CCI Transfer Student Seminar	
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
Free electives		10.5-15.5
Total Credits		186.5-191.5

* At least 4.0 credit must be taken from a Business category course (see below) and at least 3.0 credits must be from a Social Studies category course (see below)

Program Electives

- **Computer Science electives:** any CS course numbered 300 or higher
- **Mathematics electives:** MATH 200, MATH 210, MATH 262, ENGR 232, any MATH course numbered 300 or higher
- **Science electives:** any CHEM (except 111, 112, 113, 114, 151), BIO (except 161, 162, 163; can take only one of BIO100, BIO107, BIO122; can take only one of BIO101, BIO109, BIO124), PHYS (except 050, 100, 103, 104, 105, 106, 121, 122, 151, 160, 305, 306, 307, 324, 405; cannot take both PHYS 131 & 181), ENVS, GEO; cannot take NFS courses
- **Writing & Communications electives:** any WRIT, COM, ENGL courses officially certified as Writing Intensive (http://drexel.edu/engphil/about/DrexelWritingCenter/wiCourses/course_list) (WI), and SCRP270
- **Business electives:** any ACCT, BLAW, BUSN, ECON, ENTP, FIN, HRMT, INTB, MGMT, MIS, MKTG, OPM, OPR, ORGB, STAT, TAX
- **Social Studies electives:** any AFAS, ANTH, GST, HIST, JUDA, PSCI, PSY (except 330, 332, 337, 364, 365), SOC (except 364, 365), WGST
- **Arts & Humanities electives:** any ARCH, ARTH, CMGT, CJS, COM, CULA, DANC, EDEX, EDUC, ENGL (except 101, 102, 103, 105), ESTM, FASH, FMVD, INTR, LING, MUSC, PHIL, PHTO, THTR, VSCM, VSST, WRIT, Foreign Language courses (<http://www.drexel.edu/culturecomm/academics/undergraduate/modernlang/languages>) as defined by the College of Arts and Sciences, and GMAP260, ANIM140, ANIM141, ANIM152, ANIM211, ANIM212

Computer Science Tracks

Students must complete two of the following Computer Science tracks for a total of 18.0 credits. The tracks may overlap by one course. Students should check with the College for any additional Special Topics courses being offered that may be appropriate for one of the tracks.

Algorithms and Data Structures

CS 440	Theory of Computation	3.0
CS 457	Data Structures and Algorithms I	3.0
CS 458	Data Structures and Algorithms II	3.0

Artificial Intelligence

CS 380	Artificial Intelligence	3.0
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Select two of the following:

6.0

CS 383	Machine Learning	
CS 385	Evolutionary Computing	
CS 387	Game AI Development	
CS 481	Advanced Artificial Intelligence	
Computer and Network Security		
CS 472	Computer Networks: Theory, Applications and Programming	3.0
CS 475	Computer and Network Security	3.0
CS 303	Algorithmic Number Theory and Cryptography	3.0
Computer Architecture		
CS 352	Processor Architecture & Analysis	3.0
Select two of the following:		6.0
CS 476	High Performance Computing	
ECEC 356	Embedded Systems	
ECEC 413	Introduction to Parallel Computer Architecture	
Computer Graphics and Vision		
CS 430	Computer Graphics	3.0
CS 435	Computational Photography	3.0
Select one of the following:		3.0
CS 431	Advanced Rendering Techniques	
CS 432	Interactive Computer Graphics	
Computing Systems		
CS 361	Concurrent Programming	3.0
CS 370	Operating Systems	3.0
Select one of following:		3.0
CS 365	System Administration	
CS 461	Database Systems	
CS 472	Computer Networks: Theory, Applications and Programming	
Game Development and Design		
CS 345	Computer Game Design and Development	3.0
or GMAP 345	Game Development Foundations	
Select two of the following:		6.0
CS/GMAP 347	Experimental Game Development	
CS/GMAP 348	Serious Game Development	
CS 387	Game AI Development	
CS 445	Topics in Computer Gaming	
GMAP 377	Game Development: Workshop I	
GMAP 378	Game Development: Workshop II	
Human-Computer Interaction		
CS 338	Graphical User Interfaces	3.0
Select one of the following:		3.0
INFO 310	Human-Computer Interaction II	
PSY 337	Human-Computer Interaction	
Select one of the following:		3.0
CS 345	Computer Game Design and Development	
or GMAP 345	Game Development Foundations	
CS 432	Interactive Computer Graphics	
Numeric and Symbolic Computation		
CS 300	Applied Symbolic Computation	3.0
MATH 300	Numerical Analysis I	4.0
Select one of the following:		3.0-4.0
CS 303	Algorithmic Number Theory and Cryptography	
MATH 301	Numerical Analysis II	
MATH 305	Introduction to Optimization Theory	
Programming Languages		
CS 440	Theory of Computation	3.0
CS 441	Compiler Workshop I	3.0
CS 442	Compiler Workshop II	3.0
Software Engineering		
SE 311	Software Architecture II	3.0
SE 320	Software Verification and Validation	3.0
SE 410	Software Evolution	3.0

Degree Requirements (BA)

The Bachelor of Arts (BA) program emphasizes foundation courses in the humanities and the social sciences, leading to careers involving applications in those areas.

Computer Science Requirements

CS 164	Introduction to Computer Science	3.0
CS 171	Computer Programming I	3.0
or CS 175	Advanced Computer Programming I	
CS 172	Computer Programming II	3.0
or CS 176	Advanced Computer Programming II	
CS 260	Data Structures	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
CS 275	Web and Mobile App Development	3.0
CS 281	Systems Architecture	4.0
CS 283	Systems Programming	3.0
CS 350 [WI]	Software Design	3.0
CS 360	Programming Language Concepts	3.0
CS 451	Software Engineering	3.0

Computer Science track courses (see below) 18.0

Computer Science electives (see below) 6.0

Computing & Informatics Requirements

CI 101	Computing and Informatics Design I	2.0
CI 102	Computing and Informatics Design II	2.0
CI 103	Computing and Informatics Design III	2.0
CI 491 [WI]	Senior Project I	3.0
CI 492 [WI]	Senior Project II	3.0
CI 493 [WI]	Senior Project III	3.0

Mathematics Requirements

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 201	Linear Algebra	3.0-4.0
or MATH 261	Linear Algebra	
or ENGR 231	Linear Engineering Systems	
MATH 221	Discrete Mathematics	3.0
MATH 311	Probability and Statistics I	3.0-4.0
or MATH 410	Scientific Data Analysis I	

Mathematics elective (see below) 4.0

Science Requirements

18.0

Select one of the following lab science sequences:

BIO 122	Cells and Genetics	
& BIO 124	and Evolution & Organismal Diversity	
& BIO 126	and Physiology and Ecology	
CHEM 101	General Chemistry I	
& CHEM 102	and General Chemistry II	
& CHEM 103	and General Chemistry III	
PHYS 101	Fundamentals of Physics I	
& PHYS 102	and Fundamentals of Physics II	
& PHYS 201	and Fundamentals of Physics III	

Science electives (see below)

Arts & Humanities Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 311	Ethics and Information Technology	3.0
COM 230	Techniques of Speaking	3.0
Social Studies electives (see below)		12.0
International electives (see below)		6.0
Diversity Studies electives (see below)		6.0

Arts & Humanities electives (see below)		6.0
University Requirements		
UNIV CI101	The Drexel Experience	2.0
or CI 120	CCI Transfer Student Seminar	
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
Free electives *		17.5-20.5
Total Credits		184.5-189.5

* Additional Free Electives may be required dependent upon the math courses selected.

Program Electives

- **Computer Science electives:** any CS course numbered 300 or higher
- **Mathematics electives:** MATH 200, MATH 210, MATH 262, ENGR 232, any MATH course numbered 300 or higher
- **Science electives:** any CHEM (except 111, 112, 113, 114, 151), BIO (except 161, 162, 163; can take only one of BIO 100, BIO 107, BIO 122; can take only one of BIO 101, BIO 109, BIO 124), PHYS (except 050, 100, 103, 104, 105, 106, 121, 122, 151, 160, 305, 306, 307, 324, 405; cannot take both PHYS 131 & 181); ENVS, GEO, PHEV, cannot take NFS courses
- **Social Studies electives:** any AFAS, ANTH, GST, HIST, JUDA, PSCI, PSY (except 330, 332, 337, 364, 365), SOC (except 364, 365), WGST
- **International electives:** any GST, MUSC 331, PSCI 150, PSCI 255, PSCI 345, PSCI 357
- **Diversity Studies electives:** any AFAS, WGST
- **Arts & Humanities electives:** any ARCH, ARTH, CMGT, CJS, COM, CULA, DANC, EDEX, EDUC, ENGL (except 101, 102, 103, 105), ESTM, FASH, FMVD, INTR, LING, MUSC, PHIL, PHTO, THTR, VSCM, VSST, WRIT, Foreign Language courses (<http://www.drexel.edu/culturecomm/academics/undergraduate/modernlang/languages>) as defined by the College of Arts and Sciences, and GMAP 260, ANIM 140, ANIM 141, ANIM 152, ANIM 211, ANIM 212

Computer Science Tracks

Students must complete two of the following Computer Science tracks for a total of 18.0 credits. The tracks may overlap by one course. Students should check with the College for any additional Special Topics courses being offered that may be appropriate for one of the tracks.

Algorithms and Data Structures		
CS 440	Theory of Computation	3.0
CS 457	Data Structures and Algorithms I	3.0
CS 458	Data Structures and Algorithms II	3.0
Artificial Intelligence		
CS 380	Artificial Intelligence	3.0
Select two of the following:		6.0
CS 383	Machine Learning	
CS 385	Evolutionary Computing	
CS 387	Game AI Development	
CS 481	Advanced Artificial Intelligence	
Computer and Network Security		
CS 472	Computer Networks: Theory, Applications and Programming	3.0
CS 475	Computer and Network Security	3.0
CS 303	Algorithmic Number Theory and Cryptography	3.0
Computer Architecture		
CS 352	Processor Architecture & Analysis	3.0

Select two of the following:		6.0
CS 476	High Performance Computing	
ECEC 356	Embedded Systems	
ECEC 413	Introduction to Parallel Computer Architecture	

Computer Graphics and Vision		
CS 430	Computer Graphics	3.0
CS 435	Computational Photography	3.0

Select one of the following:		3.0
CS 431	Advanced Rendering Techniques	
CS 432	Interactive Computer Graphics	

Computing Systems		
CS 361	Concurrent Programming	3.0
CS 370	Operating Systems	3.0

Select one of the following:		3.0
CS 365	System Administration	
CS 461	Database Systems	
CS 472	Computer Networks: Theory, Applications and Programming	

Game Development and Design		
CS 345	Computer Game Design and Development	3.0
or GMAP 345	Game Development Foundations	

Select two of the following:		6.0
CS 347	Experimental Game Development	
CS 348	Serious Game Development	
CS 387	Game AI Development	
CS 445	Topics in Computer Gaming	
GMAP 377	Game Development: Workshop I	
GMAP 378	Game Development: Workshop II	

Human-Computer Interaction		
CS 338	Graphical User Interfaces	3.0
Select one of the following:		
INFO 310	Human-Computer Interaction II	
PSY 337	Human-Computer Interaction	

Select one of the following:		3.0
CS 345	Computer Game Design and Development	
or GMAP 345	Game Development Foundations	
CS 432	Interactive Computer Graphics	

Numeric and Symbolic Computation		
CS 300	Applied Symbolic Computation	3.0
MATH 300	Numerical Analysis I	4.0
Select one of the following:		3.0-4.0
CS 303	Algorithmic Number Theory and Cryptography	
MATH 301	Numerical Analysis II	
MATH 305	Introduction to Optimization Theory	

Programming Languages		
CS 440	Theory of Computation	3.0
CS 441	Compiler Workshop I	3.0
CS 442	Compiler Workshop II	3.0

Software Engineering		
SE 311	Software Architecture II	3.0
SE 320	Software Verification and Validation	3.0
SE 410	Software Evolution	3.0

Sample Plan of Study (BS)

BS Computer Science

5 YR UG Co-op Concentration

Term 1		Credits
CI 101	Computing and Informatics Design I	2.0
CS 164	Introduction to Computer Science	3.0
MATH 121	Calculus I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0

UNIV CI101	The Drexel Experience	1.0
Science lab		4.5
Term Credits		17.5
Term 2		
CI 102	Computing and Informatics Design II	2.0
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
CS 171 or 175	Computer Programming I Advanced Computer Programming I	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
Science lab		4.5
Term Credits		17.5
Term 3		
CI 103	Computing and Informatics Design III	2.0
CS 172 or 176	Computer Programming II Advanced Computer Programming II	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
UNIV CI101	The Drexel Experience	1.0
Science lab		4.5
Term Credits		17.5
Term 4		
CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
MATH 201	Linear Algebra	4.0
Science elective		3.0
Social Studies elective		3.0
Term Credits		16.0
Term 5		
CS 260	Data Structures	3.0
CS 275	Web and Mobile App Development	3.0
MATH 221	Discrete Mathematics	3.0
Science elective		3.0
Business elective		4.0
Term Credits		16.0
Term 6		
COM 230	Techniques of Speaking	3.0
CS 281	Systems Architecture	4.0
CS 350 [WI]	Software Design	3.0
Science elective		3.0
Arts & Humanities elective		3.0
Term Credits		16.0
Term 7		
CS 283	Systems Programming	3.0
CS 360	Programming Language Concepts	3.0
Science elective		3.0
Writing & Communications elective		3.0
Arts & Humanities elective		3.0
Term Credits		15.0
Term 8		
MATH 410 or 311	Scientific Data Analysis I Probability and Statistics I	3.0
PHIL 311	Ethics and Information Technology	3.0
Computer science electives		6.0
Arts & Humanities elective		3.0
Term Credits		15.0
Term 9		
CS 451	Software Engineering	3.0
Arts & Humanities elective		3.0
Computer Science elective		3.0

Mathematics elective		3.0
Science elective		3.0
Term Credits		15.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
Arts & Humanities elective		3.0
Computer Science electives		6.0
Free elective		3.0
Term Credits		15.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
Arts & Humanities elective		3.0
Computer Science electives		6.0
Free elective		3.0
Term Credits		15.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
Computer Science elective		3.0
Writing & Communications elective		3.0
Free elective		2.0
Term Credits		11.0

Total Credit: 186.5

Sample Plan of Study (BA)

5 YR UG Co-op Concentration

		Credits
Term 1		
CI 101	Computing and Informatics Design I	2.0
CS 164	Introduction to Computer Science	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV CI101	The Drexel Experience	1.0
Science lab		4.0
Term Credits		17.0
Term 2		
CI 102	Computing and Informatics Design II	2.0
CIVC 101	Introduction to Civic Engagement	1.0
CS 171 or 175	Computer Programming I Advanced Computer Programming I	3.0
COOP 101	Career Management and Professional Development	0.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
Science lab		4.0
Term Credits		17.0
Term 3		
CI 103	Computing and Informatics Design III	2.0
CS 172 or 176	Computer Programming II Advanced Computer Programming II	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
UNIV CI101	The Drexel Experience	1.0
Science lab		4.0
Term Credits		17.0
Term 4		
CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
MATH 201	Linear Algebra	4.0
Science elective		3.0
Social Studies elective		3.0
Term Credits		16.0

Term 5		
CS 260	Data Structures	3.0
CS 275	Web and Mobile App Development	3.0
MATH 221	Discrete Mathematics	3.0
Science elective		3.0
International elective		3.0
Term Credits		15.0
Term 6		
COM 230	Techniques of Speaking	3.0
CS 281	Systems Architecture	4.0
CS 350 [WI]	Software Design	3.0
International elective		3.0
Arts & Humanities elective		3.0
Term Credits		16.0
Term 7		
CS 283	Systems Programming	3.0
CS 360	Programming Language Concepts	3.0
Social Studies elective		3.0
Diversity Studies elective		3.0
Free elective		3.0
Term Credits		15.0
Term 8		
MATH 311 or 410	Probability and Statistics I Scientific Data Analysis I	4.0
PHIL 311	Ethics and Information Technology	3.0
Computer Science electives		6.0
Diversity Studies elective		3.0
Term Credits		16.0
Term 9		
CS 451	Software Engineering	3.0
Arts & Humanities elective		3.0
Computer Science elective		3.0
Mathematics elective		3.0
Social Studies elective		3.0
Term Credits		15.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
Computer Science electives		6.0
Social Studies elective		3.0
Free elective		3.0
Term Credits		15.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
Computer Science electives		6.0
Free electives		6.0
Term Credits		15.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
Computer Science elective		3.0
Free electives		6.5
Term Credits		12.5

Total Credit: 186.5

Minor in Computer Science

The computer science minor provides students with a breadth of knowledge in areas that form the foundation of computer science. The student adds some depth by selecting courses from a list of advanced computer science courses.

The Computer Science minor is available to all University students in good standing, with the exception of Computer Science majors.

Prerequisites

One of the following Mathematics sequences must be completed before entering the program:

- MATH 101 and MATH 102
- MATH 121 and MATH 122

Requirements

Select one of the following:		3.0-6.0
CS 171 & CS 172	Computer Programming I and Computer Programming II	
CS 175	Advanced Computer Programming I	
CS 260	Data Structures	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
Additional CS courses numbered 200 or higher. ##Students who take CS 175 should select 5 courses; all other students should select 4 courses.		12.0-15.0
Total Credits		24.0

Note: No more than 9 credits from a student's major may be used to fulfill the minor requirements. Students who, because of this rule, require additional credits to reach 24 total credits may select additional Advanced Electives as needed.

Accelerated Degrees

The College of Computing & Informatics offers several Accelerated Degree programs designed to allow students to complete both a bachelor's degree and a graduate degree along with cooperative educational experience in fewer years than would be typical if pursuing the degrees separately. Students accepted in this program can combine any of the College's bachelor's and master's degree programs as well as other options:

- Any CCI BS/any CCI MS Accelerated Degree (BS & MS in five years, including 2 Co-ops)
- Any CCI BS/MBA Accelerated Degree (BS/MBA)
- Any CCI BS/JD Accelerated Degree (BS/JD)

For more information on the criteria for entering this program, visit the BS/MS Accelerated Degree (<http://www.drexel.edu/undergrad/academics/accelerated-degrees>) page on Drexel's website.

Bachelor's/Master's Accelerated Degree in Computer Science

Applying

The guidelines for applying to the Computer Science Bachelor's/Master's (BS/MS) Accelerated Degree Program are as follows:

- University regulations require application after the completion of 90.0 credits but before the completion of 120.0 credits.
- Applicants must have an overall cumulative Grade Point Average of 3.25 or higher.
- Letters of recommendation from two Computer Science faculty are required.
- Students must submit a plan of study. Consult your advisor and course schedules for guidance.

- Applicants must have completed the following courses with a minimum GPA of 3.50:

CS 171	Computer Programming I	3.0
or CS 175	Advanced Computer Programming I	
CS 172	Computer Programming II	3.0
or CS 176	Advanced Computer Programming II	
CS 260	Data Structures	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
CS 275	Web and Mobile App Development	3.0
CS 281	Systems Architecture	4.0
MATH 221	Discrete Mathematics	3.0
CS 350 [WI]	Software Design	3.0
CS 360	Programming Language Concepts	3.0
One additional CS course numbered 300 or higher		3.0

Requirements

The requirements of the Computer Science BS/MS program follow the requirements of both the BS in Computer Science (<http://catalog.drexel.edu/undergraduate/collegeofcomputingandinformatics/computerscience/#requirementsbtext>) and the MS in Computer Science (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/computerscience/#degreerequirementsmstext>). Students must complete all the requirements of the BS in Computer Science (<http://catalog.drexel.edu/undergraduate/collegeofcomputingandinformatics/computerscience/#requirementsbtext>) except that they may drop two free electives (still maintaining the 180.0 credit minimum for the BS degree). In addition, students must complete 45.0 credits of graduate courses to satisfy the requirements of the MS in Computer Science (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/computerscience/#degreerequirementsmstext>). Please refer to the linked program pages for the details of these requirements.

When completing undergraduate CS electives and graduate CS courses, students should take care to avoid equivalent courses at both the undergraduate and graduate levels. The table below indicates pairs of equivalent courses; students may only take one or the other in each pair but not both.

CS 338	Graphical User Interfaces	3.0
or CS 530	Developing User Interfaces	
CS 370	Operating Systems	3.0
or CS 543	Operating Systems	
CS 380	Artificial Intelligence	3.0
or CS 510	Introduction to Artificial Intelligence	
CS 430	Computer Graphics	3.0
or CS 536	Computer Graphics	
CS 431	Advanced Rendering Techniques	3.0
or CS 636	Advanced Computer Graphics	
CS 432	Interactive Computer Graphics	3.0
or CS 637	Interactive Computer Graphics	
CS 435	Computational Photography	3.0
or CS 583	Introduction to Computer Vision	
CS 440	Theory of Computation	3.0
or CS 525	Theory of Computation	
CS 457	Data Structures and Algorithms I	3.0
or CS 521	Data Structures and Algorithms I	
CS 458	Data Structures and Algorithms II	3.0
or CS 522	Data Structures and Algorithms II	
CS 472	Computer Networks: Theory, Applications and Programming	3.0
or CS 544	Computer Networks	

CS 475	Computer and Network Security	3.0
or CS 645	Network Security	
CS 481	Advanced Artificial Intelligence	3.0
or CS 610	Advanced Artificial Intelligence	

Plan of Study

Students in the BS/MS program typically forego their third co-op and take advanced courses during those two terms. The sample plan of study below thus assumes a total of 14 terms completed within a 5-year period.

Term 1		Credits
CI 101	Computing and Informatics Design I	2.0
CS 164	Introduction to Computer Science	3.0
MATH 121	Calculus I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV 101	The Drexel Experience	1.0
Science lab		4.5
Term Credits		17.5
Term 2		
CI 102	Computing and Informatics Design II	2.0
CS 171	Computer Programming I	3.0
or 175	Advanced Computer Programming I	
MATH 122	Calculus II	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
COOP 101	Career Management and Professional Development	0.0
CIVC 101	Introduction to Civic Engagement	1.0
Science lab		4.5
Term Credits		17.5
Term 3		
CI 103	Computing and Informatics Design III	2.0
CS 172	Computer Programming II	3.0
or 176	Advanced Computer Programming II	
MATH 123	Calculus III	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV 101	The Drexel Experience	1.0
Science lab		4.5
Term Credits		17.5
Term 4		
CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
MATH 201	Linear Algebra	4.0
Science elective		3.0
Social Studies elective		3.0
Term Credits		16.0
Term 5		
CS 260	Data Structures	3.0
CS 275	Web and Mobile App Development	3.0
MATH 221	Discrete Mathematics	3.0
Science elective		3.0
Business elective		4.0
Term Credits		16.0
Term 6		
CS 281	Systems Architecture	4.0
CS 350 [WI]	Software Design	3.0
COM 230	Techniques of Speaking	3.0
Science elective		3.0
Arts & Humanities elective		3.0
Term Credits		16.0
Term 7		
CS 283	Systems Programming	3.0
CS 360	Programming Language Concepts	3.0

Science elective		3.0
Writing & Communications elective		3.0
Arts & Humanities elective		3.0
Free elective		3.0
Term Credits		18.0
Term 8		
Computer Science electives		6.0
MATH 410 or 311	Scientific Data Analysis I Probability and Statistics I	3.0
PHIL 311	Ethics and Information Technology	3.0
Arts & Humanities elective		3.0
Writing & Communications elective		3.0
Term Credits		18.0
Term 9		
CS 451	Software Engineering	3.0
Computer Science electives		6.0
Mathematics elective		3.0
Science elective		3.0
Arts & Humanities elective		3.0
Term Credits		18.0
Term 10		
Computer Science electives		6.0
Arts & Humanities elective		3.0
Graduate course		3.0
Graduate course		3.0
Term Credits		15.0
Term 11		
Computer Science electives		6.0
Arts & Humanities elective		3.0
Graduate course		3.0
Graduate course		3.0
Term Credits		15.0
Term 12		
CI 491 [WI]	Senior Project I	3.0
Graduate course		3.0
Graduate course		3.0
Graduate course		3.0
Graduate course		3.0
Term Credits		15.0
Term 13		
CI 492 [WI]	Senior Project II	3.0
Graduate course		3.0
Graduate course		3.0
Graduate course		3.0
Graduate course		3.0
Term Credits		15.0
Term 14		
CI 493 [WI]	Senior Project III	3.0
Graduate course		3.0
Graduate course		3.0
Graduate course		3.0
Term Credits		12.0

Total Credit: 226.5

Co-op/Career Opportunities

Co-Op Options

Three co-op options are available for this program:

- 5-year/3 co-op
- 4-year/1 co-op

- Accelerated Degree (BS & MS): 5-year/2 co-op

Career Opportunities

The demand for computing skills is tremendous and growing, with highly paid jobs. Most professionals in the field focus on the design and development of software and software-based applications. Typical jobs include software engineer, programmer, web designer, multimedia or software developer, systems analyst or consultant, manager of technical staff, client-server architect, network designer, and database specialist. Most positions require at least a bachelor's degree. Relevant work experience, such as that provided by co-operative education, is also very important, as cited by the Occupational Outlook Handbook (<http://www.bls.gov/ooh>) published by the US Bureau of Labor Statistics.

Job titles of recent computer science graduates include:

- Web Developer
- Software Systems Engineer
- Software Developer
- Network Engineer
- Application Analyst

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Drexel University Libraries

Drexel University Libraries (<http://www.library.drexel.edu>) is a learning enterprise, advancing the University's academic mission through serving as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, software engineering, health informatics, information systems, and computing technology. Resources are available online at library.drexel.edu or in-person at W. W. Hagerty Library (<http://www.library.drexel.edu/locations>).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

iCommons

Located in Room 106 of the Rush Building, the College's iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42" display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms

within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge software development and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as "DreamSpark" that allows students free access to a wide array of Microsoft software titles and operating systems.

The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

Rush Building

The Rush Building houses classrooms, CCI administrative offices (academic advising, graduate admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

The Information Technology Laboratory, located in the Rush Building, consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports. In addition, a special system has been built into the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

University Crossings - Cyber Learning Center and Computer Lab

CCI also has classrooms, administrative office and faculty offices located in University Crossings, located at the corner of JFK Blvd. and Market Street. The building houses the Cyber Learning Center, a student computer lab, as well as several classrooms with video-conference enabled technology and media projection capabilities.

The Cyber Learning Center (CLC) provides consulting and other learning resources for students taking computer science classes. The CLC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

Both the CLC and UC Lab now serve as a central hub for small group work, student meetings, and TA assistance. The UC Lab is organized with desk space around the perimeter of the lab for individual or partner/pair-programmed student work, as well as with clusters of tables which can be connected as needed into pods to create workspaces for larger groups.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, across Drexel's main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GICL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College's research web page (<http://cci.drexel.edu/research.aspx>).

Alumni Garden

The Rush Building's Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (<http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx>) may be reserved for Drexel events.

3401 Market Street

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such and University initiatives such as the Isaac L. Auerbach Cybersecurity Institute (<http://drexel.edu/cci/research/centers-institutes/Cybersecurity>). The Institute's Auerbach and Berger Families Cybersecurity Laboratory serves as University's first training facility dedicated to identifying challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

Evaluations

The College of Computing & Informatics works continually to improve its degree programs. As part of this effort, the Computer Science degree is evaluated relative to the following Objectives and Outcomes.

Computer Science Program Educational Objectives

Drexel Computer Science alumni will:

- be valued employees in a wide variety of occupations in industry, government and academia, in particular as computer scientists and software engineers;
- succeed in graduate and professional studies, such as engineering, science, law, medicine and business;
- pursue life-long learning and professional development to remain current in an ever changing technological world;
- provide leadership in their profession, in their communities, and society;
- function as responsible members of society with an awareness of the social and ethical ramifications of their work.

Computer Science Student Outcomes (for Bachelor of Science and Bachelor of Arts)

The Drexel Computer Science program enables students to attain, by the time of graduation:

- a. An ability to apply knowledge of computing and mathematics appropriate to the discipline
- b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- d. An ability to function effectively on teams to accomplish a common goal
- e. An understanding of professional, ethical, legal, security and social issues and responsibilities
- f. An ability to communicate effectively with a range of audiences
- g. An ability to analyze the local and global impact of computing on individuals, organizations, and society
- h. Recognition of the need for and an ability to engage in continuing professional development
- i. An ability to use current techniques, skills, and tools necessary for computing practice
- j. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
- k. An ability to apply design and development principles in the construction of software systems of varying complexity.

Additional Information

The Computer Science BS and BA programs are accredited by the Computing Accreditation Commission (CAC) of ABET, <http://www.abet.org>.

To view the latest BS/BA in Computer Science program enrollment numbers, please click here (<http://drexel.edu/cci/programs/undergraduate-programs/Facts>).

Computer Science Faculty

Yuan An, PhD (*University of Toronto, Canada*). Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web.

David Augenblick, MS (*University of Pennsylvania*). Associate Teaching Professor. Introductory and object-oriented programming, data structures and database systems, computer application project management, application of computer programming principles and solutions to engineering problems.

Marcello Balduccini, PhD (*Texas Tech University*) *Senior Research Scientist, Applied Informatics Group*. Associate Research Professor. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

M. Brian Blake, PhD (*George Mason University*) *Executive Vice President for Academic Affairs and Provost; Distinguished Professor of Systems and Software Engineering; Joint Appointments with the College of Engineering*

and the College of Medicine. Software engineering approaches for integration of Web-based systems.

Mark Boady, PhD (*Drexel University*). Assistant Teaching Professor. Computer Algebra, complex symbolic calculations, automation of computation problems

David E. Breen, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Matthew Burlick, PhD (*Stevens Institute of Technology*). Assistant Teaching Professor. Image processing, machine learning, real-time video tracking, object detection and classification, statistics/probability, and acoustics

Yuanfang Cai, PhD (*University of Virginia*). Associate Professor. Formal software design modeling and analysis, software economics, software evolution and modularity.

Bruce W. Char, PhD (*University of California-Berkeley*). Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments parallel and distributed computation.

Christopher Geib, PhD (*University of Edinburgh*). Associate Professor. Decision making and reasoning under conditions of uncertainty, planning, scheduling, constraint, based reasoning, human computer and robot interaction, probabilistic reasoning, computer network security, large scale process control, user interfaces.

Colin Gordon, PhD (*University of Washington*). Assistant Professor. Software reliability, program behavior, concurrent and systems-level code, formal assurance, programming models, distributed computing, even testing

Rachel Greenstadt, PhD (*Harvard University*). Associate Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security.

Jeremy R. Johnson, PhD (*Ohio State University*). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

Constantine Katsinis, PhD (*University of Rhode Island*). Teaching Professor. High-performance computer networks, parallel computer architectures with sustained teraflops performance, computer security, image processing.

Geoffrey Mainland, PhD (*Harvard University*). Assistant Professor. High-level programming languages and runtime support for non-general purpose computation.

Spiros Mancoridis, PhD (*University of Toronto*). Professor. Software engineering; software security; code analysis; evolutionary computation.

Adelaida Alban Medlock, MS (*Drexel University*). Associate Teaching Professor. Introductory programming; computer science education.

William Mongan, MS (*Drexel University*) *Associate Department Head for Undergraduate Affairs, Computer Science*. Associate Teaching Professor. Service-oriented architectures, program comprehension, reverse engineering, software engineering, computer architecture, computer science education, engineering education outreach

Ko Nishino, PhD (*University of Tokyo*) Associate Department Head for Graduate Affairs, Computer Science. Professor. Computer vision, computer graphics, analysis and synthesis of visual appearance.

Krzysztof Nowak, PhD (*Washington University*). Associate Teaching Professor. Fourier analysis, partial differential equations, image processing, wavelets, asymptotic distribution of eigenvalues, numerical methods and algorithms, computer science education.

Santiago Ontañón, PhD (*University of Barcelona*). Assistant Professor. Game AI, computer games, artificial intelligence, machine learning, case-based reasoning

Jeffrey L. Popyack, PhD (*University of Virginia*). Professor. Operations research, stochastic optimization, computational methods of Markov decision processes; artificial intelligence, computer science education.

William C. Regli, PhD (*University of Maryland-College Park*). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Jeffrey Salvage, MS (*Drexel University*). Teaching Professor. Object-oriented programming, multi-agent systems, software engineering, database theory, introductory programming, data structures.

Dario Salvucci, PhD (*Carnegie Mellon University*) Department Head, Computer Science. Professor. Human computer interaction, cognitive science, machine learning, applications for driving.

Kurt Schmidt, MS (*Drexel University*). Associate Teaching Professor. Data structures, math foundations for computer science, programming tools, programming languages.

Ali Shokoufandeh, PhD (*Rutgers University*) Senior Associate Dean of Research. Professor. Theory of algorithms, graph theory, combinatorial optimization, computer vision.

Erin Solovey, PhD (*Tufts University*). Assistant Professor. Human-computer interaction, brain-computer interfaces, tangible interaction, machine learning, human interaction with complex and autonomous systems.

Julia Stoyanovich, PhD (*Columbia University*). Assistant Professor. Data and knowledge management, big data, biological data management, search and ranking.

Brian Stuart, PhD (*Purdue University*). Associate Teaching Professor. Machine learning, networking, robotics, image processing, simulation, interpreters, data storage, operating systems, computer science, data communications, distributed/operating systems, accelerated computer programming, computer graphics.

Filippos Vokolos, PhD (*Polytechnic University*). Assistant Teaching Professor. System architecture, principles of software design and construction, verification and validation methods for the development of large software systems, foundations of software engineering, software verification & validation, software design, programming languages, dependable software systems.

Computer Science

Computer Security Concentration

In the past, computer systems have been thought of as a combination of computers and networks, where the primary role of technology

was to handle information efficiently to realize one or more objectives (for example, a customer relations management system helping an organization support and manage customers to achieve increased sales). However, the world has moved from a clear separation between people and technology to a network of systems that provide critical resources to modern living. In fact, today's world is comprised of systems and systems of systems where we see interactions at local, regional and global levels. Unfortunately, this cyberspace also allows for the connections among international organized crime, terrorists, hackers, foreign intelligence agencies, military and civilians including families and children. Furthermore, such connections enable threats to and invasions of privacy.

Specialists are needed who can work within cyberspace to help secure, defend against, respond to, and in some instance, even initiate preemptive attacks. These individuals must have detailed knowledge of the systems they protect, an understanding of the cyber-environment and physical environment in which they operate, and an understanding of the ethical expectations and legal surroundings of their field.

The Computer Science concentration in Computer Security is designed to supply graduates with the skills needed to prepare them for a wide range of opportunities. It gives students the ability to design and implement computing security and privacy processes, software and systems. Students use mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of such systems.

Additional Information

For more information about this concentration, visit the College of Computing & Informatics (<http://www.drexel.edu/cci>)' web site.

Computer Security Concentration Program Requirements

Students in the Computer Security Concentration should follow the below concentration requirements in addition to the core degree requirements for the BS in Computer Science program (p. 176). For any questions regarding your plan of study, please contact your Undergraduate Advisor (<http://drexel.edu/cci/resources/current-students/undergraduate/advising>).

The concentration in Computer Security follows the requirements of the B.S. in Computer Science (p. 176) except as noted below.

Computer Science Requirements	64.0
The following courses must be taken as the 6 CS track courses and 1 of the 2 CS electives:	
CS 303	Algorithmic Number Theory and Cryptography
CS 361	Concurrent Programming
CS 370	Operating Systems
CS 377	Software Security
CS 467	Security and Human Behavior
CS 472	Computer Networks: Theory, Applications and Programming
CS 475	Computer and Network Security
INFO 310	Human-Computer Interaction II
Computing & Informatics Requirements	15.0
Mathematics Requirements	25.0
MATH 410 is required for the concentration.	
The following course must be taken as the Mathematics elective:	
MATH 200	Multivariate Calculus
Science Requirements	26.5
Arts & Humanities Requirements	46.0
The following course must be taken as the Social Studies elective:	
PSY 101	General Psychology I

The following course must be taken as the Business elective:

ECON 201	Principles of Microeconomics	
University Requirements		3.0
Free Electives		7.0
Total Credits		186.5

Computer Security Concentration Sample Plan of Study

Term		Credits
Term 1		
CI 101	Computing and Informatics Design I	2.0
CS 164	Introduction to Computer Science	3.0
MATH 121	Calculus I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV 101	The Drexel Experience	1.0
Science lab		4.5
Term Credits		17.5
Term 2		
CI 102	Computing and Informatics Design II	2.0
CS 171 or 175	Computer Programming I Advanced Computer Programming I	3.0
MATH 122	Calculus II	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
Science lab		4.5
Term Credits		17.5
Term 3		
CI 103	Computing and Informatics Design III	2.0
CS 172 or 176	Computer Programming II Advanced Computer Programming II	3.0
MATH 123	Calculus III	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV 101	The Drexel Experience	1.0
Science lab		4.5
Term Credits		17.5
Term 4		
CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
PSY 101	General Psychology I	3.0
Science elective		3.0
Term Credits		12.0
Term 5		
CS 260	Data Structures	3.0
CS 275	Web and Mobile App Development	3.0
MATH 221	Discrete Mathematics	3.0
ECON 201	Principles of Microeconomics	4.0
Science elective		3.0
Term Credits		16.0
Term 6		
CS 281	Systems Architecture	4.0
CS 350 [WI]	Software Design	3.0
MATH 201	Linear Algebra	4.0
COM 230	Techniques of Speaking	3.0
Arts & Humanities elective		3.0
Term Credits		17.0
Term 7		
CS 283	Systems Programming	3.0
CS 360	Programming Language Concepts	3.0
Arts & Humanities electives		3.0

Free Elective		3.0
Science elective		4.0
Term Credits		16.0
Term 8		
CS 303	Algorithmic Number Theory and Cryptography	3.0
CS 361	Concurrent Programming	3.0
MATH 410	Scientific Data Analysis I	3.0
INFO 310	Human-Computer Interaction II	3.0
PHIL 311	Ethics and Information Technology	3.0
Term Credits		15.0
Term 9		
CS 451	Software Engineering	3.0
CS 370	Operating Systems	3.0
Arts & Humanities elective		3.0
Writing & Communications Elective		3.0
Math Elective		3.0
Term Credits		15.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
CS 467	Security and Human Behavior	3.0
CS 472	Computer Networks: Theory, Applications and Programming	3.0
Writing & Communications elective		3.0
Arts & Humanities elective		3.0
Term Credits		15.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
CS 475	Computer and Network Security	3.0
Arts & Humanities elective		3.0
Free Elective		7.0
Term Credits		16.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
CS 377	Software Security	3.0
Science Elective		3.0
Arts & Humanities Elective		3.0
Term Credits		12.0
Total Credit: 186.5		

Co-op and Career Opportunities

Co-Op Options

Three co-op options are available for this program:

- 5-year/3 co-op
- 4-year/1 co-op
- Accelerated Degree (BS & MS): 5-year/2 co-op

Career Opportunities

The U.S. Bureau of Labor Statistics confirmed the need for a larger and more dynamic network security workforce. In its Occupational Outlook Handbook (<http://www.bls.gov/ooh/home.htm>), the agency predicts that the demand for cybersecurity experts, including Computer Network Architects, is expected to increase at a faster than average rate (2014 to 2024) as the world responds to imminent security threats.

While government might have the most immediate need for cybersecurity professionals, market observers see tremendous growth in other organizations for cybersecurity professionals where they can have a variety of rules working on vulnerability research, antivirus software design, reverse engineering, and mobile code analysis and design.

Infrastructure security is another area requiring experts in computer security. As information technology has become more available, critical infrastructures increasingly rely on it and have become so interconnected that intrusions and disruptions in one infrastructure can potentially cause failures to others. Critical infrastructure includes airports, rail transport, hospitals, bridges, network communications, the electricity grid and power plants, seaports, oil refineries, and water systems. Infrastructure security experts work to limit the vulnerability of these systems to sabotage, terrorism, information warfare, and natural disasters.

Industries with high cybersecurity demand include:

- Computer systems design services
- Research and development in the physical, engineering, and life sciences
- Instrument manufacturing
- Consulting services
- Engineering services
- Computer and computer peripheral equipment and software merchant wholesalers
- Custom computer programming services

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Computer Science

Game Programming and Development Concentration

The concentration in game programming and development provides conceptual understanding of game design and practical experience in the design and the development of games. The courses in this concentration include fundamentals of game design and development, large-scale game development, and special topics in educational and experimental game design.

Game Programming and Development Concentration

Program Requirements

Students in the Game Programming and Development Concentration should follow the below concentration requirements in addition to the core degree requirements for the BS in Computer Science program (p. 176). For any questions regarding your plan of study, please contact your Undergraduate Advisor (<http://drexel.edu/cci/resources/current-students/undergraduate/advising>).

The Game Programming and Development concentration follows the requirements of the B.S. in Computer Science (p. 176) except as noted below.

Computer Science Requirements	58.0-61.0
The following courses must be taken to fulfill the Game Development and Design track:	
CS 345	Computer Game Design and Development
or GMAP 346	Game Development Foundations
GMAP 377	Game Development: Workshop I
GMAP 378	Game Development: Workshop II
Computing & Informatics Requirements	15.0

Mathematics Requirements	27.0
Science Requirements	25.0
The sequence below must be taken as the lab science sequence:	
PHYS 101 & PHYS 201	Fundamentals of Physics I and Fundamentals of Physics II and Fundamentals of Physics III
Arts & Humanities Requirements	45.0
The following course must be taken as the Social Studies elective:	
PSY 101	General Psychology I
The following course must be taken as a Writing & Communications elective:	
SCRIP 270 [WI]	Screenwriting I
The following courses must be taken as Arts & Humanities electives:	
GMAP 260	Overview of Computer Gaming
ANIM 140	Computer Graphics Imagery I
ANIM 141	Computer Graphics Imagery II
ANIM 211	Animation I
University Requirements	3.0
Free Electives	10.5-15.5
The following course must be taken as a free elective:	
DIGM 100	Digital Design Tools
Total Credits	186.5

Sample Plan of Study (BS) - Game Programming and Development Concentration

5 YR 5 YR UG Co-op Concentration /Game Programming & Development

Term 1		Credits
CI 101	Computing and Informatics Design I	2.0
CS 164	Introduction to Computer Science	3.0
MATH 121	Calculus I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PHYS 101	Fundamentals of Physics I	4.0
UNIV CI101	The Drexel Experience	1.0
Term Credits		17.0
Term 2		
CI 102	Computing and Informatics Design II	2.0
CS 171	Computer Programming I	3.0
MATH 122	Calculus II	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHYS 102	Fundamentals of Physics II	4.0
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
Term Credits		17.0
Term 3		
CI 103	Computing and Informatics Design III	2.0
CS 172	Computer Programming II	3.0
MATH 123	Calculus III	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHYS 201	Fundamentals of Physics III	4.0
UNIV CI101	The Drexel Experience	1.0
Term Credits		17.0
Term 4		
CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
MATH 201	Linear Algebra	4.0
PSY 101	General Psychology I	3.0

DIGM 100	Digital Design Tools	3.0
Term Credits		16.0
Term 5		
Science elective		3.0
CS 260	Data Structures	3.0
CS 275	Web and Mobile App Development	3.0
MATH 221	Discrete Mathematics	3.0
ANIM 140	Computer Graphics Imagery I	3.0
Term Credits		15.0
Term 6		
CS 281	Systems Architecture	4.0
CS 350 [WI]	Software Design	3.0
GMAP 260	Overview of Computer Gaming	3.0
ANIM 141	Computer Graphics Imagery II	3.0
COM 230	Techniques of Speaking	3.0
Term Credits		16.0
Term 7		
CS 283	Systems Programming	3.0
CS 345	Computer Game Design and Development	3.0
CS 360	Programming Language Concepts	3.0
SCRIP 270 [WI]	Screenwriting I	3.0
Science elective		3.0
Term Credits		15.0
Term 8		
ANIM 211	Animation I	3.0
Mathematics elective		3.0
Computer Science elective		3.0
MATH 410	Scientific Data Analysis I	3.0
PHIL 311	Ethics and Information Technology	3.0
Term Credits		15.0
Term 9		
Computer Science elective		3.0
Business elective		4.0
Arts & Humanities elective		3.0
CS 451	Software Engineering	3.0
Science elective		3.0
Term Credits		16.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
GMAP 377	Game Development: Workshop I	3.0
Computer Science elective		3.0
Science elective		3.0
Arts & Humanities elective		3.0
Term Credits		15.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
GMAP 378	Game Development: Workshop II	3.0
Computer Science elective		3.0
Science elective		4.0
Free elective		3.0
Term Credits		16.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
Computer Science elective		3.0
Writing & Communications elective		3.0
Free elective		2.5
Term Credits		11.5
Total Credit: 186.5		

Computing and Security Technology

Major: Computing and Security Technology

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 188.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) Code: 11.1003

Standard Occupational Classification (SOC) Code: 15-1122

About the Program

The College of Computing & Informatics' Bachelor of Science in Computing & Security Technology (BSCST) prepares students for work related to the management and administration of large-scale computing infrastructure. Students gain experience with core information technology (IT) areas including servers, databases, networks, the Web, and computer security. The program places emphasis on practical education and fundamental concepts that are supplemented by laboratory experience.

Core courses provide students with practical knowledge and skills related to proprietary and open source servers, network administration, software development, database administration, and IT security. Students take advanced electives and a concentration in either Computing Technology or Computing Security. The advanced courses include topics such as: mobile applications, IT risk assessment, intrusion detection, security audits, and computer forensics.

The degrees in Computing & Security Technology, Data Science (p. 195), and Information Systems (p. 206) share a common first year. This allows students to easily switch among the degrees early in their studies. In addition, some of the electives in each degree are accessible to students in the other two majors and this provides a deeper and broader set of advanced topics for students in all three majors.

The BS in Computing & Security Technology is offered as a full-time, on-campus bachelor's degree program or as an online, part-time degree completion program for students who have already earned an associate's degree or have completed approximately two years of college work. *Students are no longer being admitted to the on-site BSCST degree program that was offered at Burlington County College (BCC), Delaware County Community College (DCCC), and the Montgomery County Community College (MCCC). Students from these institutions are invited to apply to transfer into the online program or the on-campus program at Drexel. Also, students are no longer being admitted to the Drexel Saturday Scholars program.*

For more information about this program, please visit the BS in Computing & Security Technology web page (<http://drexel.edu/cc/i/programs/undergraduate-programs/bs-computing-security>) on the College of Computing & Informatics' website.

Degree Requirements

Students completing this major must select either a concentration in computing technology or a concentration in computing security.

Computing & Security Technology Core Requirements

CT 140	Network Administration I	3.0
CT 200	Server I	3.0
CT 210	Open Server I	3.0
CT 310	Open Server II	3.0

CT 320	Server II	3.0
CT 330	Network Administration II	3.0
CT 395	Information Technology Security I	3.0
CT 420	Information Technology Security II	3.0
Students completing this major must select either a concentration in Computing Technology or a concentration in Computing Security. see below		27.0
Information Science Requirements		
INFO 101	Introduction to Information Technology	3.0
INFO 105	Introduction to Informatics	3.0
INFO 108	Foundations of Software	3.0
INFO 151	Web Systems and Services I	3.0
or CT 230	Web Development I	
INFO 152	Web Systems and Services II	3.0
or CT 240	Web Development II	
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0
INFO 215	Social Aspects of Information Systems	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO 355	Systems Analysis II	3.0
INFO 365	Database Administration I	3.0
INFO 420	Software Project Management	3.0
Computing & Informatics Requirements		
CI 101	Computing and Informatics Design I	2.0
CI 102	Computing and Informatics Design II	2.0
CI 103	Computing and Informatics Design III	2.0
CI 491 [WI]	Senior Project I	3.0
CI 492 [WI]	Senior Project II	3.0
CI 493 [WI]	Senior Project III	3.0
Mathematics Requirements		
Choose Mathematics Sequence		12.0
MATH 101	Introduction to Analysis I	
& MATH 102	and Introduction to Analysis II	
& MATH 180	and Discrete Computational Structures	
MATH 121	Calculus I	
& MATH 122	and Calculus II	
& MATH 180	and Discrete Computational Structures	
MATH 181	Mathematical Analysis I	
& MATH 182	and Mathematical Analysis II	
& MATH 183	and Mathematical Analysis III †	
Natural Science Requirements *		8.0
Liberal Studies Requirements		
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
COM 230	Techniques of Speaking	3.0
Liberal Studies Electives **		12.0
University Requirements		
UNIV CI101	The Drexel Experience	2.0
or CI 120	CCI Transfer Student Seminar	
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
Free Electives		39.0
Total Credits		188.0

† Also choose Quantitative methods elective from any non-required MATH course, STAT 201, or SOC250

* Students select any non-required courses from the following: ANAT, BIO, CHEM, ENVS, FDSC, NFS, PHEV, PHYS, HSCI, GEO, ENSS.

** Students select any non-required courses from the following: ANTH, COM, ENGL, HIST, PHIL, PSCI, PSY, SOC, WRIT, ECON, ENT, ARTH, FMST, MUSC, TVST, VSST

Concentration in Computing Technology

Computing Technology Concentration Requirements

CT 295	Public Key Infrastructure Technology	3.0
CT 335	Mobile Applications	3.0
CT 350	Network Administration III	3.0
CT 415	Disaster Recovery and Continuity Planning	3.0
INFO 366	Database Administration II	3.0

Computing Technology Electives

Select two of the following:		6.0
CT 355	Wireless Network Security Technology	
CT 362	Network Auditing Tools	
CT 393	Information Technology Security Risk Assessment	
CT 402	Network Security II	

Security Technology Electives

Select two of the following		6.0
CT 212	Computer Forensics I: Fundamentals	
CT 222	Security and Information Warfare	
CT 393	Information Technology Security Risk Assessment	
CT 415	Disaster Recovery and Continuity Planning	

Total Credits 27.0

Concentration in Computing Security

Computing Security Concentration Requirements

CT 212	Computer Forensics I: Fundamentals	3.0
CT 312	Access Control and Intrusion Detection Technology	3.0
CT 400	Network Security	3.0
CT 412	Information Technology Security Policies	3.0
CT 422	Incident Response Best Practices	3.0
CT 432	Information Technology Security Systems Audits	3.0
CT 472	Security Defense Countermeasures	3.0

Computing Security Electives

Select two of the following:		6.0
CT 325	Operating System Security Architecture I	
CT 402	Network Security II	
CT 393	Information Technology Security Risk Assessment	
CT 415	Disaster Recovery and Continuity Planning	

Total Credits 27.0

Concentrations: Sample Plans of Study

Computing Technology Concentration

Term 1		Credits
CI 101	Computing and Informatics Design I	2.0
INFO 101	Introduction to Information Technology	3.0
INFO 108	Foundations of Software	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
or 121	Calculus I	
UNIV CI101	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
CI 102	Computing and Informatics Design II	2.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
INFO 105	Introduction to Informatics	3.0
INFO 151	Web Systems and Services I	3.0
or CT 230	Web Development I	
MATH 102	Introduction to Analysis II	4.0
or 122	Calculus II	

COOP 101 ^{***}	Career Management and Professional Development	0.0
Term Credits		16.0
Term 3		
CI 103	Computing and Informatics Design III	2.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
INFO 215	Social Aspects of Information Systems	3.0
UNIV CI101	The Drexel Experience	1.0
MATH 180	Discrete Computational Structures	4.0
INFO 152 or CT 240	Web Systems and Services II Web Development II	3.0
COOP 101 ^{***}	Career Management and Professional Development	0.0
Term Credits		16.0
Term 4		
CT 140	Network Administration I	3.0
CT 395	Information Technology Security I	3.0
INFO 200	Systems Analysis I	3.0
Free Electives		6.0
Term Credits		15.0
Term 5		
CT 330	Network Administration II	3.0
CT 420	Information Technology Security II	3.0
INFO 210	Database Management Systems	3.0
Free Electives		6.0
Term Credits		15.0
Term 6		
CT 200	Server I	3.0
CT 210	Open Server I	3.0
CT 212	Computer Forensics I: Fundamentals	3.0
Liberal Studies Elective		3.0
Science Elective I		4.0
Term Credits		16.0
Term 7		
CT 320	Server II	3.0
CT 310	Open Server II	3.0
INFO 355	Systems Analysis II	3.0
Free Elective		3.0
Science Elective II		4.0
Term Credits		16.0
Term 8		
CT 312	Access Control and Intrusion Detection Technology	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO 365	Database Administration I	3.0
COM 230	Techniques of Speaking	3.0
Liberal Studies Elective		3.0
Free Elective		3.0
Term Credits		18.0
Term 9		
CT 412	Information Technology Security Policies	3.0
INFO 420	Software Project Management	3.0
Computing Security Elective		3.0
Free Elective		6.0
Term Credits		15.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
CT 400	Network Security	3.0
Computing Security Elective		3.0
Liberal Studies Elective		3.0
Free Elective		3.0
Term Credits		15.0
Term 11		
CI 492 [WI]	Senior Project II	3.0

CT 422	Incident Response Best Practices	3.0
CT 432	Information Technology Security Systems Audits	3.0
Free Electives		6.0
Term Credits		15.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
CT 472	Security Defense Countermeasures	3.0
Free Electives		6.0
Liberal Studies Elective		3.0
Term Credits		15.0
Total Credit: 188.0		

Computing Security Concentration

Term		Credits		
Term 1	CI 101	Computing and Informatics Design I	2.0	
	ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0	
	INFO 101	Introduction to Information Technology	3.0	
	INFO 108	Foundations of Software	3.0	
	MATH 101 or 121	Introduction to Analysis I Calculus I	4.0	
	UNIV CI101	The Drexel Experience	1.0	
	Term Credits		16.0	
	Term 2	CI 102	Computing and Informatics Design II	2.0
		CIVC 101	Introduction to Civic Engagement	1.0
		ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
INFO 105		Introduction to Informatics	3.0	
INFO 151 or CT 230		Web Systems and Services I Web Development I	3.0	
MATH 102 or 122		Introduction to Analysis II Calculus II	4.0	
COOP 101 ^{***}		Career Management and Professional Development	0.0	
Term Credits		16.0		
Term 3		CI 103	Computing and Informatics Design III	2.0
		ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
	INFO 215	Social Aspects of Information Systems	3.0	
	UNIV CI101	The Drexel Experience	1.0	
	INFO 152 or CT 240	Web Systems and Services II Web Development II	3.0	
	MATH 180	Discrete Computational Structures	4.0	
	COOP 101 ^{***}	Career Management and Professional Development	0.0	
	Term Credits		16.0	
	Term 4	CT 140	Network Administration I	3.0
		CT 395	Information Technology Security I	3.0
INFO 200		Systems Analysis I	3.0	
Free Electives		6.0		
Term Credits		15.0		
Term 5		CT 330	Network Administration II	3.0
		CT 420	Information Technology Security II	3.0
		INFO 210	Database Management Systems	3.0
		Free Electives		6.0
		Term Credits		15.0
	Term 6	CT 200	Server I	3.0
		CT 210	Open Server I	3.0
		CT 350	Network Administration III	3.0
		Liberal Studies Elective		3.0

Science Elective I		4.0
Term Credits		16.0
Term 7		
CT 320	Server II	3.0
CT 310	Open Server II	3.0
INFO 355	Systems Analysis II	3.0
Free Elective		3.0
Science Elective II		4.0
Term Credits		16.0
Term 8		
COM 230	Techniques of Speaking	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO 365	Database Administration I	3.0
Computing Technology Elective		3.0
Liberal Studies Elective		3.0
Free Elective		3.0
Term Credits		18.0
Term 9		
INFO 366	Database Administration II	3.0
INFO 420	Software Project Management	3.0
Computing Security Elective		3.0
Free Electives		6.0
Term Credits		15.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
CT 295	Public Key Infrastructure Technology	3.0
Computing Security Elective		3.0
Liberal Studies Elective		3.0
Free Elective		3.0
Term Credits		15.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
CT 335	Mobile Applications	3.0
Computing Technology Elective		3.0
Free Electives		6.0
Term Credits		15.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
CT 415	Disaster Recovery and Continuity Planning	3.0
Free Elective		6.0
Liberal Studies Elective		3.0
Term Credits		15.0
Total Credit: 188.0		

Accelerated Degrees

The College of Computing & Informatics offers several Accelerated Degree programs designed to allow students to complete both a bachelor's and a graduate degree along with cooperative educational experience in fewer years than would be typical if pursuing the degrees separately. Students accepted in this program can combine any of the College bachelor's and master's degree programs as well as other options:

- Any CCI BS/any CCI MS Accelerated Degree (BS & MS in five years, including 2 Co-ops)
- Any CCI BS/MBA Accelerated Degree (BS/MBA)
- Any CCI BS/JD Accelerated Degree (BS/JD)

For more information on the criteria for entering this program visit the BS/MS Accelerated Degree (<http://www.drexel.edu/undergrad/academics/accelerated-degrees>) page on Drexel's website.

For more information on how to apply for the BS/MS Accelerated Degree program, please visit the College of Computing & Informatics' website (<http://drexel.edu/cci/admissions/undergraduate/admissions-requirements/cci-bsms-degree-admissions>).

Co-Op/Career Opportunities

Co-Op Options

Three co-op options are available for this program:

- 5-year/3 co-op
- 4-year/1 co-op
- Accelerated Degree: 5-year/2 co-op

Co-op is not available for online students.

Career Opportunities

Graduates of the Computing and Security Technology program who complete a concentration in Computing Technology can pursue careers as information technologists and advanced technicians in a wide range of industries. Information technologists are capable of performing multiple IT tasks and accessing various information resources. The program gives students a unique set of applied skills that allow them to fill a number of roles as part of the information systems team. Graduates with a concentration in Computing Security pursue careers as advanced technicians who operate and administer the security tools, technologists who create and install security solutions, and leaders who define the security policies.

Job titles of recent computing and security technology graduates include:

- Security Administrator
- Chief Information Security Officer
- IT Audit Manager
- Project Manager
- Lead Systems Engineer

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more information on career opportunities.

Facilities

Drexel University Libraries

Drexel University Libraries (<http://www.library.drexel.edu>) is a learning enterprise, advancing the University's academic mission through serving as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, software engineering, health informatics, information systems, and computing technology. Resources are available online

at library.drexel.edu or in-person at W. W. Hagerty Library (<http://www.library.drexel.edu/locations>).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

iCommons

Located in Room 106 of the Rush Building, the College's iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42" display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge software development and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as "DreamSpark" that allows students free access to a wide array of Microsoft software titles and operating systems.

The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

Rush Building

The Rush Building houses classrooms, CCI administrative offices (academic advising, graduate admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

The Information Technology Laboratory, located in the Rush Building, consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports. In addition, a special system has been built into the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

University Crossings - Cyber Learning Center and Computer Lab

CCI also has classrooms, administrative office and faculty offices located in University Crossings, located at the corner of JFK Blvd. and Market Street. The building houses the Cyber Learning Center, a student computer lab, as well as several classrooms with video-conference enabled technology and media projection capabilities.

The Cyber Learning Center (CLC) provides consulting and other learning resources for students taking computer science classes. The CLC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

Both the CLC and UC Lab now serve as a central hub for small group work, student meetings, and TA assistance. The UC Lab is organized with desk space around the perimeter of the lab for individual or partner/pair-programmed student work, as well as with clusters of tables which can be connected as needed into pods to create workspaces for larger groups.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, across Drexel's main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GICL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College's research web page (<http://cci.drexel.edu/research.aspx>).

Alumni Garden

The Rush Building's Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (<http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx>) may be reserved for Drexel events.

3401 Market Street

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such and University initiatives such as the Isaac L. Auerbach Cybersecurity Institute (<http://drexel.edu/cci/research/centers-institutes/Cybersecurity>). The Institute's Auerbach and Berger Families Cybersecurity Laboratory serves as University's first training facility dedicated to identifying challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

Evaluations

The College of Computing & Informatics works continually to improve its degree programs. As part of this effort, the Computing & Security Technology degree is evaluated relative to the following Objectives and Outcomes.

BS Computing & Security Technology Program Educational Objectives

Within three to five years of graduating, alumni of the program are expected to achieve one or more of the following milestones:

- Be valued contributors to private or public organizations as demonstrated by promotions, increased responsibility, or other professional recognition
- Contribute to professional knowledge as demonstrated by published papers, technical reports, patents, or conference presentations
- Succeed in continuing professional development as demonstrated by completion of graduate studies or professional certifications
- Display commitment and leadership within the profession and community as demonstrated by contributions towards society's greater good and prosperity

BS Computing & Security Technology Program Student Outcomes

The program enables students to attain, by the time of graduation:

- An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- An ability to function effectively on teams to accomplish a common goal
- An understanding of professional, ethical, legal, security and social issues and responsibilities
- An ability to communicate effectively with a range of audiences
- An ability to analyze the local and global impact of computing on individuals, organizations, and society
- Recognition of the need for and an ability to engage in continuing professional development
- An ability to use current techniques, skills, and tools necessary for computing practice

Computing & Informatics Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Information behavior, public libraries, gender, children, young adults, multicultural materials.

Larry Alexander, PhD (*University of Pennsylvania*) *Executive in Residence*. Research Professor. Large scale modeling and simulation, pattern recognition, the future of information technology.

Yuan An, PhD (*University of Toronto, Canada*). Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web.

David Augenblick, MS (*University of Pennsylvania*). Associate Teaching Professor. Introductory and object-oriented programming, data structures and database systems, computer application project management, application of computer programming principles and solutions to engineering problems.

Marcello Balduccini, PhD (*Texas Tech University*) *Senior Research Scientist, Applied Informatics Group*. Associate Research Professor. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

Ellen Bass, PhD (*Georgia Institute of Technology*) *Head of Department of Information Science; Joint Appointment with the College of Nursing and Health Professions*. Professor. Characterizing human judgement and decision making, modeling human judgement when supported by information automation, computational models of human-human and human-automation coordination.

Mark Boady, PhD (*Drexel University*). Assistant Teaching Professor. Computer Algebra, complex symbolic calculations, automation of computation problems

Jennifer Booker, PhD (*Drexel University*). Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems.

David E. Breen, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Matthew Burlick, PhD (*Stevens Institute of Technology*). Assistant Teaching Professor. Image processing, machine learning, real-time video tracking, object detection and classification, statistics/probability, and acoustics

Yuanfang Cai, PhD (*University of Virginia*). Associate Professor. Formal software design modeling and analysis, software economics, software evolution and modularity.

Christopher Carroll, MS (*Drexel University*). Assistant Teaching Professor. Information technology within healthcare companies, computer networking and design, IT infrastructure, server technology, information security, virtualization and cloud computing.

Bruce W. Char, PhD (*University of California-Berkeley*). Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments parallel and distributed computation.

Chaomei Chen, PhD (*University of Liverpool*). Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction.

Catherine D. Collins, MLIS (*Indiana University*). Associate Teaching Professor. Knowledge management, collection development, management of information organizations, information sources and services, international development.

John D'Ignazio, MS (*Carnegie Mellon University*). Assistant Teaching Professor. Human information interaction, digital curation, design of information infrastructures, methods development to elicit and evaluate impact on information environments, metadata schemes.

Prudence W. Dalrymple, PhD (*University of Wisconsin-Madison*) *Director, Institute for Healthcare Informatics*. Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice.

M. Carl Drott, PhD (*University of Michigan*). Associate Professor. Systems analysis techniques, web usage, competitive intelligence.

Andrea Forte, PhD (*Georgia Institute of Technology*). Associate Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy.

Susan Gasson, PhD (*University of Warwick*). Associate Professor. The co-design of business and IT-systems, distributed cognition & knowledge management in boundary-spanning groups, human-centered design, social informatics, online learning communities, grounded theory.

Christopher Geib, PhD (*University of Edinburgh*). Associate Professor. Decision making and reasoning under conditions of uncertainty, planning, scheduling, constraint, based reasoning, human computer and robot interaction, probabilistic reasoning, computer network security, large scale process control, user interfaces.

Colin Gordon, PhD (*University of Washington*). Assistant Professor. Software reliability, program behavior, concurrent and systems-level code, formal assurance, programming models, distributed computing, even testing

Jane Greenberg, PhD (*University of Pittsburgh*) *Alice B. Kroeger Professor*. Metadata, ontological engineering, data science, knowledge organization, information retrieval

Rachel Greenstadt, PhD (*Harvard University*). Associate Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security.

Peter Grillo, PhD (*Temple University*) *Associate Department Head for Undergraduate Affairs, Information Science*. Teaching Professor. Strategic applications of technology within organizations.

Gregory W. Hislop, PhD (*Drexel University*) *Senior Associate Dean for Academic Affairs*. Professor. Information technology for teaching and learning, online education, structure and organization of the information disciplines, computing education research, software evaluation and characterization.

Xiaohua Tony Hu, PhD (*University of Regina, Canada*). Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics.

Jeremy R. Johnson, PhD (*Ohio State University*). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

Weimao Ke, PhD (*University of North Carolina at Chapel Hill*). Associate Professor. Information retrieval (IR), distributed systems, intelligent filtering/recommendation, information visualization, network science, complex systems, machine learning, text/data mining, multi-agent systems, the notion of information.

Michael Khoo, PhD (*University of Colorado at Boulder*). Assistant Teaching Professor. The understandings and practices that users bring to their interactions with information systems, with a focus on the evaluation of digital libraries and educational technologies.

Xia Lin, PhD (*University of Maryland*). Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments.

Geoffrey Mainland, PhD (*Harvard University*). Assistant Professor. High-level programming languages and runtime support for non-general purpose computation.

Spiros Mancoridis, PhD (*University of Toronto*). Professor. Software engineering; software security; code analysis; evolutionary computation.

Gabriela Marcu, PhD (*Carnegie Mellon University*). Assistant Teaching Professor. Human-computer interaction, health informatics, action research, ethnography, user experience design, designing for social change, organizational information systems, ubiquitous computing, knowledge management.

Linda S. Marion, PhD (*Drexel University*). Teaching Professor. Formal and informal communication, bibliometric studies of scholarly communication, diffusion of information, information use in the social sciences, academic and public libraries, information science education.

Adelaida Alban Medlock, MS (*Drexel University*). Associate Teaching Professor. Introductory programming; computer science education.

William Mongan, MS (*Drexel University*) *Associate Department Head for Undergraduate Affairs, Computer Science*. Associate Teaching Professor. Service-oriented architectures, program comprehension, reverse engineering, software engineering, computer architecture, computer science education, engineering education outreach

Gaurav Naik, MS (*Drexel University*). Assistant Research Professor. Computer networking and cybersecurity

Delia Neuman, PhD (*The Ohio State University*). Professor Emeritus. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Ko Nishino, PhD (*University of Tokyo*) *Associate Department Head for Graduate Affairs, Computer Science*. Professor. Computer vision, computer graphics, analysis and synthesis of visual appearance.

Danuta A. Nitecki, PhD (*University of Maryland at College Park*) *Dean of Libraries*. Professor. Library metrics and use in management, library as place, and academic library service models.

Krzysztof Nowak, PhD (*Washington University*). Associate Teaching Professor. Fourier analysis, partial differential equations, image processing, wavelets, asymptotic distribution of eigenvalues, numerical methods and algorithms, computer science education.

Santiago Ontañón, PhD (*University of Barcelona*). Assistant Professor. Game AI, computer games, artificial intelligence, machine learning, case-based reasoning

Jung-ran Park, PhD (*University of Hawaii at Manoa*). Associate Professor. Knowledge organization and representation, metadata, computer-mediated communication, cross-cultural communication, multilingual information access.

Alex Poole, PhD (*University of North Carolina*). Assistant Professor. Archives and records, digital humanities, digital curation, pedagogy, diversity and inclusivity in the LIS profession

Jeffrey L. Popyack, PhD (*University of Virginia*). Professor. Operations research, stochastic optimization, computational methods of Markov decision processes; artificial intelligence, computer science education.

William C. Regli, PhD (*University of Maryland-College Park*). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Lori Richards, PhD (*University of North Carolina*). Assistant Professor. Archives, digital curation, electronic records management, information technology and digital collections, cloud computing and record keeping, management of information organizations.

Michelle L. Rogers, PhD (*University of Wisconsin-Madison*). Associate Professor. Human-computer interaction, healthcare informatics, human factors engineering, socio-technical systems, health services research, patient safety.

Jeffrey Salvage, MS (*Drexel University*). Teaching Professor. Object-oriented programming, multi-agent systems, software engineering, database theory, introductory programming, data structures.

Dario Salvucci, PhD (*Carnegie Mellon University*) *Department Head, Computer Science*. Professor. Human computer interaction, cognitive science, machine learning, applications for driving.

Kurt Schmidt, MS (*Drexel University*). Associate Teaching Professor. Data structures, math foundations for computer science, programming tools, programming languages.

Ali Shokoufandeh, PhD (*Rutgers University*) *Senior Associate Dean of Research*. Professor. Theory of algorithms, graph theory, combinational optimization, computer vision.

Erin Solovey, PhD (*Tufts University*). Assistant Professor. Human-computer interaction, brain-computer interfaces, tangible interaction, machine learning, human interaction with complex and autonomous systems.

Il-Yeol Song, PhD (*Louisiana State University*) *PhD in Information Studies Program Director*. Professor. Conceptual modeling, ontology and patterns, data warehouse and OLAP, object-oriented analysis and design with UML, medical and bioinformatics data modeling & integration,.

Julia Stoyanovich, PhD (*Columbia University*). Assistant Professor. Data and knowledge management, big data, biological data management, search and ranking.

Brian Stuart, PhD (*Purdue University*). Associate Teaching Professor. Machine learning, networking, robotics, image processing, simulation, interpreters, data storage, operating systems, computer science, data communications, distributed/operating systems, accelerated computer programming, computer graphics.

Deborah Turner, PhD (*University of Washington*). Assistant Professor. Information behavior/interaction, management of information institutions, orality and information.

Kristene Unsworth, PhD (*University of Washington*). Assistant Professor. Information policy, ethics, government information.

Filippos Vokolos, PhD (*Polytechnic University*). Assistant Teaching Professor. System architecture, principles of software design and construction, verification and validation methods for the development of large software systems, foundations of software engineering, software verification & validation, software design, programming languages, dependable software systems.

Rosina Weber, PhD (*Federal University of Santa Catarina*). Associate Professor. Knowledge-based systems; case-based reasoning;

textual case-based reasoning; computational intelligence; knowledge discovery; uncertainty, mainly targeting knowledge management goals in different domains, e.g., software engineering, military, finance, law, bioinformatics, and health sciences.

Erija Yan, PhD (*Indiana University*). Assistant Professor. Network Science, information analysis and retrieval, scholarly communication methods and applications.

Christopher C. Yang, PhD (*University of Arizona, Tucson*). Associate Professor. Web search and mining, security informatics, knowledge management, social media analytics, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, artificial intelligence, digital library, and electronic commerce.

Valerie Ann Yonker, PhD (*Drexel University*). Associate Teaching Professor. Human service information systems, systems analysis and design, measurement in software evaluation, knowledge engineering.

Emeritus Faculty

Michael E. Atwood, PhD (*University of Colorado*) *Associate Dean for Research and for Undergraduate Education*. Professor Emeritus. Human-computer interaction, computer-supported cooperative work, organizational memory.

Thomas A. Childers, PhD (*Rutgers University*). Professor Emeritus. Measurement, evaluation, and planning of information and library services, the effectiveness of information organizations.

David E. Fenske, PhD (*University of Wisconsin-Madison*). Dean Emeritus and Professor. Digital libraries, informatics, knowledge management and information technologies.

John B. Hall, PhD (*Florida State University*). Professor Emeritus. Academic library service, library administration, organization of materials.

Katherine W. McCain, PhD (*Drexel University*). Professor Emeritus. Scholarly communication, information production and use in the research process, development and structure of scientific specialties, diffusion of innovation, bibliometrics, evaluation of information retrieval systems.

Carol Hansen Montgomery, PhD (*Drexel University*) *Dean of Libraries Emeritus*. Research Professor. Selection and use of electronic collections, evaluation of library and information systems, digital libraries, economics of libraries and digital collections.

Gerry Stahl, PhD (*University of Colorado, Northwestern University*). Professor Emeritus. Human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, theory of collaboration.

Howard D. White, PhD (*University of California at Berkeley*). Professor Emeritus. Literature information systems, bibliometrics, research methods, collection development, online searching.

Susan Wiedenbeck, PhD (*University of Pittsburgh*). Professor Emeritus. Human-computer interaction, end-user programming/end-user development, empirical studies of programmers, interface design and evaluation.

Data Science

Major: Data Science

Degree Awarded: Bachelor of Science in Data Science (BSDS)

Calendar Type: Quarter

Total Credit Hours: 188.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 11.0401; 11.0501; 11.0802

Standard Occupational Classification (SOC) code: 15-1121; 15-1141

About the Program

The Bachelor of Data Science (BSDS) prepares students to meet the challenges presented by the explosive growth of very large scale and complex data sources. The availability of data from sources such as business activities, social media and scientific instruments constantly creates new problems requiring data-driven solutions and opportunities and problems for innovation. BS in Data Science students develop the knowledge and skill to address these opportunities for the benefit of individuals and organizations. Students in the degree complete a minor, typically in business or the sciences, to provide knowledge and skill in a specific subject area to which data science techniques can be applied.

Data Science students learn to:

- Define domain specific and context-relevant data analytics questions and hypotheses for individuals and organizations.
- Select relevant data sources and transform data suitable for solving data analytics problems.
- Identify appropriate techniques and tools for acquiring, retrieving, analyzing, and making use of the data.
- Apply data analytics techniques and skills to build analytical and predictive models for answering data science questions.
- Create visualizations and communicate data analytics results to a large audience and decision makers.
- Assess the necessary skills arising from the interdisciplinary nature of data science as a combination of hacking skills, analytical techniques, and domain knowledge.

The degrees in Computing and Security Technology (p. 188), Data Science, and Information Systems (p. 206) share a common first year. This allows students to easily switch among the degrees early in their studies. In addition, some of the electives in each degree are accessible to students in the other two majors and this provides a deeper and broader set of advanced topics for students in all three majors.

Additional Information

For more information about this program, please visit the BS in Data Science web page (<http://drexel.edu/cci/programs/undergraduate-programs/bs-datascience>) on the College of Computing & Informatics' website.

Degree Requirements

Data Science Requirements

INFO 101	Introduction to Information Technology	3.0
INFO 105	Introduction to Informatics	3.0
INFO 108	Foundations of Software	3.0
INFO 151	Web Systems and Services I	3.0
INFO 152	Web Systems and Services II	3.0
INFO 153	Applied Data Management	3.0
INFO 154	Software System Construction	3.0
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0

or CS 461	Database Systems	
INFO 215	Social Aspects of Information Systems	3.0
INFO 216	Issues in Information Policy	3.0
INFO 240	Introduction to Data Science	3.0
INFO 250	Information Visualization	3.0
INFO 300	Information Retrieval Systems	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO 324	Team Process and Product	3.0
INFO 333	Introduction to Information Security	3.0
INFO 371	Data Mining with Machine Learning	3.0
INFO 440	Social Media Trend Spotting	3.0
INFO electives:	Select 2 INFO courses not otherwise required	6.0
Data Science electives:	Select 2 of the following courses:	6.0
INFO 150	Ubiquitous Information Technologies	
INFO 220	Geographic Information Science	
INFO 350	Visual Analytics	
INFO 420	Software Project Management	
INFO 435	Information Services	

Computing and Informatics Requirements

CI 101	Computing and Informatics Design I	2.0
CI 102	Computing and Informatics Design II	2.0
CI 103	Computing and Informatics Design III	2.0
CI 491 [WI]	Senior Project I	3.0
CI 492 [WI]	Senior Project II	3.0
CI 493 [WI]	Senior Project III	3.0

Mathematics and Statistics Requirements

Select one of the following sequences:		12.0
MATH 101	Introduction to Analysis I	
& MATH 102	and Introduction to Analysis II	
& MATH 180	and Discrete Computational Structures	
MATH 121	Calculus I	
& MATH 122	and Calculus II	
& MATH 180	and Discrete Computational Structures	
STAT 201	Introduction to Business Statistics	4.0
STAT 202	Business Statistics II	4.0

Natural Science Requirements

Science electives:	Select from ANAT, BIO, CHEM, ENVS, FDSC, NFS, PHEV, PHYS. Courses from other departments may be considered with advisor approval.	8.0
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Behavioral and Social Science Requirements

PSY 101	General Psychology I	3.0
PSY 330	Cognitive Psychology	3.0

Arts and Humanities Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
COM 230	Techniques of Speaking	3.0
or COM 310	Technical Communication	

University and College Requirements

UNIV CI101	The Drexel Experience	2.0
or CI 120	CCI Transfer Student Seminar	
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0

Minor Requirements¹

Free Electives		24.0
Total Credits		188.0

¹ Students should consult their academic advisor regarding a minor that requires more than 24.0 credits.

Sample Plan of Study

Term 1		Credits
CI 101	Computing and Informatics Design I	2.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
INFO 101	Introduction to Information Technology	3.0
INFO 108	Foundations of Software	3.0
MATH 101 or 121	Introduction to Analysis I Calculus I	4.0
UNIV CI101	The Drexel Experience	1.0
	Term Credits	16.0
Term 2		
CI 102	Computing and Informatics Design II	2.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
INFO 105	Introduction to Informatics	3.0
INFO 151	Web Systems and Services I	3.0
MATH 102 or 122	Introduction to Analysis II Calculus II	4.0
COOP 101	Career Management and Professional Development	0.0
	Term Credits	16.0
Term 3		
CI 103	Computing and Informatics Design III	2.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
INFO 152	Web Systems and Services II	3.0
INFO 215	Social Aspects of Information Systems	3.0
MATH 180	Discrete Computational Structures	4.0
UNIV CI101	The Drexel Experience	1.0
COOP 101	Career Management and Professional Development	0.0
	Term Credits	16.0
Term 4		
INFO 153	Applied Data Management	3.0
INFO 200	Systems Analysis I	3.0
INFO 333	Introduction to Information Security	3.0
PSY 101	General Psychology I	3.0
Free Elective		3.0
	Term Credits	15.0
Term 5		
INFO 210	Database Management Systems	3.0
INFO 216	Issues in Information Policy	3.0
INFO 240	Introduction to Data Science	3.0
INFO 300	Information Retrieval Systems	3.0
STAT 201	Introduction to Business Statistics	4.0
	Term Credits	16.0
Term 6		
COM 230 or 310 [WI]	Techniques of Speaking Technical Communication	3.0
INFO 250	Information Visualization	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO Elective		3.0
STAT 202	Business Statistics II	4.0
	Term Credits	16.0
Term 7		
INFO 440	Social Media Trend Spotting	3.0
PSY 330	Cognitive Psychology	3.0
Data Science Elective		3.0
Free Elective		3.0
Minor Course		3.0
	Term Credits	15.0
Term 8		
INFO 371	Data Mining with Machine Learning	3.0

INFO 324	Team Process and Product	3.0
Free elective		3.0
Minor course		3.0
Science sequence		4.0
	Term Credits	16.0
Term 9		
INFO elective		3.0
Data Science Elective		3.0
Free elective		3.0
Minor course		3.0
Science sequence		4.0
	Term Credits	16.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
Free electives		7.0
Minor courses		6.0
	Term Credits	16.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
INFO elective		3.0
Free elective		3.0
Minor courses		6.0
	Term Credits	15.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
Free electives		9.0
Minor course		3.0
	Term Credits	15.0
Total Credit: 188.0		

Minor in Data Science

Data Science provides a foundation for problem-solving in a data-driven society. The minor in Data Science combined basic courses in statistics, information and technology and social contexts to address problems that require large and disparate datasets.

Any student in any major can benefit from a minor in data science. Graduates with such background knowledge are prepared to actively participate in the application of data science within their major area of study.

The minor is available to all University students in good standing, with the exception of students majoring in data science.

STAT 201	Introduction to Business Statistics	4.0
STAT 202	Business Statistics II	4.0
INFO 240	Introduction to Data Science	3.0
INFO 371	Data Mining with Machine Learning	3.0
INFO 440	Social Media Trend Spotting	3.0
Select 3 of the following:		9.0
INFO 150	Ubiquitous Information Technologies	
INFO 220	Geographic Information Science	
INFO 250	Information Visualization	
INFO 350	Visual Analytics	
INFO 435	Information Services	
CS 461	Database Systems	
	or INFO 210 (Database Management Systems)	
Total Credits		26.0

Accelerated Degrees

The College of Computing & Informatics offers several Accelerated Degree programs designed to allow students to complete both a bachelor's degree and a graduate degree along with cooperative educational experience in fewer years than would be typical if pursuing the degrees separately. Students accepted in this program can combine any of the College bachelor's and master's degree programs as well as other options.

- Any CCI BS/any CCI MS Accelerated Degree (BS & MS in five years, including 2 Co-ops)
- Any CCI BS/MBA Accelerated Degree (BS/MBA)
- Any CCI BS/JD Accelerated Degree (BS/JD)

For more information on the criteria for entering this program, visit the BS/MS Accelerated Degree (<http://www.drexel.edu/undergrad/academics/accelerated-degrees>) page on Drexel's website.

For more information on how to apply for the BS/MS Accelerated Degree program, please visit the College of Computing & Informatics' website (<http://drexel.edu/ccj/admissions/undergraduate/admissions-requirements/cci-bsms-degree-admissions>).

Co-op/Career Opportunities

Co-Op Options

Three co-op options are available for this program:

- 5-year/3 co-op
- 4-year/1 co-op
- Accelerated Degree (BS & MS): 5-year/2 co-op

Career Opportunities

The new data science major provides valuable skills that can be transported to a number of job settings. The demand for graduates with data science knowledge is strong, and employers often want evidence of additional communication and problem-solving skills that can be applicable to specific disciplines. Data science program graduates could potentially serve as key members of organizational data science teams able to create novel information products, with an emphasis on solving problems that can only be addressed using large and disparate data sources. The program is also an excellent preparation for graduate study in data science.

Sample job titles for data science graduates include:

- Data Scientist
- Business Intelligence Officer
- Information Architect
- Usability Analyst

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Drexel University Libraries

Drexel University Libraries (<http://www.library.drexel.edu>) is a learning enterprise, advancing the University's academic mission through serving as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through

four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, software engineering, health informatics, information systems, and computing technology. Resources are available online at library.drexel.edu or in-person at W. W. Hagerty Library (<http://www.library.drexel.edu/locations>).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

iCommons

Located in Room 106 of the Rush Building, the College's iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42" display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge software development and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as "DreamSpark" that allows students free access to a wide array of Microsoft software titles and operating systems.

The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

Rush Building

The Rush Building houses classrooms, CCI administrative offices (academic advising, graduate admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

The Information Technology Laboratory, located in the Rush Building, consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high

powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports. In addition, a special system has been built into the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

University Crossings - Cyber Learning Center and Computer Lab

CCI also has classrooms, administrative office and faculty offices located in University Crossings, located at the corner of JFK Blvd. and Market Street. The building houses the Cyber Learning Center, a student computer lab, as well as several classrooms with video-conference enabled technology and media projection capabilities.

The Cyber Learning Center (CLC) provides consulting and other learning resources for students taking computer science classes. The CLC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

Both the CLC and UC Lab now serve as a central hub for small group work, student meetings, and TA assistance. The UC Lab is organized with desk space around the perimeter of the lab for individual or partner/pair-programmed student work, as well as with clusters of tables which can be connected as needed into pods to create workspaces for larger groups.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, across Drexel's main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GICL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College's research web page (<http://cci.drexel.edu/research.aspx>).

Alumni Garden

The Rush Building's Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (<http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx>) may be reserved for Drexel events.

3401 Market Street

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such and University initiatives such as the Isaac L. Auerbach Cybersecurity Institute (<http://drexel.edu/cci/research/centers-institutes/Cybersecurity>). The Institute's Auerbach and Berger Families Cybersecurity Laboratory serves as University's first training facility dedicated to identifying challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

Evaluations

The College of Computing & Informatics works continually to improve its degree programs. As part of this effort, the Data Science degree is evaluated relative to the following Objectives and Outcomes.

BS Data Science Program Educational Objectives

Within three to five years of graduation, alumni of the program are expected to achieve one or more of the following milestones:

- Be valued contributors to private or public organizations as demonstrated by promotions, increased responsibility, or other professional recognition
- Contribute to professional knowledge as demonstrated by published papers, technical reports, patents, or conference presentations
- Succeed in continuing professional development as demonstrated by completion of graduate studies or professional certifications
- Display commitment and leadership within the professional and community as demonstrated by contributions towards society's greater good and prosperity.

BS Data Science Program Student Outcomes

The program enables students to attain, by the time of graduation

- An ability to apply knowledge of computing and mathematics appropriate to the discipline
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- An ability to function effectively on teams to accomplish a common goal
- An understanding of professional, ethical, legal, security and social issues
- An ability to communicate effectively with a range of audiences
- An ability to analyze the local and global impact of computing on individuals, organizations, and society
- Recognition of the need for and an ability to engage in continuing professional development
- An ability to use current techniques, skills, and tools necessary for computing practice

Information Science Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Information behavior, public libraries, gender, children, young adults, multicultural materials.

Larry Alexander, PhD (*University of Pennsylvania*) Executive in Residence. Research Professor. Large scale modeling and simulation, pattern recognition, the future of information technology.

Yuan An, PhD (*University of Toronto, Canada*). Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web.

Ellen Bass, PhD (*Georgia Institute of Technology*) Head of Department of Information Science; Joint Appointment with the College of Nursing and Health Professions. Professor. Characterizing human judgement

and decision making, modeling human judgement when supported by information automation, computational models of human-human and human-automation coordination.

Jennifer Booker, PhD (*Drexel University*). Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems.

Christopher Carroll, MS (*Drexel University*). Assistant Teaching Professor. Information technology within healthcare companies, computer networking and design, IT infrastructure, server technology, information security, virtualization and cloud computing.

Chaomei Chen, PhD (*University of Liverpool*). Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction.

Catherine D. Collins, MLIS (*Indiana University*). Associate Teaching Professor. Knowledge management, collection development, management of information organizations, information sources and services, international development.

John D'Ignazio, MS (*Carnegie Mellon University*). Assistant Teaching Professor. Human information interaction, digital curation, design of information infrastructures, methods development to elicit and evaluate impact on information environments, metadata schemes.

Prudence W. Dalrymple, PhD (*University of Wisconsin-Madison*) *Director, Institute for Healthcare Informatics*. Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice.

M. Carl Drott, PhD (*University of Michigan*). Associate Professor. Systems analysis techniques, web usage, competitive intelligence.

Andrea Forte, PhD (*Georgia Institute of Technology*). Associate Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy.

Susan Gasson, PhD (*University of Warwick*). Associate Professor. The co-design of business and IT-systems, distributed cognition & knowledge management in boundary-spanning groups, human-centered design, social informatics, online learning communities, grounded theory.

Jane Greenberg, PhD (*University of Pittsburgh*) *Alice B. Kroeger Professor*. Metadata, ontological engineering, data science, knowledge organization, information retrieval

Peter Grillo, PhD (*Temple University*) *Associate Department Head for Undergraduate Affairs, Information Science*. Teaching Professor. Strategic applications of technology within organizations.

Gregory W. Hislop, PhD (*Drexel University*) *Senior Associate Dean for Academic Affairs*. Professor. Information technology for teaching and learning, online education, structure and organization of the information disciplines, computing education research, software evaluation and characterization.

Xiaohua Tony Hu, PhD (*University of Regina, Canada*). Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics.

Weimao Ke, PhD (*University of North Carolina at Chapel Hill*). Associate Professor. Information retrieval (IR), distributed systems, intelligent filtering/recommendation, information visualization, network science, complex systems, machine learning, text/data mining, multi-agent systems, the notion of information.

Xia Lin, PhD (*University of Maryland*). Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments.

Linda S. Marion, PhD (*Drexel University*). Teaching Professor. Formal and informal communication, bibliometric studies of scholarly communication, diffusion of information, information use in the social sciences, academic and public libraries, information science education.

Delia Neuman, PhD (*The Ohio State University*). Professor Emeritus. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Danuta A. Nitecki, PhD (*University of Maryland at College Park*) *Dean of Libraries*. Professor. Library metrics and use in management, library as place, and academic library service models.

Jung-ran Park, PhD (*University of Hawaii at Manoa*). Associate Professor. Knowledge organization and representation, metadata, computer-mediated communication, cross-cultural communication, multilingual information access.

Alex Poole, PhD (*University of North Carolina*). Assistant Professor. Archives and records, digital humanities, digital curation, pedagogy, diversity and inclusivity in the LIS profession

Lori Richards, PhD (*University of North Carolina*). Assistant Professor. Archives, digital curation, electronic records management, information technology and digital collections, cloud computing and record keeping, management of information organizations.

Michelle L. Rogers, PhD (*University of Wisconsin-Madison*). Associate Professor. Human-computer interaction, healthcare informatics, human factors engineering, socio-technical systems, health services research, patient safety.

Aleksandra Sarcevic, PhD (*Rutgers University*). Assistant Professor. Computer-supported cooperative work, human-computer interaction, healthcare informatics, crisis informatics, social analysis of information and communications technology (ICT).

Il-Yeol Song, PhD (*Louisiana State University*) *PhD in Information Studies Program Director*. Professor. Conceptual modeling, ontology and patterns, data warehouse and OLAP, object-oriented analysis and design with UML, medical and bioinformatics data modeling & integration,.

Deborah Turner, PhD (*University of Washington*). Assistant Professor. Information behavior/interaction, management of information institutions, orality and information.

Kristene Unsworth, PhD (*University of Washington*). Assistant Professor. Information policy, ethics, government information.

Rosina Weber, PhD (*Federal University of Santa Catarina*). Associate Professor. Knowledge-based systems; case-based reasoning; textual case-based reasoning; computational intelligence; knowledge discovery; uncertainty, mainly targeting knowledge management goals

in different domains, e.g., software engineering, military, finance, law, bioninformatics, and health sciences.

Christopher C. Yang, PhD (*University of Arizona, Tucson*). Associate Professor. Web search and mining, security informatics, knowledge management, social media analytics, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, artificial intelligence, digital library, and electronic commerce.

Valerie Ann Yonker, PhD (*Drexel University*). Associate Teaching Professor. Human service information systems, systems analysis and design, measurement in software evaluation, knowledge engineering.

Emeritus Faculty

Michael E. Atwood, PhD (*University of Colorado*) Associate Dean for Research and for Undergraduate Education. Professor Emeritus. Human-computer interaction, computer-supported cooperative work, organizational memory.

Thomas A. Childers, PhD (*Rutgers University*). Professor Emeritus. Measurement, evaluation, and planning of information and library services, the effectiveness of information organizations.

David E. Fenske, PhD (*University of Wisconsin-Madison*). Dean Emeritus and Professor. Digital libraries, informatics, knowledge management and information technologies.

Katherine W. McCain, PhD (*Drexel University*). Professor Emeritus. Scholarly communication, information production and use in the research process, development and structure of scientific specialties, diffusion of innovation, bibliometrics, evaluation of information retrieval systems.

Carol Hansen Montgomery, PhD (*Drexel University*) Dean of Libraries Emeritus. Research Professor. Selection and use of electronic collections, evaluation of library and information systems, digital libraries, economics of libraries and digital collections.

Howard D. White, PhD (*University of California at Berkeley*). Professor Emeritus. Literature information systems, bibliometrics, research methods, collection development, online searching.

Susan Wiedenbeck, PhD (*University of Pittsburgh*). Professor Emeritus. Human-computer interaction, end-user programming/end-user development, empirical studies of programmers, interface design and evaluation.

Informatics

Major: Informatics

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 188.0-189.0

Classification of Instructional Programs (CIP) code: 11.1014

Standard Occupational Classification (SOC) code: 15-1132; 15-1133

About the Program

Note: Effective Fall 2016, students will no longer be accepted into this program. Students are encouraged to apply for the BS in Data Science (p. 195) program, which encompasses the content of the BS in Informatics program while adding additional coverage in computational techniques.

The College of Computing & Informatics' Bachelor of Science in Informatics (BSI) prepares students to extract and present valuable information from massive data sets. The volume of data from sources such as social media and scientific measurement continues to grow at high rates, and organizations are creating teams of technical experts who can deal with this deluge of data. BSI students develop the knowledge and skill to work on these problems in data science.

Informatics students learn to

- define information needs of individuals and organizations;
- select and transform data to increase usefulness for solving particular problems;
- analyze and synthesize unstructured data to create actionable information;
- create information visualizations for data exploration and presentation;
- manage very large volume data sources from acquisition through disposal;
- secure, preserve, and control access to data in a manner consistent with legal and organizational considerations.

The informatics curriculum focuses on the key components of informatics: people, information, and technology. The degree encompasses a broad range of topics related to the data life cycle from creation to presentation. To link the degree program to real work problems, students will be required to align themselves with a discipline through the identification of a minor.

Degree Requirements

Sample Plan of Study

Term 1		Credits
CI 101	Computing and Informatics Design I	2.0
INFO 101	Introduction to Information Technology	3.0
INFO 108	Foundations of Software	3.0
MATH 101 or 121	Introduction to Analysis I Calculus I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV I101		1.0
Term Credits		16.0
Term 2		Credits
CI 102	Computing and Informatics Design II	2.0
INFO 105	Introduction to Informatics	3.0
INFO 151	Web Systems and Services I	3.0
MATH 102 or 122	Introduction to Analysis II Calculus II	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101 ***	Career Management and Professional Development	0.0
Term Credits		16.0
Term 3		Credits
CI 103	Computing and Informatics Design III	2.0
INFO 110	Human-Computer Interaction I	3.0
INFO 152	Web Systems and Services II	3.0
MATH 180	Discrete Computational Structures	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV I101		1.0
Term Credits		16.0
Term 4		Credits
INFO 153	Applied Data Management	3.0

INFO 200	Systems Analysis I	3.0
INFO 333	Introduction to Information Security	3.0
SOC 250	Research Methods I	4.0
PSY 101	General Psychology I	3.0
Term Credits		16.0
Term 5		
INFO 210	Database Management Systems	3.0
INFO 216	Issues in Information Policy	3.0
INFO 240	Introduction to Data Science	3.0
INFO 300	Information Retrieval Systems	3.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		16.0
Term 6		
INFO 215	Social Aspects of Information Systems	3.0
INFO 250	Information Visualization	3.0
STAT 202	Business Statistics II	4.0
PHIL 105	Critical Reasoning	3.0
COM 230	Techniques of Speaking	3.0
Term Credits		16.0
Term 7		
INFO 440	Social Media Trend Spotting	3.0
PSY 330	Cognitive Psychology	3.0
PHIL 311	Ethics and Information Technology	3.0
Minor course		3.0
Free elective		3.0
Term Credits		15.0
Term 8		
INFO 324	Team Process and Product	3.0
INFO 371	Data Mining with Machine Learning	3.0
Minor course		3.0
Science sequence		4.0
Free elective		3.0
Term Credits		16.0
Term 9		
Free elective		3.0
INFO electives		6.0
Minor course		3.0
Science sequence		4.0
Term Credits		16.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
Minor courses		6.0
Free electives		7.0
Term Credits		16.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
INFO elective		3.0
Minor courses		6.0
Free elective		3.0
Term Credits		15.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
Minor course		3.0
Free electives		9.0
Term Credits		15.0
Total Credit: 189.0		

*** COOP 101 is taken either winter or spring depending on co-op cycle. Please consult your advisor for additional information.

Minor in Informatics

Note: Effective Fall Term 2015, students are no longer being accepted into this program.

Informatics is the science of information, the practice of information processing, and the engineering of information systems. The minor in informatics combines basic courses in information systems and technology with courses that address the cognitive issues and social contexts in which information systems and technologies are embedded.

Any student in any major can benefit from a minor in informatics. Graduates with such background knowledge are prepared to actively participate in the application of information technology within their major area of study.

The minor is available to all University students in good standing, with the exception of students majoring in informatics, information systems, or information technology.

Required Courses

INFO 101	Introduction to Information Technology	3.0
INFO 105	Introduction to Informatics	3.0
INFO 108	Foundations of Software	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 210	Database Management Systems	3.0
INFO 215	Social Aspects of Information Systems	3.0
Select two from the following list:		6.0
INFO 216	Issues in Information Policy	
INFO 220	Geographic Information Science	
INFO 240	Introduction to Data Science	
INFO 250	Information Visualization	
INFO 440	Social Media Trend Spotting	
Total Credits		24.0

Accelerated Degrees

The College of Computing & Informatics offers several Accelerated Degree programs designed to allow students to complete both a bachelor's degree and a graduate degree along with cooperative educational experience in fewer years than would be typical if pursuing the degrees separately. Students accepted in this program can combine any of the College's bachelor's and master's degree programs as well as other options:

- Any CCI BS/any CCI MS Accelerated Degree (BS & MS in five years, including 2 Co-ops)
- Any CCI BS/MBA Accelerated Degree (BS/MBA)
- Any CCI BS/JD Accelerated Degree (BS/JD)

For more information on the criteria for entering this program, visit the BS/MS Accelerated Degree (<http://www.drexel.edu/undergrad/academics/accelerated-degrees>) page on Drexel's website.

For more information on how to apply for the BS/MS Accelerated Degree program, please visit the College of Computing & Informatics' website (<http://drexel.edu/cci/admissions/undergraduate/admissions-requirements/cci-bsms-degree-admissions>).

Co-op/Career Opportunities

Co-Op Options

Two co-op options are available for this program:

- 5-year/3 co-op
- 4-year/1 co-op
- Accelerated Degree (BS & MS): 5-year/2 co-op

Career Opportunities

The informatics major provides valuable skills that can be transported to a number of job settings. The demand for graduates with informatics knowledge is strong, and employers often want evidence of additional communication and problem-solving skills that can be applicable to specific disciplines. The program is also an excellent preparation for graduate study.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Evaluations

The College of Computing & Informatics works continually to improve its degree programs. As part of this effort, the Informatics degree is evaluated relative to the following Outcomes and Objectives.

Program Educational Objectives

Within three to five years of graduating, alumni of the program are expected to achieve one or more of the following milestones:

- Be a valued contributor to private or public organizations as demonstrated by promotions, increased responsibility, or other professional recognition
- Contribute to professional knowledge as demonstrated by published papers, technical reports, patents, or conference presentations
- Succeed in continuing professional development as demonstrated by completion of graduate studies or professional certifications
- Demonstrate commitment and leadership within their profession and community as demonstrated by professional and community activity or contributions towards society's greater good and prosperity

Student Outcomes

The program enables students to achieve, by the time of graduation:

- An ability to analyze a problem or information needs (of users or organizations) and identify and define the data needed to support decision making to resolve the problem or need.
- An ability to discover, create, evaluate and synthesize reliable data from large disparate sources of unstructured and messy data that occur in a variety of formats.
- An ability to transform large data sets through analysis into actionable information that individuals and organizations need.
- An ability to present data tailored to the information needs of different stakeholder groups using a variety of appropriate visualization techniques.
- An ability to secure, retain, and preserve data and information using the latest techniques and in accordance with data life cycle management practices and current information policies at the organizational, local, national and global levels.

- An ability to assess the value as well as legal and regulatory implications of using data and information for organizations, individuals, and society.

Computing & Informatics Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Information behavior, public libraries, gender, children, young adults, multicultural materials.

Larry Alexander, PhD (*University of Pennsylvania*) *Executive in Residence*. Research Professor. Large scale modeling and simulation, pattern recognition, the future of information technology.

Yuan An, PhD (*University of Toronto, Canada*). Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web.

David Augenblick, MS (*University of Pennsylvania*). Associate Teaching Professor. Introductory and object-oriented programming, data structures and database systems, computer application project management, application of computer programming principles and solutions to engineering problems.

Marcello Balduccini, PhD (*Texas Tech University*) *Senior Research Scientist, Applied Informatics Group*. Associate Research Professor. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

Ellen Bass, PhD (*Georgia Institute of Technology*) *Head of Department of Information Science; Joint Appointment with the College of Nursing and Health Professions*. Professor. Characterizing human judgement and decision making, modeling human judgement when supported by information automation, computational models of human-human and human-automation coordination.

Mark Boady, PhD (*Drexel University*). Assistant Teaching Professor. Computer Algebra, complex symbolic calculations, automation of computation problems

Jennifer Booker, PhD (*Drexel University*). Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems.

David E. Breen, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Matthew Burlick, PhD (*Stevens Institute of Technology*). Assistant Teaching Professor. Image processing, machine learning, real-time video tracking, object detection and classification, statistics/probability, and acoustics

Yuanfang Cai, PhD (*University of Virginia*). Associate Professor. Formal software design modeling and analysis, software economics, software evolution and modularity.

Christopher Carroll, MS (*Drexel University*). Assistant Teaching Professor. Information technology within healthcare companies, computer networking and design, IT infrastructure, server technology, information security, virtualization and cloud computing.

Bruce W. Char, PhD (*University of California-Berkeley*). Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments parallel and distributed computation.

Chaomei Chen, PhD (*University of Liverpool*). Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction.

Catherine D. Collins, MLIS (*Indiana University*). Associate Teaching Professor. Knowledge management, collection development, management of information organizations, information sources and services, international development.

John D'Ignazio, MS (*Carnegie Mellon University*). Assistant Teaching Professor. Human information interaction, digital curation, design of information infrastructures, methods development to elicit and evaluate impact on information environments, metadata schemes.

Prudence W. Dalrymple, PhD (*University of Wisconsin-Madison*) Director, *Institute for Healthcare Informatics*. Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice.

M. Carl Drott, PhD (*University of Michigan*). Associate Professor. Systems analysis techniques, web usage, competitive intelligence.

Andrea Forte, PhD (*Georgia Institute of Technology*). Associate Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy.

Susan Gasson, PhD (*University of Warwick*). Associate Professor. The co-design of business and IT-systems, distributed cognition & knowledge management in boundary-spanning groups, human-centered design, social informatics, online learning communities, grounded theory.

Christopher Geib, PhD (*University of Edinburgh*). Associate Professor. Decision making and reasoning under conditions of uncertainty, planning, scheduling, constraint, based reasoning, human computer and robot interaction, probabilistic reasoning, computer network security, large scale process control, user interfaces.

Colin Gordon, PhD (*University of Washington*). Assistant Professor. Software reliability, program behavior, concurrent and systems-level code, formal assurance, programming models, distributed computing, even testing

Jane Greenberg, PhD (*University of Pittsburgh*) *Alice B. Kroeger Professor*. Metadata, ontological engineering, data science, knowledge organization, information retrieval

Rachel Greenstadt, PhD (*Harvard University*). Associate Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security.

Peter Grillo, PhD (*Temple University*) *Associate Department Head for Undergraduate Affairs, Information Science*. Teaching Professor. Strategic applications of technology within organizations.

Gregory W. Hislop, PhD (*Drexel University*) *Senior Associate Dean for Academic Affairs*. Professor. Information technology for teaching and learning, online education, structure and organization of the information

disciplines, computing education research, software evaluation and characterization.

Xiaohua Tony Hu, PhD (*University of Regina, Canada*). Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics.

Jeremy R. Johnson, PhD (*Ohio State University*). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

Weimao Ke, PhD (*University of North Carolina at Chapel Hill*). Associate Professor. Information retrieval (IR), distributed systems, intelligent filtering/recommendation, information visualization, network science, complex systems, machine learning, text/data mining, multi-agent systems, the notion of information.

Michael Khoo, PhD (*University of Colorado at Boulder*). Assistant Teaching Professor. The understandings and practices that users bring to their interactions with information systems, with a focus on the evaluation of digital libraries and educational technologies.

Xia Lin, PhD (*University of Maryland*). Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments.

Geoffrey Mainland, PhD (*Harvard University*). Assistant Professor. High-level programming languages and runtime support for non-general purpose computation.

Spiros Mancoridis, PhD (*University of Toronto*). Professor. Software engineering; software security; code analysis; evolutionary computation.

Gabriela Marcu, PhD (*Carnegie Mellon University*). Assistant Teaching Professor. Human-computer interaction, health informatics, action research, ethnography, user experience design, designing for social change, organizational information systems, ubiquitous computing, knowledge management.

Linda S. Marion, PhD (*Drexel University*). Teaching Professor. Formal and informal communication, bibliometric studies of scholarly communication, diffusion of information, information use in the social sciences, academic and public libraries, information science education.

Adelaida Alban Medlock, MS (*Drexel University*). Associate Teaching Professor. Introductory programming; computer science education.

William Mongan, MS (*Drexel University*) *Associate Department Head for Undergraduate Affairs, Computer Science*. Associate Teaching Professor. Service-oriented architectures, program comprehension, reverse engineering, software engineering, computer architecture, computer science education, engineering education outreach

Gaurav Naik, MS (*Drexel University*). Assistant Research Professor. Computer networking and cybersecurity

Delia Neuman, PhD (*The Ohio State University*). Professor Emeritus. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Ko Nishino, PhD (*University of Tokyo*) *Associate Department Head for Graduate Affairs, Computer Science*. Professor. Computer vision, computer graphics, analysis and synthesis of visual appearance.

Danuta A. Nitecki, PhD (*University of Maryland at College Park*) *Dean of Libraries*. Professor. Library metrics and use in management, library as place, and academic library service models.

Krzysztof Nowak, PhD (*Washington University*). Associate Teaching Professor. Fourier analysis, partial differential equations, image processing, wavelets, asymptotic distribution of eigenvalues, numerical methods and algorithms, computer science education.

Santiago Ontañón, PhD (*University of Barcelona*). Assistant Professor. Game AI, computer games, artificial intelligence, machine learning, case-based reasoning

Jung-ran Park, PhD (*University of Hawaii at Manoa*). Associate Professor. Knowledge organization and representation, metadata, computer-mediated communication, cross-cultural communication, multilingual information access.

Alex Poole, PhD (*University of North Carolina*). Assistant Professor. Archives and records, digital humanities, digital curation, pedagogy, diversity and inclusivity in the LIS profession

Jeffrey L. Popyack, PhD (*University of Virginia*). Professor. Operations research, stochastic optimization, computational methods of Markov decision processes; artificial intelligence, computer science education.

William C. Regli, PhD (*University of Maryland-College Park*). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Lori Richards, PhD (*University of North Carolina*). Assistant Professor. Archives, digital curation, electronic records management, information technology and digital collections, cloud computing and record keeping, management of information organizations.

Michelle L. Rogers, PhD (*University of Wisconsin-Madison*). Associate Professor. Human-computer interaction, healthcare informatics, human factors engineering, socio-technical systems, health services research, patient safety.

Jeffrey Salvage, MS (*Drexel University*). Teaching Professor. Object-oriented programming, multi-agent systems, software engineering, database theory, introductory programming, data structures.

Dario Salvucci, PhD (*Carnegie Mellon University*) *Department Head, Computer Science*. Professor. Human computer interaction, cognitive science, machine learning, applications for driving.

Kurt Schmidt, MS (*Drexel University*). Associate Teaching Professor. Data structures, math foundations for computer science, programming tools, programming languages.

Ali Shokoufandeh, PhD (*Rutgers University*) *Senior Associate Dean of Research*. Professor. Theory of algorithms, graph theory, combinational optimization, computer vision.

Erin Solovey, PhD (*Tufts University*). Assistant Professor. Human-computer interaction, brain-computer interfaces, tangible interaction, machine learning, human interaction with complex and autonomous systems.

Il-Yeol Song, PhD (*Louisiana State University*) *PhD in Information Studies Program Director*. Professor. Conceptual modeling, ontology and patterns, data warehouse and OLAP, object-oriented analysis and design with UML, medical and bioinformatics data modeling & integration,.

Julia Stoyanovich, PhD (*Columbia University*). Assistant Professor. Data and knowledge management, big data, biological data management, search and ranking.

Brian Stuart, PhD (*Purdue University*). Associate Teaching Professor. Machine learning, networking, robotics, image processing, simulation, interpreters, data storage, operating systems, computer science, data communications, distributed/operating systems, accelerated computer programming, computer graphics.

Deborah Turner, PhD (*University of Washington*). Assistant Professor. Information behavior/interaction, management of information institutions, orality and information.

Kristene Unsworth, PhD (*University of Washington*). Assistant Professor. Information policy, ethics, government information.

Filippos Vokolos, PhD (*Polytechnic University*). Assistant Teaching Professor. System architecture, principles of software design and construction, verification and validation methods for the development of large software systems, foundations of software engineering, software verification & validation, software design, programming languages, dependable software systems.

Rosina Weber, PhD (*Federal University of Santa Catarina*). Associate Professor. Knowledge-based systems; case-based reasoning; textual case-based reasoning; computational intelligence; knowledge discovery; uncertainty, mainly targeting knowledge management goals in different domains, e.g., software engineering, military, finance, law, bioinformatics, and health sciences.

Erija Yan, PhD (*Indiana University*). Assistant Professor. Network Science, information analysis and retrieval, scholarly communication methods and applications.

Christopher C. Yang, PhD (*University of Arizona, Tucson*). Associate Professor. Web search and mining, security informatics, knowledge management, social media analytics, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, artificial intelligence, digital library, and electronic commerce.

Valerie Ann Yonker, PhD (*Drexel University*). Associate Teaching Professor. Human service information systems, systems analysis and design, measurement in software evaluation, knowledge engineering.

Emeritus Faculty

Michael E. Atwood, PhD (*University of Colorado*) *Associate Dean for Research and for Undergraduate Education*. Professor Emeritus. Human-computer interaction, computer-supported cooperative work, organizational memory.

Thomas A. Childers, PhD (*Rutgers University*). Professor Emeritus. Measurement, evaluation, and planning of information and library services, the effectiveness of information organizations.

David E. Fenske, PhD (*University of Wisconsin-Madison*). Dean Emeritus and Professor. Digital libraries, informatics, knowledge management and information technologies.

John B. Hall, PhD (*Florida State University*). Professor Emeritus. Academic library service, library administration, organization of materials.

Katherine W. McCain, PhD (*Drexel University*). Professor Emeritus. Scholarly communication, information production and use in the research process, development and structure of scientific specialties, diffusion of innovation, bibliometrics, evaluation of information retrieval systems.

Carol Hansen Montgomery, PhD (*Drexel University*) *Dean of Libraries Emeritus*. Research Professor. Selection and use of electronic collections, evaluation of library and information systems, digital libraries, economics of libraries and digital collections.

Gerry Stahl, PhD (*University of Colorado, Northwestern University*). Professor Emeritus. Human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, theory of collaboration.

Howard D. White, PhD (*University of California at Berkeley*). Professor Emeritus. Literature information systems, bibliometrics, research methods, collection development, online searching.

Susan Wiedenbeck, PhD (*University of Pittsburgh*). Professor Emeritus. Human-computer interaction, end-user programming/end-user development, empirical studies of programmers, interface design and evaluation.

Information Systems

Major: Information Systems

Degree Awarded: Bachelor of Science Degree (BS)

Calendar Type: Quarter

Total Credit Hours: 188.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 11.0401

Standard Occupational Classification (SOC) code: 11-3021

About the Program

The College of Computing & Informatics' Bachelor of Science in Information Systems (BSIS) prepares students to apply information technology for the benefit of individuals and organizations. Students develop the skills and knowledge to design, develop, and manage leading-edge information systems. Since many Information Systems students choose careers in business organizations, a minor in business is built in to the degree requirements.

The Information Systems curriculum prepares students for a wide range of information technology applications. Students learn how to determine client needs, design appropriate solutions, specify data architectures, and improve usability of systems.

The core courses in the program address topics including fundamentals of programming, system design, database management systems, networking, security and privacy, and social implications of information technology. These courses provide a foundation for more advanced courses in technical areas of interest to each student. The technical courses are supplemented by course in business, behavioral sciences, natural science, mathematics, and humanities to provide balance and useful supplemental materials for information systems careers.

The degrees in Computing and Security Technology (p. 188), Data Science (p. 195), and Information Systems share a common first year. This allows students to easily switch among the degrees early in their studies. In addition, some of the electives in each degree are accessible

to students in the other two majors and this provides a deeper and broader set of advanced topics for students in all three majors.

Additional Information

For more information about this program, please visit the BS in Information Systems web page (<http://drexel.edu/cci/programs/undergraduate-programs/bs-information-systems>) on the College of Computing & Informatics' website.

Degree Requirements

Information Systems Requirements

INFO 101	Introduction to Information Technology	3.0
INFO 105	Introduction to Informatics	3.0
INFO 108	Foundations of Software	3.0
INFO 151	Web Systems and Services I	3.0
INFO 152	Web Systems and Services II	3.0
INFO 153	Applied Data Management	3.0
INFO 154	Software System Construction	3.0
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0
INFO 215	Social Aspects of Information Systems	3.0
INFO 216	Issues in Information Policy	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO 324	Team Process and Product	3.0
INFO 330	Computer Networking Technology I	4.0
INFO 333	Introduction to Information Security	3.0
INFO 355	Systems Analysis II	3.0
INFO 420	Software Project Management	3.0
Information Systems Electives *		12.0

Computing and Informatics Requirements

CI 101	Computing and Informatics Design I	2.0
CI 102	Computing and Informatics Design II	2.0
CI 103	Computing and Informatics Design III	2.0
CI 491 [WI]	Senior Project I	3.0
CI 492 [WI]	Senior Project II	3.0
CI 493 [WI]	Senior Project III	3.0

Business Minor Requirements (See Minor Requirements below)

Students not selecting a business minor are still required to take STAT 201.

Mathematics Requirements

Select one of the following sequences:	12.0
MATH 101 & MATH 102 & MATH 180	Introduction to Analysis I and Introduction to Analysis II and Discrete Computational Structures
MATH 121 & MATH 122 & MATH 180	Calculus I and Calculus II and Discrete Computational Structures

Natural Science Requirements

Select 8.0 credits from any non-required courses from the following: ANAT, BIO, CHEM, ENVS, FDSC, NFS, PHEV, PHYS, HSCI, GEO, ENSS	8.0
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Liberal Studies Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
COM 230	Techniques of Speaking	3.0
or COM 310	Technical Communication	
PSY 101	General Psychology I	3.0
PSY 330	Cognitive Psychology	3.0

University and College Requirements

UNIV CI101	The Drexel Experience	2.0
or CI 120	CCI Transfer Student Seminar	
CIVC 101	Introduction to Civic Engagement	1.0

COOP 101	Career Management and Professional Development	0.0
Free Electives		44.0
Total Credits		188.0

* Any non-required INFO course

Business Minor Requirement

In addition to taking STAT 201, students complete the requirements for one of the following business minors. *Please note:* MIS classes do not count towards the Business Administration Minor for Information Systems students. Students must choose another option to fulfill the Business Administration Minor requirements.

- Accounting (p. 330)
- Business Administration
- Economics
- Finance
- International Economics (p. 375)
- Legal Studies (p. 343)
- Marketing (p. 349)
- Operations & Supply Chain Management (p. 352)

Sample Plan of Study

5 YR UG Co-op Concentration

Term	Credits	
Term 1		
CI 101	Computing and Informatics Design I	2.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
INFO 101	Introduction to Information Technology	3.0
INFO 108	Foundations of Software	3.0
MATH 101 or 121	Introduction to Analysis I Calculus I	4.0
UNIV CI101	The Drexel Experience	1.0
	Term Credits	16.0
Term 2		
CI 102	Computing and Informatics Design II	2.0
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101**	Career Management and Professional Development	0.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
INFO 105	Introduction to Informatics	3.0
INFO 151	Web Systems and Services I	3.0
MATH 102 or 122	Introduction to Analysis II Calculus II	4.0
	Term Credits	16.0
Term 3		
CI 103	Computing and Informatics Design III	2.0
COOP 101**	Career Management and Professional Development	0.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
INFO 152	Web Systems and Services II	3.0
INFO 215	Social Aspects of Information Systems	3.0
MATH 180	Discrete Computational Structures	4.0
UNIV CI101	The Drexel Experience	1.0
	Term Credits	16.0
Term 4		
INFO 153	Applied Data Management	3.0
INFO 200	Systems Analysis I	3.0
INFO 333	Introduction to Information Security	3.0
Free electives		6.0
	Term Credits	15.0

Term 5		
INFO 154	Software System Construction	3.0
INFO 210	Database Management Systems	3.0
INFO 216	Issues in Information Policy	3.0
PSY 101	General Psychology I	3.0
Free elective		3.0
	Term Credits	15.0
Term 6		
INFO 324	Team Process and Product	3.0
INFO 355	Systems Analysis II	3.0
COM 320 [WI] or 310 [WI]	Science Writing Technical Communication	3.0
Free electives		6.0
Business elective		4.0
	Term Credits	19.0
Term 7		
INFO 310	Human-Computer Interaction II	3.0
INFO 330	Computer Networking Technology I	4.0
PSY 330	Cognitive Psychology	3.0
INFO elective		3.0
Business elective		4.0
	Term Credits	17.0
Term 8		
INFO 420	Software Project Management	3.0
Science Sequence Course 1*		4.0
Business elective		4.0
Free electives		6.0
	Term Credits	17.0
Term 9		
Science Sequence Course 2*		4.0
Business electives		8.0
Free elective		4.0
	Term Credits	16.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
INFO electives		6.0
Business elective		4.0
Free elective		3.0
	Term Credits	16.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
INFO elective		3.0
Free electives		10.0
	Term Credits	16.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
Free electives		12.0
	Term Credits	15.0
Total Credit:		194.0

* See degree requirements (p. 206).

** COOP 101 is taken either winter or spring depending on co-op cycle. Please consult your advisor for additional information.

Minor in Information Systems

The information systems minor is available to all University students in good standing, with the exception of students already majoring in information systems, information technology or informatics.

Required Courses

INFO 101	Introduction to Information Technology	3.0
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INFO 110	Human-Computer Interaction I	3.0
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0
INFO 330	Computer Networking Technology I	4.0
INFO 355	Systems Analysis II	3.0
Two information system electives *		6.0
Total Credits		25.0

* An additional 6 credits or more are to be chosen from other course offerings in information systems pertinent to the student's overall program of study. Guidance in selecting these electives will be provided by staff and faculty of the College of Information Science and Technology.

Accelerated Degrees

The College of Computing & Informatics offers several Accelerated Degree programs designed to allow students to complete both a bachelor's degree and a graduate degree along with cooperative educational experience in fewer years than would be typical if pursuing the degrees separately.

Students accepted in this program can combine any of the College's bachelor's and master's degree programs as well as other options:

- Any CCI BS/any CCI MS Accelerated Degree (BS & MS in five years, including 2 Co-ops)
- Any CCI BS/MBA Accelerated Degree (BS/MBA)
- Any CCI BS/JD Accelerated Degree (BS/JD)

For more information on the criteria for entering this program, visit the BS/MS Accelerated Degree (<http://www.drexel.edu/undergrad/academics/accelerated-degrees>) page on Drexel's website.

For more information on how to apply for the BS/MS Accelerated Degree program, please visit the College of Computing & Informatics' website (<http://drexel.edu/ccci/admissions/undergraduate/admissions-requirements/cci-bsms-degree-admissions>).

Co-op/Career Opportunities

Co-Op Options

Two co-op options are available for this program:

- 5-year/3 co-op
- 4-year/1 co-op
- Accelerated Degree (BS & MS): 5-year/2 co-op

The following list is a sample of recent co-op job titles and employers:

- *Applications Architect*, Aetna
- *e-Communications Intern*, Airgas
- *PC Network Support*, Aramark
- *Information Systems Intern*, Campbell's Soup
- *Distributed WAN Support Co-op*, Cigna
- *Network Services*, GlaxoSmithKline
- *Programmer/Analyst*, Independence Blue Cross
- *Information Management Co-op*, Johnson & Johnson
- *Database Developer*, Princeton Plasma Physics
- *Website Developer*, QVC

- *Shared Services Co-op*, Wyeth

Career Opportunities

The demand for information systems professionals is strong. Graduates find careers in a number of areas, including designing information systems, leading project teams, planning, developing, and marketing information systems. Most information systems students enter the professional world right after graduation, but some continue their studies in advanced information technology programs.

Job titles of recent information systems graduates include:

- Security Analyst
- Network Systems Analyst
- Database Administrator
- Data Communications Analyst
- Systems Administrator
- Systems Engineer

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Drexel University Libraries

Drexel University Libraries (<http://www.library.drexel.edu>) is a learning enterprise, advancing the University's academic mission through serving as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, software engineering, health informatics, information systems, and computing technology. Resources are available online at library.drexel.edu or in-person at W. W. Hagerty Library (<http://www.library.drexel.edu/locations>).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

iCommons

Located in Room 106 of the Rush Building, the College's iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42" display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge software development and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as "DreamSpark" that allows students free access to a wide array of Microsoft software titles and operating systems.

The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

Rush Building

The Rush Building houses classrooms, CCI administrative offices (academic advising, graduate admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

The Information Technology Laboratory, located in the Rush Building, consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports. In addition, a special system has been built into the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

University Crossings - Cyber Learning Center and Computer Lab

CCI also has classrooms, administrative office and faculty offices located in University Crossings, located at the corner of JFK Blvd. and Market Street. The building houses the Cyber Learning Center, a student computer lab, as well as several classrooms with video-conference enabled technology and media projection capabilities.

The Cyber Learning Center (CLC) provides consulting and other learning resources for students taking computer science classes. The CLC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

Both the CLC and UC Lab now serve as a central hub for small group work, student meetings, and TA assistance. The UC Lab is organized with desk space around the perimeter of the lab for individual or partner/pair-programmed student work, as well as with clusters of tables which can be connected as needed into pods to create workspaces for larger groups.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, across Drexel's main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab,

Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GICL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College's research web page (<http://cci.drexel.edu/research.aspx>).

Alumni Garden

The Rush Building's Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (<http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx>) may be reserved for Drexel events.

3401 Market Street

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such and University initiatives such as the Isaac L. Auerbach Cybersecurity Institute (<http://drexel.edu/cci/research/centers-institutes/Cybersecurity>). The Institute's Auerbach and Berger Families Cybersecurity Laboratory serves as University's first training facility dedicated to identifying challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

Evaluations

The College of Computing & Informatics works continually to improve its degree programs. As part of this effort, the Information Systems degree is evaluated relative to the following Objectives and Outcomes.

BS in Information Systems Program Educational Objectives

Within three to five years of graduating, alumni of the program are expected to achieve one or more of the following milestones:

- Be valued contributors to private or public organizations as demonstrated by promotions, increased responsibility, or other professional recognition
- Contribute to professional knowledge as demonstrated by published papers, technical reports, patents, or conference presentations
- Succeed in continuing professional development as demonstrated by completion of graduate studies or professional certifications
- Demonstrate commitment and leadership within their profession and community as demonstrated by professional and community activity or contributions towards society's greater good and prosperity

BS in Information Systems Student Outcomes

The program enables students to attain, by the time of graduation:

- An ability to apply knowledge of computing and mathematics appropriate to the discipline
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

- d. An ability to function effectively on teams to accomplish a common goal
- e. An understanding of professional, ethical, legal, security and social issues
- f. An ability to communicate effectively with a range of audiences
- g. An ability to analyze the local and global impact of computing on individuals, organizations, and society
- h. Recognition of the need for and an ability to engage in continuing professional development
- i. An ability to use current techniques, skills, and tools necessary for computing practice.
- j. An understanding of processes that support the delivery and management of information systems within a specific application environment

The BSIS is accredited by the Computing Accreditation Commission (CAC) of ABET, <http://www.abet.org>.

To view the latest BS in Information Systems program enrollment numbers, please click here (<http://drexel.edu/cci/programs/undergraduate-programs/Facts>).

Computing & Informatics Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Information behavior, public libraries, gender, children, young adults, multicultural materials.

Larry Alexander, PhD (*University of Pennsylvania*) *Executive in Residence*. Research Professor. Large scale modeling and simulation, pattern recognition, the future of information technology.

Yuan An, PhD (*University of Toronto, Canada*). Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web.

David Augenblick, MS (*University of Pennsylvania*). Associate Teaching Professor. Introductory and object-oriented programming, data structures and database systems, computer application project management, application of computer programming principles and solutions to engineering problems.

Marcello Balduccini, PhD (*Texas Tech University*) *Senior Research Scientist, Applied Informatics Group*. Associate Research Professor. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

Ellen Bass, PhD (*Georgia Institute of Technology*) *Head of Department of Information Science; Joint Appointment with the College of Nursing and Health Professions*. Professor. Characterizing human judgement and decision making, modeling human judgement when supported by information automation, computational models of human-human and human-automation coordination.

Mark Boady, PhD (*Drexel University*). Assistant Teaching Professor. Computer Algebra, complex symbolic calculations, automation of computation problems

Jennifer Booker, PhD (*Drexel University*). Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems.

David E. Breen, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Matthew Burlick, PhD (*Stevens Institute of Technology*). Assistant Teaching Professor. Image processing, machine learning, real-time video tracking, object detection and classification, statistics/probability, and acoustics

Yuanfang Cai, PhD (*University of Virginia*). Associate Professor. Formal software design modeling and analysis, software economics, software evolution and modularity.

Christopher Carroll, MS (*Drexel University*). Assistant Teaching Professor. Information technology within healthcare companies, computer networking and design, IT infrastructure, server technology, information security, virtualization and cloud computing.

Bruce W. Char, PhD (*University of California-Berkeley*). Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments parallel and distributed computation.

Chaomei Chen, PhD (*University of Liverpool*). Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction.

Catherine D. Collins, MLIS (*Indiana University*). Associate Teaching Professor. Knowledge management, collection development, management of information organizations, information sources and services, international development.

John D'Ignazio, MS (*Carnegie Mellon University*). Assistant Teaching Professor. Human information interaction, digital curation, design of information infrastructures, methods development to elicit and evaluate impact on information environments, metadata schemes.

Prudence W. Dalrymple, PhD (*University of Wisconsin-Madison*) *Director, Institute for Healthcare Informatics*. Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice.

M. Carl Drott, PhD (*University of Michigan*). Associate Professor. Systems analysis techniques, web usage, competitive intelligence.

Andrea Forte, PhD (*Georgia Institute of Technology*). Associate Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy.

Susan Gasson, PhD (*University of Warwick*). Associate Professor. The co-design of business and IT-systems, distributed cognition & knowledge management in boundary-spanning groups, human-centered design, social informatics, online learning communities, grounded theory.

Christopher Geib, PhD (*University of Edinburgh*). Associate Professor. Decision making and reasoning under conditions of uncertainty, planning, scheduling, constraint, based reasoning, human computer and robot interaction, probabilistic reasoning, computer network security, large scale process control, user interfaces.

Colin Gordon, PhD (*University of Washington*). Assistant Professor. Software reliability, program behavior, concurrent and systems-level code,

formal assurance, programming models, distributed computing, even testing

Jane Greenberg, PhD (*University of Pittsburgh*) *Alice B. Kroeger Professor*. Metadata, ontological engineering, data science, knowledge organization, information retrieval

Rachel Greenstadt, PhD (*Harvard University*). Associate Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security.

Peter Grillo, PhD (*Temple University*) *Associate Department Head for Undergraduate Affairs, Information Science*. Teaching Professor. Strategic applications of technology within organizations.

Gregory W. Hislop, PhD (*Drexel University*) *Senior Associate Dean for Academic Affairs*. Professor. Information technology for teaching and learning, online education, structure and organization of the information disciplines, computing education research, software evaluation and characterization.

Xiaohua Tony Hu, PhD (*University of Regina, Canada*). Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics.

Jeremy R. Johnson, PhD (*Ohio State University*). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

Weimao Ke, PhD (*University of North Carolina at Chapel Hill*). Associate Professor. Information retrieval (IR), distributed systems, intelligent filtering/recommendation, information visualization, network science, complex systems, machine learning, text/data mining, multi-agent systems, the notion of information.

Michael Khoo, PhD (*University of Colorado at Boulder*). Assistant Teaching Professor. The understandings and practices that users bring to their interactions with information systems, with a focus on the evaluation of digital libraries and educational technologies.

Xia Lin, PhD (*University of Maryland*). Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments.

Geoffrey Mainland, PhD (*Harvard University*). Assistant Professor. High-level programming languages and runtime support for non-general purpose computation.

Spiros Mancoridis, PhD (*University of Toronto*). Professor. Software engineering; software security; code analysis; evolutionary computation.

Gabriela Marcu, PhD (*Carnegie Mellon University*). Assistant Teaching Professor. Human-computer interaction, health informatics, action research, ethnography, user experience design, designing for social change, organizational information systems, ubiquitous computing, knowledge management.

Linda S. Marion, PhD (*Drexel University*). Teaching Professor. Formal and informal communication, bibliometric studies of scholarly communication, diffusion of information, information use in the social sciences, academic and public libraries, information science education.

Adelaida Alban Medlock, MS (*Drexel University*). Associate Teaching Professor. Introductory programming; computer science education.

William Mongan, MS (*Drexel University*) *Associate Department Head for Undergraduate Affairs, Computer Science*. Associate Teaching Professor. Service-oriented architectures, program comprehension, reverse engineering, software engineering, computer architecture, computer science education, engineering education outreach

Gaurav Naik, MS (*Drexel University*). Assistant Research Professor. Computer networking and cybersecurity

Delia Neuman, PhD (*The Ohio State University*). Professor Emeritus. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Ko Nishino, PhD (*University of Tokyo*) *Associate Department Head for Graduate Affairs, Computer Science*. Professor. Computer vision, computer graphics, analysis and synthesis of visual appearance.

Danuta A. Nitecki, PhD (*University of Maryland at College Park*) *Dean of Libraries*. Professor. Library metrics and use in management, library as place, and academic library service models.

Krzysztof Nowak, PhD (*Washington University*). Associate Teaching Professor. Fourier analysis, partial differential equations, image processing, wavelets, asymptotic distribution of eigenvalues, numerical methods and algorithms, computer science education.

Santiago Ontañón, PhD (*University of Barcelona*). Assistant Professor. Game AI, computer games, artificial intelligence, machine learning, case-based reasoning

Jung-ran Park, PhD (*University of Hawaii at Manoa*). Associate Professor. Knowledge organization and representation, metadata, computer-mediated communication, cross-cultural communication, multilingual information access.

Alex Poole, PhD (*University of North Carolina*). Assistant Professor. Archives and records, digital humanities, digital curation, pedagogy, diversity and inclusivity in the LIS profession

Jeffrey L. Popyack, PhD (*University of Virginia*). Professor. Operations research, stochastic optimization, computational methods of Markov decision processes; artificial intelligence, computer science education.

William C. Regli, PhD (*University of Maryland-College Park*). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Lori Richards, PhD (*University of North Carolina*). Assistant Professor. Archives, digital curation, electronic records management, information technology and digital collections, cloud computing and record keeping, management of information organizations.

Michelle L. Rogers, PhD (*University of Wisconsin-Madison*). Associate Professor. Human-computer interaction, healthcare informatics, human factors engineering, socio-technical systems, health services research, patient safety.

Jeffrey Salvage, MS (*Drexel University*). Teaching Professor. Object-oriented programming, multi-agent systems, software engineering, database theory, introductory programming, data structures.

Dario Salvucci, PhD (*Carnegie Mellon University*) *Department Head, Computer Science*. Professor. Human computer interaction, cognitive science, machine learning, applications for driving.

Kurt Schmidt, MS (*Drexel University*). Associate Teaching Professor. Data structures, math foundations for computer science, programming tools, programming languages.

Ali Shokoufandeh, PhD (*Rutgers University*) *Senior Associate Dean of Research*. Professor. Theory of algorithms, graph theory, combinatorial optimization, computer vision.

Erin Solovey, PhD (*Tufts University*). Assistant Professor. Human-computer interaction, brain-computer interfaces, tangible interaction, machine learning, human interaction with complex and autonomous systems.

Il-Yeol Song, PhD (*Louisiana State University*) *PhD in Information Studies Program Director*. Professor. Conceptual modeling, ontology and patterns, data warehouse and OLAP, object-oriented analysis and design with UML, medical and bioinformatics data modeling & integration,.

Julia Stoyanovich, PhD (*Columbia University*). Assistant Professor. Data and knowledge management, big data, biological data management, search and ranking.

Brian Stuart, PhD (*Purdue University*). Associate Teaching Professor. Machine learning, networking, robotics, image processing, simulation, interpreters, data storage, operating systems, computer science, data communications, distributed/operating systems, accelerated computer programming, computer graphics.

Deborah Turner, PhD (*University of Washington*). Assistant Professor. Information behavior/interaction, management of information institutions, orality and information.

Kristene Unsworth, PhD (*University of Washington*). Assistant Professor. Information policy, ethics, government information.

Filippos Vokolos, PhD (*Polytechnic University*). Assistant Teaching Professor. System architecture, principles of software design and construction, verification and validation methods for the development of large software systems, foundations of software engineering, software verification & validation, software design, programming languages, dependable software systems.

Rosina Weber, PhD (*Federal University of Santa Catarina*). Associate Professor. Knowledge-based systems; case-based reasoning; textual case-based reasoning; computational intelligence; knowledge discovery; uncertainty, mainly targeting knowledge management goals in different domains, e.g., software engineering, military, finance, law, bioinformatics, and health sciences.

Erija Yan, PhD (*Indiana University*). Assistant Professor. Network Science, information analysis and retrieval, scholarly communication methods and applications.

Christopher C. Yang, PhD (*University of Arizona, Tucson*). Associate Professor. Web search and mining, security informatics, knowledge management, social media analytics, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, artificial intelligence, digital library, and electronic commerce.

Valerie Ann Yonker, PhD (*Drexel University*). Associate Teaching Professor. Human service information systems, systems analysis and design, measurement in software evaluation, knowledge engineering.

Emeritus Faculty

Michael E. Atwood, PhD (*University of Colorado*) *Associate Dean for Research and for Undergraduate Education*. Professor Emeritus. Human-computer interaction, computer-supported cooperative work, organizational memory.

Thomas A. Childers, PhD (*Rutgers University*). Professor Emeritus. Measurement, evaluation, and planning of information and library services, the effectiveness of information organizations.

David E. Fenske, PhD (*University of Wisconsin-Madison*). Dean Emeritus and Professor. Digital libraries, informatics, knowledge management and information technologies.

John B. Hall, PhD (*Florida State University*). Professor Emeritus. Academic library service, library administration, organization of materials.

Katherine W. McCain, PhD (*Drexel University*). Professor Emeritus. Scholarly communication, information production and use in the research process, development and structure of scientific specialties, diffusion of innovation, bibliometrics, evaluation of information retrieval systems.

Carol Hansen Montgomery, PhD (*Drexel University*) *Dean of Libraries Emeritus*. Research Professor. Selection and use of electronic collections, evaluation of library and information systems, digital libraries, economics of libraries and digital collections.

Gerry Stahl, PhD (*University of Colorado, Northwestern University*). Professor Emeritus. Human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, theory of collaboration.

Howard D. White, PhD (*University of California at Berkeley*). Professor Emeritus. Literature information systems, bibliometrics, research methods, collection development, online searching.

Susan Wiedenbeck, PhD (*University of Pittsburgh*). Professor Emeritus. Human-computer interaction, end-user programming/end-user development, empirical studies of programmers, interface design and evaluation.

Information Technology

Major: Information Technology

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 188.0

Classification of Instructional Programs (CIP) code: 11.0401

Standard Occupational Classification (SOC) Code: 11-3021; 15-1133

About the Program

Note: Effective Fall 2016, students will no longer be accepted into this program. Students are encouraged to apply for the BS in Computing & Security Technology (p. 188) program, which encompasses the content of the BS in Information Technology program plus a significant expansion in coverage of computer security technology.

The College of Computing & Informatics' Bachelor of Science in Information Technology (BSIT) prepares students to manage the infrastructure of the information revolution. With organizations and individuals increasingly dependent on information technology, there is great demand for expertise related to the servers, databases, networks, and software systems that provide the "pipes and wires" of the Internet

world. BSIT students tend to be hands-on problem solvers who like to apply their technical expertise to operate and manage information technology.

The Information Technology curriculum helps students develop expertise in the core information technologies of networking, databases, Web systems, programming, security, and human-computer interaction. BSIT students learn to install, operate, monitor, and upgrade these technologies to provide the technology environments required to deliver information products and services. BSIT students learn to approach the application of information technology from a user-centered perspective aimed at meeting the needs of users and organizations in a societal and global context.

The core courses in the program address the core information technologies mentioned above. These foundation courses are followed by advanced courses focusing on management and administration of the core technologies (including database administration, network administration, etc.).

Degree Requirements

Sample Plan of Study

BS Information Technology

5 YR UG Co-op Concentration

Term 1		Credits
CI 101	Computing and Informatics Design I	2.0
INFO 101	Introduction to Information Technology	3.0
INFO 108	Foundations of Software	3.0
MATH 121 or 101	Calculus I Introduction to Analysis I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV CI101	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
CI 102	Computing and Informatics Design II	2.0
INFO 105	Introduction to Informatics	3.0
INFO 151	Web Systems and Services I	3.0
MATH 122 or 102	Calculus II Introduction to Analysis II	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101*	Career Management and Professional Development	0.0
Term Credits		16.0
Term 3		
CI 103	Computing and Informatics Design III	2.0
INFO 110	Human-Computer Interaction I	3.0
INFO 152	Web Systems and Services II	3.0
MATH 180	Discrete Computational Structures	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV CI101	The Drexel Experience	1.0
Term Credits		16.0
Term 4		
INFO 153	Applied Data Management	3.0
INFO 200	Systems Analysis I	3.0
INFO 320	Server Technology I	4.0
COM 230	Techniques of Speaking	3.0
PSY 101	General Psychology I	3.0
Term Credits		16.0
Term 5		

INFO 210	Database Management Systems	3.0
PHIL 105	Critical Reasoning	3.0
PSY 330	Cognitive Psychology	3.0
IT elective		3.0
Free elective		3.0
Term Credits		15.0
Term 6		
INFO 333	Introduction to Information Security	3.0
PHIL 111	Symbolic Logic I	3.0
IT Advanced Topic course		3.0
Natural Science Sequence course		4.0
Free elective		3.0
Term Credits		16.0
Term 7		
INFO 215	Social Aspects of Information Systems	3.0
INFO 324	Team Process and Product	3.0
INFO 330	Computer Networking Technology I	4.0
IT Advanced Topic course		3.0
Natural Science Sequence course		4.0
Term Credits		17.0
Term 8		
INFO 410	Information Technology Infrastructure	3.0
STAT 201	Introduction to Business Statistics	4.0
COM 310 [WI]	Technical Communication	3.0
IT elective		3.0
Free elective		3.0
Term Credits		16.0
Term 9		
INFO 415	Information Technology Services	3.0
Select one of the following:		4.0
ACCT 115	Financial Accounting Foundations	
ECON 201	Principles of Microeconomics	
ORGB 300 [WI]	Organizational Behavior	
IT Advanced Topic course		3.0
IT elective		3.0
Free elective		3.0
Term Credits		16.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
INFO 420	Software Project Management	3.0
Select one of the following:		4.0
ORGB 300 [WI]	Organizational Behavior	
ECON 201	Principles of Microeconomics	
ACCT 115	Financial Accounting Foundations	
Free elective		4.0
Term Credits		14.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
Behavioral Science elective		3.0
Arts and Humanities elective		3.0
Free electives		6.0
Term Credits		15.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
Behavioral Science elective		3.0
Free electives		9.0
Term Credits		15.0
Total Credit: 188.0		

* COOP 101 is taken either winter or spring depending on co-op cycle. Please consult your advisor for additional information.

Accelerated Degrees

The College of Computing & Informatics offers several accelerated degree programs designed to allow students to complete both a bachelor's degree and a graduate degree along with cooperative educational experience in fewer years than would be typical if pursuing the degrees separately.

Students accepted in this program can combine any of the College of Computing & Informatics' bachelor's and master's degree programs as well as other options:

- Any CCI BS/any CCI MS Accelerated Degree (BS & MS in five years, including 2 Co-ops)
- Any CCI BS /MBA Accelerated Degree (BS/MBA)
- Any CCI BS/JD Accelerated Degree (BS/JD)

For more information on the criteria for entering this program, visit the BS/MS Accelerated Degree (<http://www.drexel.edu/undergrad/academics/accelerated-degrees>) page on Drexel's website.

For more information on how to apply for the BS/MS Accelerated Degree program, please visit the College of Computing & Informatics' website (<http://drexel.edu/cc/i/admissions/undergraduate/admissions-requirements/cci-bsms-degree-admissions>).

Co-op/Career Opportunities

Co-Op Options

Three co-op options are available for this program:

- 5-year/3 co-op
- 4-year/1 co-op
- Accelerated Degree (BS & MS): 5-year/2 co-op

The following list is a sample of recent co-op job titles and employers:

- *Collaborative Services Analyst*, GlaxoSmithKline
- *Information Technology & Computer Support Consultant*, University of Pennsylvania
- *Network Operations/Security Solutions Co-Op*, Susquehanna International Group
- *Operations Development*, PJM Interconnection
- *Portal Operations Analyst*, SAP America
- *PECO Technical Services*, Exelon Corporation

Career Opportunities

The demand for information technology professionals continues to be strong. Graduates find careers in a number of areas, including designing IT services, leading project teams, providing user support, operating and managing networks, and administering servers and databases.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Drexel University Libraries

Drexel University Libraries (<http://www.library.drexel.edu>) is a learning enterprise, advancing the University's academic mission through serving

as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, software engineering, health informatics, information systems, and computing technology. Resources are available online at library.drexel.edu or in-person at W. W. Hagerty Library (<http://www.library.drexel.edu/locations>).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

iCommons

Located in Room 106 of the Rush Building, the College's iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42" display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge software development and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as "DreamSpark" that allows students free access to a wide array of Microsoft software titles and operating systems.

The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

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University Crossings - Cyber Learning Center and Computer Lab

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Research Laboratories

The College houses multiple research labs, led by CCI faculty, across Drexel's main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GICL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College's research web page (<http://cci.drexel.edu/research.aspx>).

Alumni Garden

The Rush Building's Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (<http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx>) may be reserved for Drexel events.

3401 Market Street

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such and University initiatives such as the Isaac L. Auerbach Cybersecurity Institute (<http://drexel.edu/cci/research/centers-institutes/Cybersecurity>). The Institute's Auerbach and Berger Families Cybersecurity Laboratory serves as University's first training facility dedicated to identifying challenges and

discovering solutions in the areas of cyber infrastructure protection and incident response.

Evaluations

The College of Computing & Informatics works continually to improve its degree programs. As part of this effort, the Information Technology degree is evaluated relative to the following Objectives and Outcomes.

BS in Information Technology Program Educational Objectives

Within three to five years of graduating, alumni of the program are expected to achieve one or more of the following milestones:

- a. Be valued contributors to private or public organizations as demonstrated by promotions, increased responsibility, or other professional recognition
- b. Contribute to professional knowledge as demonstrated by published papers, technical reports, patents, or conference presentations
- c. Succeed in continuing professional development as demonstrated by completion of graduate studies or professional certifications
- d. Demonstrate commitment and leadership within their profession and community as demonstrated by professional and community activity or contributions towards society's greater good and prosperity

BS in Information Technology Student Outcomes

The program enables students to attain, by the time of graduation:

- a. An ability to apply knowledge of computing and mathematics appropriate to the discipline
- b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- d. An ability to function effectively on teams to accomplish a common goal
- e. An understanding of professional, ethical, legal, security and social issues and responsibilities
- f. An ability to communicate effectively with a range of audiences
- g. An ability to analyze the local and global impact of computing on individuals, organizations, and society
- h. Recognition of the need for and an ability to engage in continuing professional development
- i. An ability to use current techniques, skills, and tools necessary for computing practice
- j. An ability to use and apply current technical concepts and practices in the core information technologies
- k. An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems

- I. An ability to effectively integrate IT-based solutions into the user environment
- m. An understanding of best practices and standards and their application
- n. An ability to assist in the creation of an effective project plan

The BS in Information Technology is accredited by the Computing Accreditation Commission (CAC) of ABET, <http://www.abet.org>.

To view the latest BS in Information Technology program enrollment numbers, please click here (<http://drexel.edu/cci/programs/undergraduate-programs/Facts>).

Computing & Informatics Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Information behavior, public libraries, gender, children, young adults, multicultural materials.

Larry Alexander, PhD (*University of Pennsylvania*) *Executive in Residence*. Research Professor. Large scale modeling and simulation, pattern recognition, the future of information technology.

Yuan An, PhD (*University of Toronto, Canada*). Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web.

David Augenblick, MS (*University of Pennsylvania*). Associate Teaching Professor. Introductory and object-oriented programming, data structures and database systems, computer application project management, application of computer programming principles and solutions to engineering problems.

Marcello Balduccini, PhD (*Texas Tech University*) *Senior Research Scientist, Applied Informatics Group*. Associate Research Professor. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

Ellen Bass, PhD (*Georgia Institute of Technology*) *Head of Department of Information Science; Joint Appointment with the College of Nursing and Health Professions*. Professor. Characterizing human judgement and decision making, modeling human judgement when supported by information automation, computational models of human-human and human-automation coordination.

Mark Boady, PhD (*Drexel University*). Assistant Teaching Professor. Computer Algebra, complex symbolic calculations, automation of computation problems

Jennifer Booker, PhD (*Drexel University*). Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems.

David E. Breen, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Matthew Burlick, PhD (*Stevens Institute of Technology*). Assistant Teaching Professor. Image processing, machine learning, real-time video

tracking, object detection and classification, statistics/probability, and acoustics

Yuanfang Cai, PhD (*University of Virginia*). Associate Professor. Formal software design modeling and analysis, software economics, software evolution and modularity.

Christopher Carroll, MS (*Drexel University*). Assistant Teaching Professor. Information technology within healthcare companies, computer networking and design, IT infrastructure, server technology, information security, virtualization and cloud computing.

Bruce W. Char, PhD (*University of California-Berkeley*). Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments parallel and distributed computation.

Chaomei Chen, PhD (*University of Liverpool*). Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction.

Catherine D. Collins, MLIS (*Indiana University*). Associate Teaching Professor. Knowledge management, collection development, management of information organizations, information sources and services, international development.

John D'Ignazio, MS (*Carnegie Mellon University*). Assistant Teaching Professor. Human information interaction, digital curation, design of information infrastructures, methods development to elicit and evaluate impact on information environments, metadata schemes.

Prudence W. Dalrymple, PhD (*University of Wisconsin-Madison*) *Director, Institute for Healthcare Informatics*. Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice.

M. Carl Drott, PhD (*University of Michigan*). Associate Professor. Systems analysis techniques, web usage, competitive intelligence.

Andrea Forte, PhD (*Georgia Institute of Technology*). Associate Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy.

Susan Gasson, PhD (*University of Warwick*). Associate Professor. The co-design of business and IT-systems, distributed cognition & knowledge management in boundary-spanning groups, human-centered design, social informatics, online learning communities, grounded theory.

Christopher Geib, PhD (*University of Edinburgh*). Associate Professor. Decision making and reasoning under conditions of uncertainty, planning, scheduling, constraint, based reasoning, human computer and robot interaction, probabilistic reasoning, computer network security, large scale process control, user interfaces.

Colin Gordon, PhD (*University of Washington*). Assistant Professor. Software reliability, program behavior, concurrent and systems-level code, formal assurance, programming models, distributed computing, even testing

Jane Greenberg, PhD (*University of Pittsburgh*) *Alice B. Kroeger Professor*. Metadata, ontological engineering, data science, knowledge organization, information retrieval

Rachel Greenstadt, PhD (*Harvard University*). Associate Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security.

Peter Grillo, PhD (*Temple University*) *Associate Department Head for Undergraduate Affairs, Information Science*. Teaching Professor. Strategic applications of technology within organizations.

Gregory W. Hislop, PhD (*Drexel University*) *Senior Associate Dean for Academic Affairs*. Professor. Information technology for teaching and learning, online education, structure and organization of the information disciplines, computing education research, software evaluation and characterization.

Xiaohua Tony Hu, PhD (*University of Regina, Canada*). Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics.

Jeremy R. Johnson, PhD (*Ohio State University*). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

Weimao Ke, PhD (*University of North Carolina at Chapel Hill*). Associate Professor. Information retrieval (IR), distributed systems, intelligent filtering/recommendation, information visualization, network science, complex systems, machine learning, text/data mining, multi-agent systems, the notion of information.

Michael Khoo, PhD (*University of Colorado at Boulder*). Assistant Teaching Professor. The understandings and practices that users bring to their interactions with information systems, with a focus on the evaluation of digital libraries and educational technologies.

Xia Lin, PhD (*University of Maryland*). Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments.

Geoffrey Mainland, PhD (*Harvard University*). Assistant Professor. High-level programming languages and runtime support for non-general purpose computation.

Spiros Mancoridis, PhD (*University of Toronto*). Professor. Software engineering; software security; code analysis; evolutionary computation.

Gabriela Marcu, PhD (*Carnegie Mellon University*). Assistant Teaching Professor. Human-computer interaction, health informatics, action research, ethnography, user experience design, designing for social change, organizational information systems, ubiquitous computing, knowledge management.

Linda S. Marion, PhD (*Drexel University*). Teaching Professor. Formal and informal communication, bibliometric studies of scholarly communication, diffusion of information, information use in the social sciences, academic and public libraries, information science education.

Adelaida Alban Medlock, MS (*Drexel University*). Associate Teaching Professor. Introductory programming; computer science education.

William Mongan, MS (*Drexel University*) *Associate Department Head for Undergraduate Affairs, Computer Science*. Associate Teaching Professor. Service-oriented architectures, program comprehension, reverse engineering, software engineering, computer architecture, computer science education, engineering education outreach

Gaurav Naik, MS (*Drexel University*). Assistant Research Professor. Computer networking and cybersecurity

Delia Neuman, PhD (*The Ohio State University*). Professor Emeritus. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Ko Nishino, PhD (*University of Tokyo*) *Associate Department Head for Graduate Affairs, Computer Science*. Professor. Computer vision, computer graphics, analysis and synthesis of visual appearance.

Danuta A. Nitecki, PhD (*University of Maryland at College Park*) *Dean of Libraries*. Professor. Library metrics and use in management, library as place, and academic library service models.

Krzysztof Nowak, PhD (*Washington University*). Associate Teaching Professor. Fourier analysis, partial differential equations, image processing, wavelets, asymptotic distribution of eigenvalues, numerical methods and algorithms, computer science education.

Santiago Ontañón, PhD (*University of Barcelona*). Assistant Professor. Game AI, computer games, artificial intelligence, machine learning, case-based reasoning

Jung-ran Park, PhD (*University of Hawaii at Manoa*). Associate Professor. Knowledge organization and representation, metadata, computer-mediated communication, cross-cultural communication, multilingual information access.

Alex Poole, PhD (*University of North Carolina*). Assistant Professor. Archives and records, digital humanities, digital curation, pedagogy, diversity and inclusivity in the LIS profession

Jeffrey L. Popyack, PhD (*University of Virginia*). Professor. Operations research, stochastic optimization, computational methods of Markov decision processes; artificial intelligence, computer science education.

William C. Regli, PhD (*University of Maryland-College Park*). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Lori Richards, PhD (*University of North Carolina*). Assistant Professor. Archives, digital curation, electronic records management, information technology and digital collections, cloud computing and record keeping, management of information organizations.

Michelle L. Rogers, PhD (*University of Wisconsin-Madison*). Associate Professor. Human-computer interaction, healthcare informatics, human factors engineering, socio-technical systems, health services research, patient safety.

Jeffrey Salvage, MS (*Drexel University*). Teaching Professor. Object-oriented programming, multi-agent systems, software engineering, database theory, introductory programming, data structures.

Dario Salvucci, PhD (*Carnegie Mellon University*) *Department Head, Computer Science*. Professor. Human computer interaction, cognitive science, machine learning, applications for driving.

Kurt Schmidt, MS (*Drexel University*). Associate Teaching Professor. Data structures, math foundations for computer science, programming tools, programming languages.

Ali Shokoufandeh, PhD (*Rutgers University*) *Senior Associate Dean of Research*. Professor. Theory of algorithms, graph theory, combinational optimization, computer vision.

Erin Solovey, PhD (*Tufts University*). Assistant Professor. Human-computer interaction, brain-computer interfaces, tangible interaction, machine learning, human interaction with complex and autonomous systems.

Il-Yeol Song, PhD (*Louisiana State University*) *PhD in Information Studies Program Director*. Professor. Conceptual modeling, ontology and patterns, data warehouse and OLAP, object-oriented analysis and design with UML, medical and bioinformatics data modeling & integration.

Julia Stoyanovich, PhD (*Columbia University*). Assistant Professor. Data and knowledge management, big data, biological data management, search and ranking.

Brian Stuart, PhD (*Purdue University*). Associate Teaching Professor. Machine learning, networking, robotics, image processing, simulation, interpreters, data storage, operating systems, computer science, data communications, distributed/operating systems, accelerated computer programming, computer graphics.

Deborah Turner, PhD (*University of Washington*). Assistant Professor. Information behavior/interaction, management of information institutions, orality and information.

Kristene Unsworth, PhD (*University of Washington*). Assistant Professor. Information policy, ethics, government information.

Filippos Vokolos, PhD (*Polytechnic University*). Assistant Teaching Professor. System architecture, principles of software design and construction, verification and validation methods for the development of large software systems, foundations of software engineering, software verification & validation, software design, programming languages, dependable software systems.

Rosina Weber, PhD (*Federal University of Santa Catarina*). Associate Professor. Knowledge-based systems; case-based reasoning; textual case-based reasoning; computational intelligence; knowledge discovery; uncertainty, mainly targeting knowledge management goals in different domains, e.g., software engineering, military, finance, law, bioinformatics, and health sciences.

Erija Yan, PhD (*Indiana University*). Assistant Professor. Network Science, information analysis and retrieval, scholarly communication methods and applications.

Christopher C. Yang, PhD (*University of Arizona, Tucson*). Associate Professor. Web search and mining, security informatics, knowledge management, social media analytics, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, artificial intelligence, digital library, and electronic commerce.

Valerie Ann Yonker, PhD (*Drexel University*). Associate Teaching Professor. Human service information systems, systems analysis and design, measurement in software evaluation, knowledge engineering.

Emeritus Faculty

Michael E. Atwood, PhD (*University of Colorado*) *Associate Dean for Research and for Undergraduate Education*. Professor Emeritus.

Human-computer interaction, computer-supported cooperative work, organizational memory.

Thomas A. Childers, PhD (*Rutgers University*). Professor Emeritus. Measurement, evaluation, and planning of information and library services, the effectiveness of information organizations.

David E. Fenske, PhD (*University of Wisconsin-Madison*). Dean Emeritus and Professor. Digital libraries, informatics, knowledge management and information technologies.

John B. Hall, PhD (*Florida State University*). Professor Emeritus. Academic library service, library administration, organization of materials.

Katherine W. McCain, PhD (*Drexel University*). Professor Emeritus. Scholarly communication, information production and use in the research process, development and structure of scientific specialties, diffusion of innovation, bibliometrics, evaluation of information retrieval systems.

Carol Hansen Montgomery, PhD (*Drexel University*) *Dean of Libraries Emeritus*. Research Professor. Selection and use of electronic collections, evaluation of library and information systems, digital libraries, economics of libraries and digital collections.

Gerry Stahl, PhD (*University of Colorado, Northwestern University*). Professor Emeritus. Human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, theory of collaboration.

Howard D. White, PhD (*University of California at Berkeley*). Professor Emeritus. Literature information systems, bibliometrics, research methods, collection development, online searching.

Susan Wiedenbeck, PhD (*University of Pittsburgh*). Professor Emeritus. Human-computer interaction, end-user programming/end-user development, empirical studies of programmers, interface design and evaluation.

Software Engineering

Major: Software Engineering

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 188.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Program (CIP) code: 14.0903

Standard Occupational Classification (SOC) code: 15-1132; 15-1133

About the Program

The College of Computing & Informatics' Bachelor of Science in Software Engineering (BSSE) prepares students to design and build software systems. Software is essential to the functioning of modern society but high quality software is very challenging to create. Software engineering focuses on the knowledge and skills to meet that challenge and create high quality software on schedule within budget.

The Software Engineering curriculum addresses a full range of software activities including gathering client requirements, designing and constructing software solutions, testing software, and modifying and extending existing systems. The curriculum also recognizes that most software is developed by teams, and students develop skills in project management and team operation. Graduates are well-prepared to

function as software engineering team members and also move toward software engineering management.

The core courses address programming and use of software development tools, specification and design, software architecture, verification and validation, software evolution, and team projects. These courses are supplemented with courses drawn from computer science and Informatics that provide theoretical background and application knowledge. The full curriculum prepares BSSE students to apply processes, methods, and tools to the problem of building and maintaining software with a defined level of quality, at a predictable cost, on a predictable schedule.

Additional Information

For more information about this program, please visit the BS in Software Engineering web page (<http://drexel.edu/cci/programs/undergraduate-programs/bs-software-engineering>) on the College of Computing & Informatics' website.

Degree Requirements

Software Engineering Requirements

CS 164	Introduction to Computer Science	3.0
CS 171	Computer Programming I	3.0
or CS 175	Advanced Computer Programming I	
CS 172	Computer Programming II	3.0
or CS 176	Advanced Computer Programming II	
SE 210	Software Specification and Design I	3.0
SE 211	Software Specification and Design II	3.0
SE 310	Software Architecture I	3.0
SE 311	Software Architecture II	3.0
SE 320	Software Verification and Validation	3.0
SE 410	Software Evolution	3.0

Computer Science Requirements

CS 260	Data Structures	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
CS 281	Systems Architecture	4.0
CS 283	Systems Programming	3.0

Information Systems Requirements

INFO 210	Database Management Systems	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO 420	Software Project Management	3.0

Computing & Informatics Requirements

CI 101	Computing and Informatics Design I	2.0
CI 102	Computing and Informatics Design II	2.0
CI 103	Computing and Informatics Design III	2.0
CI 491 [WI]	Senior Project I	3.0
CI 492 [WI]	Senior Project II	3.0
CI 493 [WI]	Senior Project III	3.0

Computing & Informatics Electives

CS 472	Computer Networks: Theory, Applications and Programming	3.0-4.0
or INFO 330	Computer Networking Technology I	
Computing & Informatics electives (see below)		18.0

Mathematics Requirements

CS 270	Mathematical Foundations of Computer Science	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 221	Discrete Mathematics	3.0
STAT 201	Introduction to Business Statistics	4.0
STAT 202	Business Statistics II	4.0

Science Requirements

Select one of the following lab science sequences:

BIO 122 & BIO 124 & BIO 126	Cells and Genetics and Evolution & Organismal Diversity and Physiology and Ecology	
CHEM 101 & CHEM 102 & CHEM 103	General Chemistry I and General Chemistry II and General Chemistry III	
PHYS 101 & PHYS 102 & PHYS 201	Fundamentals of Physics I and Fundamentals of Physics II and Fundamentals of Physics III	

Science electives (see below)

Arts & Humanities Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 105	Critical Reasoning	3.0
PHIL 311	Ethics and Information Technology	3.0
COM 230	Techniques of Speaking	3.0
COM 310 [WI]	Technical Communication	3.0
PSY 101	General Psychology I	3.0
PSY 330	Cognitive Psychology	3.0

Select two of the following:

ACCT 110	Accounting for Professionals	
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	

Arts & Humanities, Business, or Social Studies elective (see below) 3.0-4.0

University Requirements

UNIV CI101	The Drexel Experience	2.0
or CI 120	CCI Transfer Student Seminar	
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0

Free Electives 13.0-18.0

Total Credits 188.0

Program Electives

- **Computing & Informatics electives:** any non-required CS, INFO, SE course numbered 300 or higher except CS 350 or CS 451
- **Science electives:** any CHEM (except 111, 112, 113, 114, 151), BIO (except 161, 162, 163; can take only one of BIO 100, BIO 107, BIO 122; can take only one of BIO 101, BIO 109, BIO 124), PHYS (except 050, 100, 103, 104, 105, 106, 121, 122, 151, 160, 305, 306, 307, 324, 405; cannot take both PHYS 131 and PHYS 181), ENVS, PHEV. Cannot take NFS courses.
- **Business electives:** any ACCT, BLAW, BUSN, ECON, ENTP, FIN, HRMT, INTB, MGMT, MIS, MKTG, OPM, OPR, ORGB, STAT, TAX
- **Social Studies electives:** any AFAS, ANTH, HIST, GST, JUDA, PSCI, PSY (except 330, 332, 337, 364, 365), SOC (except 364, 365), WGST
- **Arts & Humanities electives:** any ARCH, ARTH, CMGT, CJS, COM, CULA, DANC, EDEX, EDUC, ENGL (except 101, 102, 103, 105), ESTM, FASH, FMVD, INTR, LING, MUSC, PHIL, PHTO, THTR, VSCM, VSST, WRIT, Foreign Language courses (<http://www.drexel.edu/culturecomm/academics/undergraduate/modernlang/languages>) as defined by the College of Arts and Sciences, and GMAP 260, ANIM 140, ANIM 141, ANIM 152, ANIM 211, ANIM 212

Sample Plan of Study

5 YR UG Co-op Concentration

5 YR UG Co-op Concentration

Term 1		Credits
CI 101	Computing and Informatics Design I	2.0
CS 164	Introduction to Computer Science	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV CI101	The Drexel Experience	1.0
Science lab		4.0
	Term Credits	17.0
Term 2		
CI 102	Computing and Informatics Design II	2.0
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
CS 171 or 175	Computer Programming I Advanced Computer Programming I	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
Science lab		4.0
	Term Credits	17.0
Term 3		
CI 103	Computing and Informatics Design III	2.0
CS 172 or 176	Computer Programming II Advanced Computer Programming II	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
UNIV CI101	The Drexel Experience	1.0
Science lab		4.0
	Term Credits	17.0
Term 4		
COM 230	Techniques of Speaking	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
SE 210	Software Specification and Design I	3.0
Science elective		3.0
	Term Credits	15.0
Term 5		
CS 260	Data Structures	3.0
INFO 210	Database Management Systems	3.0
MATH 221	Discrete Mathematics	3.0
SE 211	Software Specification and Design II	3.0
Science elective		3.0
	Term Credits	15.0
Term 6		
COM 310 [WI]	Technical Communication	3.0
CS 281	Systems Architecture	4.0
PSY 101	General Psychology I	3.0
SE 310	Software Architecture I	3.0
STAT 201	Introduction to Business Statistics	4.0
	Term Credits	17.0
Term 7		
CS 283	Systems Programming	3.0
SE 311	Software Architecture II	3.0
STAT 202	Business Statistics II	4.0
Science elective		3.0
Free elective		3.0
	Term Credits	16.0
Term 8		
INFO 420	Software Project Management	3.0
PHIL 105	Critical Reasoning	3.0
SE 320	Software Verification and Validation	3.0
Computing & Informatics elective		3.0

Free elective		3.0
	Term Credits	15.0
Term 9		
INFO 310	Human-Computer Interaction II	3.0
PHIL 311	Ethics and Information Technology	3.0
SE 410	Software Evolution	3.0
Computing & Informatics elective		3.0
Free elective		3.0
	Term Credits	15.0
Term 10		
CI 491 [WI]	Senior Project I	3.0
INFO 330 or CS 472	Computer Networking Technology I Computer Networks: Theory, Applications and Programming	4.0
Select one of the following:		4.0
ACCT 110	Accounting for Professionals	
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	
Computing & Informatics elective		3.0
Free elective		2.0
	Term Credits	16.0
Term 11		
CI 492 [WI]	Senior Project II	3.0
PSY 330	Cognitive Psychology	3.0
Select one of the following:		4.0
ACCT 110	Accounting for Professionals	
ECON 202	Principles of Macroeconomics	
ECON 201	Principles of Microeconomics	
Computing & Informatics electives		6.0
	Term Credits	16.0
Term 12		
CI 493 [WI]	Senior Project III	3.0
Computing & Informatics elective		3.0
Arts & Humanities elective		3.0
Free elective		3.0
	Term Credits	12.0

Total Credit: 188.0

Minor in Software Engineering

The Software Engineering minor is available to all University students in good standing, with the exception of Software Engineering majors.

Prerequisites

One of the following Mathematics sequences must be completed before entering the program:

- MATH 101 and MATH 102
- MATH 121 and MATH 122

Requirements

CS 171	Computer Programming I	3.0
or CS 175	Advanced Computer Programming I	
CS 172	Computer Programming II	3.0
or CS 176	Advanced Computer Programming II	
CS 260	Data Structures	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
SE 210	Software Specification and Design I	3.0
SE 310	Software Architecture I	3.0
or CS 350	Software Design	
SE 320	Software Verification and Validation	3.0
Select one of the following:		3.0

SE 211	Software Specification and Design II	
SE 311	Software Architecture II	
SE 410	Software Evolution	
Total Credits		24.0

Note: No more than 9.0 credits from a student's major may be used to fulfill the minor requirements. Students who, because of this rule, require additional credits to reach 24.0 total credits may select from the following courses as needed:

INFO 210	Database Management Systems	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO 355	Systems Analysis II	3.0
INFO 420	Software Project Management	3.0

Accelerated Degrees

The College of Computing & Informatics offers several accelerated degree programs designed to allow students to complete both a bachelor's degree and a graduate degree along with cooperative educational experience in fewer years than would be typical if pursuing the degrees separately.

Students accepted in this program can combine any of the Computing and Informatics bachelor's and master's degree programs as well as other options:

- Any CCI BS/any CCI MS Accelerated Degree (BS & MS in five years, including 2 Co-ops)
- Any CCI BS /MBA Accelerated Degree (BS/MBA) (BS & MBA in four years, including 1 Co-op option only)
- Any CCI BS/JD Accelerated Degree (BS/JD)

For more information on the criteria for entering this program, visit the BS/MS Accelerated Degree (<http://www.drexel.edu/undergrad/academics/accelerated-degrees>) page on the Drexel website.

For more information on how to apply for the BS/MS Accelerated Degree program, please visit the College of Computing & Informatics' website (<http://drexel.edu/cc/i/admissions/undergraduate/admissions-requirements/cci-bsms-degree-admissions>).

Co-op/Career Opportunities

Co-Op Options

Three co-op options are available for this program:

- 5-year/3 co-op
- 4-year/1 co-op
- Accelerated Degree: 5-year/2 co-op

Career Opportunities

The demand for software engineering professionals is quite strong. Graduates can expect career opportunities in software design and development in a variety of application areas. Software engineering graduates are particularly well suited to work as members or leaders of software project teams. They have knowledge and skills to help them develop quality software within schedule and cost constraints.

According to the U.S. Bureau of Labor Statistics' Occupational Outlook Handbook (<http://www.bls.gov/ooh>), software developer is among the fastest growing U.S. careers requiring at least a bachelor's degree, with an estimated 186,600 new jobs by 2024. Although they have jobs in most

industries, many software developers work in computer systems design and related services firms or software publishers. The field's rapid growth is mainly due to the increase in demand for computer software, especially in healthcare.

Most software engineering students enter the professional world right after graduation, but some continue their studies in advanced software engineering programs.

Job titles of recent software engineering graduates include:

- Software Engineer
- Software Architect
- Software System Project Manager
- Software Project Team Leader

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Drexel University Libraries

Drexel University Libraries (<http://www.library.drexel.edu>) is a learning enterprise, advancing the University's academic mission through serving as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, software engineering, health informatics, information systems, and computing technology. Resources are available online at library.drexel.edu or in-person at W. W. Hagerty Library (<http://www.library.drexel.edu/locations>).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

iCommons

Located in Room 106 of the Rush Building, the College's iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42" display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is

a member of the Rational SEED Program which provides cutting-edge software development and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as “DreamSpark” that allows students free access to a wide array of Microsoft software titles and operating systems.

The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University’s network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

Rush Building

The Rush Building houses classrooms, CCI administrative offices (academic advising, graduate admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

The Information Technology Laboratory, located in the Rush Building, consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports. In addition, a special system has been built into the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

University Crossings - Cyber Learning Center and Computer Lab

CCI also has classrooms, administrative office and faculty offices located in University Crossings, located at the corner of JFK Blvd. and Market Street. The building houses the Cyber Learning Center, a student computer lab, as well as several classrooms with video-conference enabled technology and media projection capabilities.

The Cyber Learning Center (CLC) provides consulting and other learning resources for students taking computer science classes. The CLC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

Both the CLC and UC Lab now serve as a central hub for small group work, student meetings, and TA assistance. The UC Lab is organized with desk space around the perimeter of the lab for individual or partner/pair-programmed student work, as well as with clusters of tables which can be connected as needed into pods to create workspaces for larger groups.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, across Drexel’s main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GICL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel

Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College’s research web page (<http://cci.drexel.edu/research.aspx>).

Alumni Garden

The Rush Building’s Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (<http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx>) may be reserved for Drexel events.

3401 Market Street

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such and University initiatives such as the Isaac L. Auerbach Cybersecurity Institute (<http://drexel.edu/cci/research/centers-institutes/Cybersecurity>). The Institute’s Auerbach and Berger Families Cybersecurity Laboratory serves as University’s first training facility dedicated to identifying challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

Evaluations

The College of Computing & Informatics works continually to improve its degree programs. As part of this effort, the software engineering degree is evaluated relative to the following Objectives and Outcomes.

Program Educational Objectives

Within three to five years of graduating, alumni of the program are expected to achieve one or more of the following milestones:

- a. Graduates of the program obtain employment as software developers, where their software and communication skills eventually propel them toward technical and administrative leadership positions in industry and government.
- b. Graduates of the program demonstrate an ability to continue to learn throughout their career and to keep pace with changing technology as appropriate to their positions.
- c. Graduates of the program specialize and enhance their software engineering knowledge by enrolling and completing technical graduate courses and other technical education to position them to advance software engineering practice as senior technical staff members or managers.
- d. Graduates of the program specialize and enhance their software engineering knowledge by enrolling and graduating from MSc and PhD degree programs to position them to contribute to the intellectual foundations of the discipline of software engineering as researchers in industrial and government laboratories as well as in academia.
- e. Graduates of the program advance toward becoming leaders in disciplines other than software engineering by enrolling and graduating from graduate-level degree programs in complimentary disciplines such as law and business, where the BSSE serves as an educational foundation.
- f. Graduates of the program will demonstrate an awareness of their professional and social responsibility as software engineers by participation in professional activities and application of their knowledge for the good of society.

Software Engineering Student Outcomes

The program enables students to attain, by the time of graduation:

- a. An ability to apply knowledge of mathematics, science and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data
- c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Additional Information

The Software Engineering program is accredited by the Engineering Accreditation Commission (EAC) of ABET (<http://www.abet.org>).

To view the latest BS in Software Engineering program enrollment numbers, please click here (<http://drexel.edu/cci/programs/undergraduate-programs/Facts>).

Computing & Informatics Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Information behavior, public libraries, gender, children, young adults, multicultural materials.

Larry Alexander, PhD (*University of Pennsylvania*) *Executive in Residence*. Research Professor. Large scale modeling and simulation, pattern recognition, the future of information technology.

Yuan An, PhD (*University of Toronto, Canada*). Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web.

David Augenblick, MS (*University of Pennsylvania*). Associate Teaching Professor. Introductory and object-oriented programming, data structures and database systems, computer application project management, application of computer programming principles and solutions to engineering problems.

Marcello Balduccini, PhD (*Texas Tech University*) *Senior Research Scientist, Applied Informatics Group*. Associate Research Professor. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

Ellen Bass, PhD (*Georgia Institute of Technology*) *Head of Department of Information Science; Joint Appointment with the College of Nursing and Health Professions*. Professor. Characterizing human judgement

and decision making, modeling human judgement when supported by information automation, computational models of human-human and human-automation coordination.

Mark Boady, PhD (*Drexel University*). Assistant Teaching Professor. Computer Algebra, complex symbolic calculations, automation of computation problems

Jennifer Booker, PhD (*Drexel University*). Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems.

David E. Breen, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Matthew Burlick, PhD (*Stevens Institute of Technology*). Assistant Teaching Professor. Image processing, machine learning, real-time video tracking, object detection and classification, statistics/probability, and acoustics

Yuanfang Cai, PhD (*University of Virginia*). Associate Professor. Formal software design modeling and analysis, software economics, software evolution and modularity.

Christopher Carroll, MS (*Drexel University*). Assistant Teaching Professor. Information technology within healthcare companies, computer networking and design, IT infrastructure, server technology, information security, virtualization and cloud computing.

Bruce W. Char, PhD (*University of California-Berkeley*). Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments parallel and distributed computation.

Chaomei Chen, PhD (*University of Liverpool*). Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction.

Catherine D. Collins, MLIS (*Indiana University*). Associate Teaching Professor. Knowledge management, collection development, management of information organizations, information sources and services, international development.

John D'Ignazio, MS (*Carnegie Mellon University*). Assistant Teaching Professor. Human information interaction, digital curation, design of information infrastructures, methods development to elicit and evaluate impact on information environments, metadata schemes.

Prudence W. Dalrymple, PhD (*University of Wisconsin-Madison*) *Director, Institute for Healthcare Informatics*. Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice.

M. Carl Drott, PhD (*University of Michigan*). Associate Professor. Systems analysis techniques, web usage, competitive intelligence.

Andrea Forte, PhD (*Georgia Institute of Technology*). Associate Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy.

Susan Gasson, PhD (*University of Warwick*). Associate Professor. The co-design of business and IT-systems, distributed cognition & knowledge management in boundary-spanning groups, human-centered design, social informatics, online learning communities, grounded theory.

Christopher Geib, PhD (*University of Edinburgh*). Associate Professor. Decision making and reasoning under conditions of uncertainty, planning, scheduling, constraint, based reasoning, human computer and robot interaction, probabilistic reasoning, computer network security, large scale process control, user interfaces.

Colin Gordon, PhD (*University of Washington*). Assistant Professor. Software reliability, program behavior, concurrent and systems-level code, formal assurance, programming models, distributed computing, even testing

Jane Greenberg, PhD (*University of Pittsburgh*) *Alice B. Kroeger Professor*. Metadata, ontological engineering, data science, knowledge organization, information retrieval

Rachel Greenstadt, PhD (*Harvard University*). Associate Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security.

Peter Grillo, PhD (*Temple University*) *Associate Department Head for Undergraduate Affairs, Information Science*. Teaching Professor. Strategic applications of technology within organizations.

Gregory W. Hislop, PhD (*Drexel University*) *Senior Associate Dean for Academic Affairs*. Professor. Information technology for teaching and learning, online education, structure and organization of the information disciplines, computing education research, software evaluation and characterization.

Xiaohua Tony Hu, PhD (*University of Regina, Canada*). Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics.

Jeremy R. Johnson, PhD (*Ohio State University*). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

Weimao Ke, PhD (*University of North Carolina at Chapel Hill*). Associate Professor. Information retrieval (IR), distributed systems, intelligent filtering/recommendation, information visualization, network science, complex systems, machine learning, text/data mining, multi-agent systems, the notion of information.

Michael Khoo, PhD (*University of Colorado at Boulder*). Assistant Teaching Professor. The understandings and practices that users bring to their interactions with information systems, with a focus on the evaluation of digital libraries and educational technologies.

Xia Lin, PhD (*University of Maryland*). Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments.

Geoffrey Mainland, PhD (*Harvard University*). Assistant Professor. High-level programming languages and runtime support for non-general purpose computation.

Spiros Mancoridis, PhD (*University of Toronto*). Professor. Software engineering; software security; code analysis; evolutionary computation.

Gabriela Marcu, PhD (*Carnegie Mellon University*). Assistant Teaching Professor. Human-computer interaction, health informatics, action research, ethnography, user experience design, designing for social change, organizational information systems, ubiquitous computing, knowledge management.

Linda S. Marion, PhD (*Drexel University*). Teaching Professor. Formal and informal communication, bibliometric studies of scholarly communication, diffusion of information, information use in the social sciences, academic and public libraries, information science education.

Adelaida Alban Medlock, MS (*Drexel University*). Associate Teaching Professor. Introductory programming; computer science education.

William Mongan, MS (*Drexel University*) *Associate Department Head for Undergraduate Affairs, Computer Science*. Associate Teaching Professor. Service-oriented architectures, program comprehension, reverse engineering, software engineering, computer architecture, computer science education, engineering education outreach

Gaurav Naik, MS (*Drexel University*). Assistant Research Professor. Computer networking and cybersecurity

Delia Neuman, PhD (*The Ohio State University*). Professor Emeritus. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Ko Nishino, PhD (*University of Tokyo*) *Associate Department Head for Graduate Affairs, Computer Science*. Professor. Computer vision, computer graphics, analysis and synthesis of visual appearance.

Danuta A. Nitecki, PhD (*University of Maryland at College Park*) *Dean of Libraries*. Professor. Library metrics and use in management, library as place, and academic library service models.

Krzysztof Nowak, PhD (*Washington University*). Associate Teaching Professor. Fourier analysis, partial differential equations, image processing, wavelets, asymptotic distribution of eigenvalues, numerical methods and algorithms, computer science education.

Santiago Ontañón, PhD (*University of Barcelona*). Assistant Professor. Game AI, computer games, artificial intelligence, machine learning, case-based reasoning

Jung-ran Park, PhD (*University of Hawaii at Manoa*). Associate Professor. Knowledge organization and representation, metadata, computer-mediated communication, cross-cultural communication, multilingual information access.

Alex Poole, PhD (*University of North Carolina*). Assistant Professor. Archives and records, digital humanities, digital curation, pedagogy, diversity and inclusivity in the LIS profession

Jeffrey L. Popyack, PhD (*University of Virginia*). Professor. Operations research, stochastic optimization, computational methods of Markov decision processes; artificial intelligence, computer science education.

William C. Regli, PhD (*University of Maryland-College Park*). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Lori Richards, PhD (*University of North Carolina*). Assistant Professor. Archives, digital curation, electronic records management, information technology and digital collections, cloud computing and record keeping, management of information organizations.

Michelle L. Rogers, PhD (*University of Wisconsin-Madison*). Associate Professor. Human-computer interaction, healthcare informatics, human factors engineering, socio-technical systems, health services research, patient safety.

Jeffrey Salvage, MS (*Drexel University*). Teaching Professor. Object-oriented programming, multi-agent systems, software engineering, database theory, introductory programming, data structures.

Dario Salvucci, PhD (*Carnegie Mellon University*) *Department Head, Computer Science*. Professor. Human computer interaction, cognitive science, machine learning, applications for driving.

Kurt Schmidt, MS (*Drexel University*). Associate Teaching Professor. Data structures, math foundations for computer science, programming tools, programming languages.

Ali Shokoufandeh, PhD (*Rutgers University*) *Senior Associate Dean of Research*. Professor. Theory of algorithms, graph theory, combinational optimization, computer vision.

Erin Solovey, PhD (*Tufts University*). Assistant Professor. Human-computer interaction, brain-computer interfaces, tangible interaction, machine learning, human interaction with complex and autonomous systems.

Il-Yeol Song, PhD (*Louisiana State University*) *PhD in Information Studies Program Director*. Professor. Conceptual modeling, ontology and patterns, data warehouse and OLAP, object-oriented analysis and design with UML, medical and bioinformatics data modeling & integration.

Julia Stoyanovich, PhD (*Columbia University*). Assistant Professor. Data and knowledge management, big data, biological data management, search and ranking.

Brian Stuart, PhD (*Purdue University*). Associate Teaching Professor. Machine learning, networking, robotics, image processing, simulation, interpreters, data storage, operating systems, computer science, data communications, distributed/operating systems, accelerated computer programming, computer graphics.

Deborah Turner, PhD (*University of Washington*). Assistant Professor. Information behavior/interaction, management of information institutions, orality and information.

Kristene Unsworth, PhD (*University of Washington*). Assistant Professor. Information policy, ethics, government information.

Filippos Vokolos, PhD (*Polytechnic University*). Assistant Teaching Professor. System architecture, principles of software design and construction, verification and validation methods for the development of large software systems, foundations of software engineering, software verification & validation, software design, programming languages, dependable software systems.

Rosina Weber, PhD (*Federal University of Santa Catarina*). Associate Professor. Knowledge-based systems; case-based reasoning; textual case-based reasoning; computational intelligence; knowledge discovery; uncertainty, mainly targeting knowledge management goals in different domains, e.g., software engineering, military, finance, law, bioinformatics, and health sciences.

Erija Yan, PhD (*Indiana University*). Assistant Professor. Network Science, information analysis and retrieval, scholarly communication methods and applications.

Christopher C. Yang, PhD (*University of Arizona, Tucson*). Associate Professor. Web search and mining, security informatics, knowledge management, social media analytics, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, artificial intelligence, digital library, and electronic commerce.

Valerie Ann Yonker, PhD (*Drexel University*). Associate Teaching Professor. Human service information systems, systems analysis and design, measurement in software evaluation, knowledge engineering.

Emeritus Faculty

Michael E. Atwood, PhD (*University of Colorado*) *Associate Dean for Research and for Undergraduate Education*. Professor Emeritus. Human-computer interaction, computer-supported cooperative work, organizational memory.

Thomas A. Childers, PhD (*Rutgers University*). Professor Emeritus. Measurement, evaluation, and planning of information and library services, the effectiveness of information organizations.

David E. Fenske, PhD (*University of Wisconsin-Madison*). Dean Emeritus and Professor. Digital libraries, informatics, knowledge management and information technologies.

John B. Hall, PhD (*Florida State University*). Professor Emeritus. Academic library service, library administration, organization of materials.

Katherine W. McCain, PhD (*Drexel University*). Professor Emeritus. Scholarly communication, information production and use in the research process, development and structure of scientific specialties, diffusion of innovation, bibliometrics, evaluation of information retrieval systems.

Carol Hansen Montgomery, PhD (*Drexel University*) *Dean of Libraries Emeritus*. Research Professor. Selection and use of electronic collections, evaluation of library and information systems, digital libraries, economics of libraries and digital collections.

Gerry Stahl, PhD (*University of Colorado, Northwestern University*). Professor Emeritus. Human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, theory of collaboration.

Howard D. White, PhD (*University of California at Berkeley*). Professor Emeritus. Literature information systems, bibliometrics, research methods, collection development, online searching.

Susan Wiedenbeck, PhD (*University of Pittsburgh*). Professor Emeritus. Human-computer interaction, end-user programming/end-user development, empirical studies of programmers, interface design and evaluation.

Minor in Emergency Management

Natural or man-made disasters can strike at anytime and anywhere. They take many forms—a hurricane, an earthquake, a tornado, a flood, a fire or a hazardous spill, an act of nature or an act of terrorism. Disasters can build over days or weeks, or hit suddenly, without warning. Every year, millions of people face disasters and their consequences.

This minor is designed to equip individuals with the fundamental competencies expected of professionals in the field of emergency

management. It provides the knowledge, skills, and abilities necessary to be competent emergency managers.

Students interested in pursuing a minor in emergency management may include individuals majoring in architecture, civil engineering, construction management, criminal justice, political science, and professional studies.

The minor is available to all University students in good standing.

Core Requirements

EMER 210	Hazard Mitigation	3.0
EMER 215	Public Management in Times of Crisis	3.0
EMER 220	Emergency Incident Risk Management	3.0
EMER 225	Infrastructure Disaster Recovery	3.0
Select four of the following:		12.0
CT 222	Security and Information Warfare	
CT 225	Data Mining Technology for Security	
CT 315	Security Management Practice	
CT 393	Information Technology Security Risk Assessment	
CT 395	Information Technology Security I	
CT 412	Information Technology Security Policies	
CT 415	Disaster Recovery and Continuity Planning	
CT 420	Information Technology Security II	
CT 422	Incident Response Best Practices	
CT 432	Information Technology Security Systems Audits	
CT 472	Security Defense Countermeasures	
EMER 235	Public Information Strategies	
EMER 245	Search and Rescue	
EMS 307	Critical Incident Stress Management	
EMS 445	Organizing Community Response in Disasters	
Total Credits		24.0

Minor in Human Centered Computing

Human-Centered Computing looks to improve the integration of computing in the lives of individuals and the collaboration within groups. The minor in Human-Centered Computing combines basic courses in areas including human computer interaction, collaborative work, and graphical user interfaces.

A student in any major can benefit from a minor in Human-Centered Computing. The minor is available to all University students in good standing.

INFO 110	Human-Computer Interaction I	3.0
INFO 150	Ubiquitous Information Technologies	3.0
INFO 216	Issues in Information Policy	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO 405	Social and Collaborative Computing	3.0
INFO 440	Social Media Trend Spotting	3.0
Select 2 of the following:		6.0
CS 275	Web and Mobile App Development	
CS 338	Graphical User Interfaces	
CS 345	Computer Game Design and Development	
CS 432	Interactive Computer Graphics	
INFO 220	Geographic Information Science	
INFO 250	Information Visualization	
INFO 350	Visual Analytics	
INFO 405	Social and Collaborative Computing	
Total Credits		24.0

Minor in Security Technology

The demand for individuals with security related skills is increasing and essential in today's internet-dominated society. Computer and information systems managers are becoming more involved with the security of data, responsible for sophisticated and more efficient computer networks and increasingly more complex websites and intranets. The minor in Security Technology combines basic courses in security and technology required to help organizations keep their computer systems secure.

Any student in any major can benefit from a minor in Security Technology. Graduates with such background knowledge are prepared to actively participate in the application of security technology within the major area of study.

The minor is available to all University students in good standing, with the exception of students majoring in Computing and Security Technology.

CT 140	Network Administration I	3.0
CT 210	Open Server I	3.0
CT 312	Access Control and Intrusion Detection Technology	3.0
CT 395	Information Technology Security I	3.0
CT 412	Information Technology Security Policies	3.0
CT 420	Information Technology Security II	3.0
INFO 101	Introduction to Information Technology	3.0
Security Technology Elective, Select 1 of the following:		3.0
CT 315	Security Management Practice	
CT 362	Network Auditing Tools	
CT 393	Information Technology Security Risk Assessment	
CT 415	Disaster Recovery and Continuity Planning	
Total Credits		24.0

Certificate in Computing and Security Technology

Certificate Level: Post-Baccalaureate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate Certificate

Number of Credits to Completion: 24.0

Instructional Delivery: Online; Campus (part-time only)

Calendar Type: Quarter

Expected Time to Completion: 5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 11.1003

Standard Occupational Classification (SOC) Code: 15-1152

Note: Effective Fall 2014, students are no longer being accepted into this certificate program.

The certificate in computing & security technology is designed for computing technology professionals who have a BS degree in computing technology or considerable experience in the area, and who are seeking a career change or professional advancement with an additional focus on security.

The curriculum provides a deep understanding of the basic security-related issues and technologies as well as the flexibility to choose additional areas of study tailored to the needs of the individual student.

Required Courses

CT 300	Security Technology Models and Architecture I	3.0
CT 312	Access Control and Intrusion Detection Technology	3.0

CT 325	Operating System Security Architecture I	3.0
CT 336	Internet Protocol Security and Virtual Private Network Technology	3.0
CT 402	Network Security II	3.0
CT 472	Security Defense Countermeasures	3.0
Select two of the following:		6.0
CT 212	Computer Forensics I: Fundamentals	
CT 222	Security and Information Warfare	
CT 295	Public Key Infrastructure Technology	
CT 315	Security Management Practice	
CT 326	Operating System Security Architecture II	
CT 355	Wireless Network Security Technology	
CT 362	Network Auditing Tools	
CT 382	Applied Cryptography	
CT 393	Information Technology Security Risk Assessment	
CT 412	Information Technology Security Policies	
CT 415	Disaster Recovery and Continuity Planning	
CT 422	Incident Response Best Practices	
CT 432	Information Technology Security Systems Audits	
Total Credits		24.0

The College of Engineering

The College of Engineering curriculum is designed to provide students a thorough understanding of scientific, mathematical, and engineering fundamentals--as well as the ability to apply these areas of knowledge creatively to a wide variety of engineering problems.

Majors

- Architectural Engineering (BS) (p. 230)
- Chemical Engineering (BS) (p. 237)
- Civil Engineering (BS) (p. 240)
- Computer Engineering (BS) (p. 244)
- Construction Management (BS) (p. 251)
 - Real Estate Concentration (p. 253)
- Electrical Engineering (BS) (p. 255)
- Engineering (BS) (p. 262)
- Engineering Technology (BS) (p. 264)
 - Biomedical Engineering Technology Concentration (p. 265)
 - Electrical Engineering Technology Concentration (p. 267)
 - Industrial Engineering Technology Concentration (p. 268)
 - Mechanical Engineering Technology Concentration (p. 270)
- Environmental Engineering (BS) (p. 271)
- Materials Science and Engineering (BS) (p. 275)
- Mechanical Engineering (BS) (p. 282)
- Property Management (BS) (p. 288)
- Systems Engineering (BS/MS) (p. 290)

Minors

- Architectural Engineering (p. 235)
- Computer Engineering (p. 247)
- Construction Management (p. 254)
- Electrical Engineering (p. 258)
- Engineering Management (p. 292)
- Engineering Policy Analysis (p. 292)
- Entertainment Engineering (p. 293)
- Environmental Engineering (p. 274)
- Global Engineering (p. 293)
- Materials Science and Engineering (p. 279)
- Mechanical Engineering (p. 285)
- Nuclear Engineering (p. 294)
- Project Management (p. 294)
- Property Management (p. 290)
- Real Estate (p. 295)
- Systems Engineering (p. 295)

Certificates

- Construction Management (I, II, III, IV) (p. 295)

About the College

Drexel University's College of Engineering has emphasized its strengths in engineering, science and technology to train students to become the leaders of the future. In little over a century, Drexel University has transformed itself into a large, comprehensive institution committed to excellence in education, research and service to the engineering society and to the broader community. Although much has changed, the original mission of the University still rings true today.

The College of Engineering offers students a diverse academic learning and research environment embodying the highest standards of knowledge and preparing them to impact society's greatest challenges. Through entrepreneurial risk-taking and exploration, students are encouraged to find innovative solutions that promote economic development and improve life.

In addition to the traditional engineering curriculum, the college offers Property Management (p. 288), (p. 288) Engineering Technology (p. 264), and Construction Management (p. 251).

Objectives of the traditional Undergraduate Engineering Program

The profession of engineering is concerned with turning the natural elements and energies to the service of mankind. The objectives of the undergraduate program in the College of Engineering (<http://www.drexel.edu/coe>) are:

- *To offer an education that will give graduates the flexibility to adjust to future changes in technology*
- *To develop a sense of professionalism and entrepreneurship*
- *To provide a framework for concentrated study in a professional area*

To implement those objectives the curricula of the College of Engineering are designed to provide a firm grounding in basic science and liberal arts, along with broad-based engineering sciences and professional engineering subjects.

Cooperative Education

In five-year cooperative programs, engineering majors spend a total of 12 terms in school and six terms on co-op assignment. Freshmen attend classes for three terms. During their sophomore, pre-junior, and junior years, students generally attend class for two terms and are assigned a cooperative employment position for two terms each year.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

About the Traditional Engineering Curriculum

Degree Requirements

The degree of Bachelor of Science in the engineering specialties is comprised of academic work and six terms of co-op or engineering experience for the five-year program. For the four-year program, only two terms of co-op are required. Transfer students must complete a minimum of two terms of co-op or engineering experience in order to earn a cooperative engineering degree accredited by ABET (<http://www.abet.org>).

Engineering student must maintain an overall grade point average of 2.0 in all required courses in their major.

The Bachelor of Science in Engineering (BSE) program is a customizable undergraduate engineering degree program offered in the College of Engineering. The program is designed for students who are seeking an interdisciplinary education rooted in engineering. The degree is structured so students achieve a strong foundation in science, math and engineering. Upper level engineering electives can be chosen to fit the student's individual interests and career objectives. The BS in Engineering program allows the student to create their own engineering curriculum path with the assistance of their BSE advisors. The program is also flexible enough so that students can complete up to two minors in areas which may include but are not limited to environmental studies, finance, entrepreneurship, music, legal studies or pre-med. To learn more about the Bachelor of Science in Engineering program, please visit the Program Overview webpage (<http://drexel.edu/engineering/areas-of-study/engineering/BSE/ProgramOverview>).

Curricular Organization

Students in the traditional engineering programs study the same subjects during the three terms in the first year. During the two terms of the sophomore year, students begin taking department specific coursework.

The first five terms are devoted to those subjects that form the foundation of the engineering curriculum. Courses in the core engineering curriculum are organized and taught to provide an integrated view of the basic sciences and an introduction to the art of engineering through group projects that deal with open-ended problems characteristic of the practice of engineering. Students also learn to use the modern tools of engineering both on the computer and in the laboratory.

The college considers it essential that students entering the Drexel Engineering Curriculum be placed in courses that take advantage of their abilities and prior training. Student preparation level is determined by a review committee that evaluates the student's high school record, standardized test scores, and placement tests administered during freshman orientation.

Students who demonstrate the preparation and skills to succeed in our integrated engineering calculus course immediately will be placed in the course starting in the fall term. Students who are not prepared for this sequence may participate in a special "pre-engineering" program before the fall term. These students may also have a modified fall schedule and may need summer school during the following summer.

In the second year, professional subjects are introduced, and all the first-level professional courses are completed by the junior year. The senior year in all curricula contains at least one elective sequence so that students can study some aspect of engineering more deeply. In addition, all curricula provide a design experience in the senior year. Recognizing the importance of general education studies in the education of an engineer, all curricula require that courses be taken in this area. These requirements are described in more detail in the General Education Requirements (<http://drexel.edu/engineering/resources/undergraduate-advising/current-students/electives/general-ed-electives>).

The Common Curriculum

University Requirements

CIVC 101	Introduction to Civic Engagement	1.0
UNIV E101	The Drexel Experience	2.0

Foundation Requirements

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
BIO 141	Essential Biology	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0

In addition, engineering students complete thirty (30.0) credits of General Education Requirements (p. 229).

Electives

In addition to the electives in the General Education electives there are two types of elective sequences in the engineering curricula: technical electives and free electives. Technical electives are courses in engineering, science, or management that build on the required professional courses and lead to a specific technical specialization. Possible elective sequences should be discussed with and approved by advisors before the end of the junior year. Free electives are any courses for which students are eligible and that are not remedial in nature for engineering students.

General Education Requirements

The General Education Program is designed to give engineering students an opportunity to take a set of courses that complement their technical studies and satisfy their intellectual and/or career interests. All engineering majors must take thirty (30.0) credits. Nine (9.0) of the thirty credits are designated as follows and must be completed by all majors:

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

General Education requirements for specific majors can be found in the degree requirements for each major. The remaining credits can be chosen from the disciplines listed below.

Course Subjects

This following list is a sampling of subject codes for courses that can be taken to fulfill General Education requirements; other courses may be accepted upon advisor approval.

Accounting (ACCT), Africana Studies (AFAS), Anthropology (ANTH), Arabic (ARBC), Architecture (ARCH), Art History (ARTH), Business Law (BLAW), Chinese (CHIN), Communication (COM), Criminology & Justice Studies (CJS), Culinary Arts (CULA), Customer Operations (CUST),

Dance (DANC), Economics (ECON), Education (EDUC), English (ENGL, except 101, 102, 103 & 105), Entertainment & Arts Management (EAM), Entrepreneurship (ENTP), Film Studies (FMST), Finance (FIN), French (FREN), General Business (BUSN), German (GER), Greek, (GREC), Hebrew (HBRW), History (HIST), Hotel & Restaurant Management (HRM), Humanities (HUM, except 106, 107, & 108), Interior Design (INTR), International Area Studies (IAS), International Business (INTB), Italian (ITAL), Japanese (JAPN), Judaic Studies (JUDA), Korean (KOR), Language (LANG), Leadership (LEAD), Management (MGMT), Marketing (MKTG), Military Science (MLSC), Music (MUSC), Music Industry Program (MIP), Operations Management (OPM), Operations Research (OPR), Organizational Behavior (ORGB), Philosophy (PHIL), Photography (PHOT), Production Operations Management (POM), Portuguese (PORT), Product Design (PROD) Project Management (PROJ), Political Science (PSCI), Psychology (PSY, except 330 & 337), Public Health (PBHL), Real Estate (REAL), Russian (RUSS), Screenwriting & Playwriting (SCRIP), Sociology (SOC, except 364 & 365), Spanish (SPAN), Sports Management (SMT), Taxation (TAX), Theatre (THTR), WEST Studies (WEST), Women's and Gender Studies (WGST), and Writing (WRIT).

General Education electives must be non-technical. All Computer, Math, Engineering & Science related courses will NOT count as General Education electives.

Special Programs

Accelerated Programs/ Bachelor's/Master's Dual Degree Program

The Accelerated Program of the College of Engineering provides opportunities for highly talented and strongly motivated students to progress toward their educational goals essentially at their own pace. Primarily through advanced placement, credit by examination, flexibility of scheduling, and independent study, the program makes it possible to complete the undergraduate curriculum and initiate graduate study in less than the five years required by the standard curriculum. Students enrolled in this program may take advantage of the five-year Bachelor's/Master's Dual Degree Program described on the College of Engineering's Accelerated Programs (<http://drexel.edu/engineering/programs/undergraduate/accelerated-programs>) web page.

Lincoln University/Drexel 3-3 Plan

Drexel participates in a program with Lincoln University under which a student may attend Lincoln University for three years, taking liberal arts subjects and pre-engineering courses in mathematics, science, and related areas; transfer to Drexel; and receive a degree in engineering after three additional years at Drexel. This is similar to the conventional 3-2 program in which other colleges and universities participate; the extra year is necessitated by Drexel's co-operative education plan.

Facilities

Core Engineering Facilities

The Freshman Engineering Design Laboratories are located in the newly-created Innovation Studio. The Studio hosts activities for all class levels from Freshman Design at one end through Senior Design at the other. It includes 3D printers, multiple sensor suites and the college machine shop representing the flow of freshman initial ideas through complex fabrication.

Freshman Design courses taken by all new freshmen are held exclusively in the Innovation Studio which was completed in the fall of 2015. A team of Drexel faculty and staff designed the studio to allow activities of many scales as well as to promote open communication within and across groups of students. The lab tables accommodate work in small and larger groups.

The Innovation Studios are an example of Drexel's commitment to undergraduate education, but providing up-to-date, high-quality technology to facilitate the kind of experiential learning that keeps Drexel at the cutting edge.

Department Facilities

Departments within the College of Engineering have laboratory equipment appropriate for required lab coursework within curriculum. Most engineering department webpages describe their specialized facilities in detail.

Architectural Engineering

Major: Architectural Engineering

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 193.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0401

Standard Occupational Classification (SOC) code: 11-9041

About the Program

The architectural engineering major prepares graduates for professional work in the analysis, design, construction, and operation of residential, commercial, institutional, and industrial buildings. The program develops engineers familiar with all aspects of safe and economical construction. Students study the principles of structural support and external cladding, building environmental systems, and project management and develop depth in at least one area.

The program integrates building disciplines, including coordination with architects, construction managers, civil, mechanical, and electrical engineers, and others. Students use computer-aided design tools to understand system interactions, perform analysis, design, scheduling, and cost analysis, and present their work.

The first two years of the curriculum cover fundamentals necessary for all engineers. The pre-junior and junior years emphasize building systems and the principles governing their performance. In addition to the core engineering and science, students learn architectural approaches through studio design. Seniors focus on either structural or building environmental systems design, as well as a full-year realistic design project. The academic program is complemented by exposure to professional practice in the co-op experience.

A special feature of the major is senior design. A group of students works with a faculty advisor to develop a significant design project selected by the group. All architectural engineering students participate in a design project.

Mission Statement

The civil and architectural engineering faculty are responsible for delivering an outstanding curriculum that equips our graduates with the broad technical knowledge, design proficiency, professionalism, and

communications skills required for them to make substantial contributions to society and to enjoy rewarding careers.

Program Educational Objectives

Architectural engineering graduates will become professionals who analyze, design, construct, manage, or operate residential, commercial, institutional and industrial buildings and systems, or advance knowledge of the field.

Student Outcomes

The department's student outcomes reflect the skills and abilities that the curriculum is designed to provide to students by the time they graduate. These are:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- d) an ability to function on multidisciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional and ethical responsibility;
- g) an ability to communicate effectively;
- h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i) a recognition of the need for, and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for architectural engineering practice.

Concentration Options

Mechanical Concentration (HVAC)

Students who choose the mechanical concentration (HVAC) prepare for careers dealing with the building environment. As co-ops and graduates, they will be involved in the many design aspects of building environmental control, including:

- building load definitions
- equipment selection and design
- distribution system design
- control systems design
- energy analysis and system optimization
- building operation for safety, economy and maximum performance

Structural Concentration

Students who choose the structural concentration prepare for careers dealing with the building structure. As co-ops and graduates, they will be involved in the design of the many aspects of building structure including:

- building load definitions
- structural system design
- foundation system design

Digital Building Concentration

Students who choose the digital building concentration prepare for careers dealing with the role of computer technology in building design, construction and operation. As co-ops and graduates, they will be involved in:

- development and use of Building Information Models (BIM) and databases
- configuration and operation of building sensor and actuator networks and monitoring systems
- developing and maintaining construction schedules, databases and monitoring systems

Additional Information

The Architectural Engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (<http://www.abet.org>).

For more information about this major, contact the program director:

Michael Waring, PhD

Assistant Professor

Civil, Architectural & Environmental Engineering

maw59@drexel.edu

Degree Requirements

General Education/Liberal Studies Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV E101	The Drexel Experience	1.0
General Education requirements *		12.0

Foundation Requirements

BIO 141	Essential Biology	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0

Major Requirements

AE 220	Introduction to HVAC	3.5
AE 340	Architectural Illumination and Electrical Systems	3.0

AE 390	Architectural Engineering Design I	4.0
AE 391	Architectural Engineering Design II	4.0
AE 544	Building Envelope Systems	3.0
ARCH 141	Architecture and Society I	3.0
ARCH 142	Architecture and Society II	3.0
ARCH 143	Architecture and Society III	3.0
ARCH 191	Studio 1-AE	3.0
ARCH 192	Studio 2-AE	3.0
CAE 491 [WI]	Senior Design Project I	3.0
CAE 492 [WI]	Senior Design Project II	3.0
CAE 493 [WI]	Senior Design Project III	3.0
CAEE 202	Introduction to Civil, Architectural & Environmental Engineering	3.0
CAEE 203	System Balances and Design in CAEE	3.0
CAEE 212	Geologic Principles for Infrastructure & Environmental Engineering	4.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
CIVE 250	Construction Materials	4.0
CIVE 330	Hydraulics	4.0
CIVE 320	Introduction to Fluid Flow	3.0
ENGR 361	Statistical Analysis of Engineering Systems	3.0
MEM 202	Statics	3.0
MEM 230	Mechanics of Materials I	4.0
Concentration Courses		29.0
Students select one of the following concentrations for a total of 29.0 credits:		
Mechanical Concentration		
AE 430	Control Systems for HVAC	
CIVE 370	Introduction to Structural Analysis	
CIVE 371	Introduction to Structural Design	
CIVE 372	Structural Laboratory	
MEM 345	Heat Transfer	
MEM 413	HVAC Loads	
MEM 414	HVAC Equipment	
Three professional electives		
Structural Concentration		
CIVE 300	Structural Analysis I	
CIVE 301	Structural Design I	
CIVE 310	Soil Mechanics I	
CIVE 400	First Principles of Structural Design	
CIVE 401	Structural Design II	
CIVE 402	Structural Design III	
CIVE 410	Foundation Engineering	
Two professional electives		
Digital Building Concentration		
AE 510	Intelligent Buildings	
CIVE 370	Introduction to Structural Analysis	
CIVE 371	Introduction to Structural Design	
CIVE 372	Structural Laboratory	
CMGT 361	Contracts And Specifications I	
CMGT 467	Techniques of Project Control	
INFO 210	Database Management Systems	
INFO 203	Information Technology for Engineers	
Two professional electives		
Total Credits		193.0

* General Education Requirements. (p. 229)

Sample Plan of Study

BS Architectural Engineering, Mechanical Engineering

5 YR UG Co-op Concentration/Mechanical Engineering

Term 1		Credits
CHEM 101	General Chemistry I	3.5
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
Term Credits		16.5
Term 2		Credits
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
PHYS 101	Fundamentals of Physics I	4.0
MATH 122	Calculus II	4.0
Term Credits		19.5
Term 3		Credits
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		17.5
Term 4		Credits
CAEE 201	Introduction to Infrastructure Engineering	3.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		17.0
Term 5		Credits
ARCH 191	Studio 1-AE	3.0
CAEE 210	Measurements in Civil, Architectural and Environmental Engineering I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0
Term Credits		18.0
Term 6		Credits
AE 340	Architectural Illumination and Electrical Systems	3.0
ARCH 141	Architecture and Society I	3.0
ARCH 192	Studio 2-AE	3.0
CIVE 320	Introduction to Fluid Flow	3.0
MEM 230	Mechanics of Materials I	4.0
Term Credits		16.0
Term 7		Credits
AE 220	Introduction to HVAC	3.5
ARCH 142	Architecture and Society II	3.0

CAEE 211	Measurements in Civil, Architectural and Environmental Engineering II	4.0
CIVE 250	Construction Materials	4.0
CIVE 330	Hydraulics	4.0
	Term Credits	18.5
Term 8		
AE 390	Architectural Engineering Design I	4.0
ARCH 143	Architecture and Society III	3.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
CIVE 370	Introduction to Structural Analysis	3.0
MEM 345	Heat Transfer	4.0
	Term Credits	17.0
Term 9		
AE 391	Architectural Engineering Design II	4.0
CIVE 371	Introduction to Structural Design	3.0
CIVE 372	Structural Laboratory	1.0
	Professional elective*	3.0
	General Education elective*	3.0
	Term Credits	14.0
Term 10		
AE 544	Building Envelope Systems	3.0
CAE 491 [WI]	Senior Design Project I	3.0
ENGR 361	Statistical Analysis of Engineering Systems	3.0
MEM 413	HVAC Loads	3.0
	General Education elective*	3.0
	Term Credits	15.0
Term 11		
CAE 492 [WI]	Senior Design Project II	3.0
MEM 414	HVAC Equipment	3.0
	Professional elective*	3.0
	General Education elective*	3.0
	Term Credits	12.0
Term 12		
AE 430	Control Systems for HVAC	3.0
CAE 493 [WI]	Senior Design Project III	3.0
	Professional elective*	3.0
	General Education elective*	3.0
	Term Credits	12.0
Total Credit: 193.0		

* See degree requirements (p. 231).

BS Architectural Engineering, Structural 5 YR UG Co-op Concentration/Structural

		Credits
Term 1		
CHEM 101	General Chemistry I	3.5
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
	Term Credits	16.5
Term 2		
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0

PHYS 101	Fundamentals of Physics I	4.0
UNIV E101	The Drexel Experience	0.5
	Term Credits	19.0
Term 3		
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
UNIV E101	The Drexel Experience	0.5
	Term Credits	18.0
Term 4		
CAEE 201	Introduction to Infrastructure Engineering	3.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
	Term Credits	17.0
Term 5		
ARCH 191	Studio 1-AE	3.0
CAEE 210	Measurements in Civil, Architectural and Environmental Engineering I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0
	Term Credits	18.0
Term 6		
AE 340	Architectural Illumination and Electrical Systems	3.0
ARCH 141	Architecture and Society I	3.0
ARCH 192	Studio 2-AE	3.0
CIVE 320	Introduction to Fluid Flow	3.0
MEM 230	Mechanics of Materials I	4.0
	Term Credits	16.0
Term 7		
AE 220	Introduction to HVAC	3.5
ARCH 142	Architecture and Society II	3.0
CAEE 211	Measurements in Civil, Architectural and Environmental Engineering II	4.0
CIVE 250	Construction Materials	4.0
CIVE 330	Hydraulics	4.0
	Term Credits	18.5
Term 8		
AE 390	Architectural Engineering Design I	4.0
ARCH 143	Architecture and Society III	3.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
CIVE 300	Structural Analysis I	3.0
CIVE 310	Soil Mechanics I	4.0
	Term Credits	17.0
Term 9		
AE 391	Architectural Engineering Design II	4.0
CIVE 301	Structural Design I	4.0
	Professional elective*	3.0
	General Education elective*	3.0
	Term Credits	14.0
Term 10		
AE 544	Building Envelope Systems	3.0
CAE 491 [WI]	Senior Design Project I	3.0
CIVE 400	First Principles of Structural Design	3.0
ENGR 361	Statistical Analysis of Engineering Systems	3.0
	General Education elective*	3.0
	Term Credits	15.0

Term 11		
CAE 492 [WI]	Senior Design Project II	3.0
CIVE 401	Structural Design II	3.0
CIVE 410	Foundation Engineering	3.0
General Education elective *		3.0
Term Credits		12.0
Term 12		
CAE 493 [WI]	Senior Design Project III	3.0
CIVE 402	Structural Design III	3.0
Professional elective *		3.0
General Education elective *		3.0
Term Credits		12.0
Total Credit: 193.0		

* See degree requirements (p. 231).

BS Architectural Engineering, Digital Building 5 YR UG Co-op Concentration/Digital Building

Term 1		Credits
CHEM 101	General Chemistry I	3.5
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
Term Credits		16.5
Term 2		
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
PHYS 101	Fundamentals of Physics I	4.0
MATH 122	Calculus II	4.0
UNIV E101	The Drexel Experience	0.5
Term Credits		19.0
Term 3		
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
UNIV E101	The Drexel Experience	0.5
Term Credits		18.0
Term 4		
CAEE 201	Introduction to Infrastructure Engineering	3.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		17.0
Term 5		
ARCH 191	Studio 1-AE	3.0
CAEE 210	Measurements in Civil, Architectural and Environmental Engineering I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0

MEM 202	Statics	3.0
Term Credits		18.0
Term 6		
AE 340	Architectural Illumination and Electrical Systems	3.0
ARCH 141	Architecture and Society I	3.0
ARCH 192	Studio 2-AE	3.0
CIVE 320	Introduction to Fluid Flow	3.0
MEM 230	Mechanics of Materials I	4.0
Term Credits		16.0
Term 7		
AE 220	Introduction to HVAC	3.5
ARCH 142	Architecture and Society II	3.0
CAEE 211	Measurements in Civil, Architectural and Environmental Engineering II	4.0
CIVE 250	Construction Materials	4.0
CIVE 330	Hydraulics	4.0
Term Credits		18.5
Term 8		
AE 390	Architectural Engineering Design I	4.0
ARCH 143	Architecture and Society III	3.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
CIVE 370	Introduction to Structural Analysis	3.0
Professional Elective **		3.0
Term Credits		16.0
Term 9		
AE 391	Architectural Engineering Design II	4.0
CIVE 371	Introduction to Structural Design	3.0
CIVE 372	Structural Laboratory	1.0
INFO 210	Database Management Systems	3.0
General Education Elective *		3.0
Term Credits		14.0
Term 10		
AE 544	Building Envelope Systems	3.0
CAE 491 [WI]	Senior Design Project I	3.0
ENGR 361	Statistical Analysis of Engineering Systems	3.0
INFO 203	Information Technology for Engineers	3.0
General Education Elective *		3.0
Term Credits		15.0
Term 11		
AE 510	Intelligent Buildings	3.0
CAE 492 [WI]	Senior Design Project II	3.0
CMGT 467	Techniques of Project Control	4.0
General Education Elective *		3.0
Term Credits		13.0
Term 12		
CAE 493 [WI]	Senior Design Project III	3.0
CMGT 361	Contracts And Specifications I	3.0
General Education Elective *		3.0
Professional Elective **		3.0
Term Credits		12.0
Total Credit: 193.0		

* See degree requirements (p. 231).

** Students are asked to speak with their program advisor before registering for the INFO elective.

Co-op/Career Opportunities

The major in architectural engineering prepares students for professional work in residential, commercial, institutional, and industrial building systems, in cooperation with architects and other engineers.

Sample Co-op Experiences

When students complete their co-op jobs, they are asked to write an overview of their experiences. These brief quotes are taken from some recent student reports:

Project technician, major university: "Studied and surveyed existing buildings and facilities for: their compliance with the Americans with Disabilities Act, heating and air conditioning equipment sizing, electrical loads, and their planning and usage of space. Designed improvements from the field surveys taken, and developed construction drawings. Worked closely with the workforce in implementing these changes."

CAD technician, private engineering firm: "Prepared computer generated construction plans for various water and sewer reconstruction projects. . . Was able to expand my knowledge of Auto CAD to include Advanced Design Modules."

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Dual/Accelerated Degree

The Accelerated Program of the College of Engineering provides opportunities for highly talented and strongly motivated students to progress toward their educational goals essentially at their own pace. Primarily through advanced placement, credit by examination, flexibility of scheduling, and independent study, the program makes it possible to complete the undergraduate curriculum and initiate graduate study in less than the five years required by the standard curriculum.

Dual Degree Bachelor's Programs

A student completing the Bachelor of Science degree program in architectural engineering may complete additional courses (specified by the department) to earn the Bachelor of Science degree in civil engineering. (The reverse is difficult because of prerequisites in the sequence of architectural studio design courses, which begins in the sophomore year.)

Required Courses for Dual Degree in Civil Engineering

CIVE 430	Hydrology	3.0
CIVE 477 [WI]	Seminar	2.0
CIVE 478 [WI]	Seminar	1.0
ENVE 300	Introduction to Environmental Engineering	3.0
Technical Elective (200-level or above) *		3.0

Required Courses for Mechanical Concentration

CIVE 310	Soil Mechanics I	4.0
CIVE 410	Foundation Engineering	3.0

Required Courses for Structural Concentration

CIVE 375	Structural Material Behavior	3.0
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* Check with the Department for Technical elective options.

Bachelor's/Master's Dual Degree Program

Exceptional students can also pursue a master of science degree in the same period as the bachelor of science. Exceptional students can also pursue a master of science degree in the same period as the bachelor of science. For more information about this program, visit the Department's BS/MS Dual Degree Program (http://www.cae.drexel.edu/dual_degree.asp) page.

Minor in Architectural Engineering

The minor in architectural engineering, designed to broaden the professional capabilities of students, offers the building systems portion of the architectural engineering curriculum with enough attention to structural components for completeness. Pursuing a minor in architectural engineering can be of interest to mechanical engineering students who wish to learn the application of HVAC systems within the building context; to civil engineering students who require knowledge of large-scale infrastructure systems; and to chemical engineering students who wish to understand the energy and distribution aspects of process plant design.

The minor consists of a minimum of 24.0 credits total, with five required core courses. Students take a minimum of eight additional credits taken from a list of optional courses.

While this minor is primarily designed to provide technical knowledge and skills to other engineers, with the appropriate prerequisites students from other disciplines—such as architecture—can also complete this minor.

Prerequisites

The common engineering core curriculum prerequisites are required of all students in the College of Engineering. Students from other colleges will need the appropriate background prerequisite courses in physics, mathematics and thermodynamics.

Required Courses

AE 220	Introduction to HVAC	3.5
AE 340	Architectural Illumination and Electrical Systems	3.0
	or ARCH 263 Environmental Systems III	
AE 390	Architectural Engineering Design I	4.0
CAEE 202	Introduction to Civil, Architectural & Environmental Engineering	3.0
CIVE 370	Introduction to Structural Analysis	3.0
Select two of the following:		8.0
AE 391	Architectural Engineering Design II	
ARCH 191	Studio 1-AE	
	or ARCH 10 Studio 1-A	
CIVE 240 [WI]	Engineering Economic Analysis	
CIVE 250	Construction Materials	
CIVE 371	Introduction to Structural Design	
MEM 413	HVAC Loads	
MEM 310	Thermodynamic Analysis I	
Total Credits		24.5

Facilities

The Department is well equipped with state-of-the-art facilities:

- The department computer labs are in operation: a computer-assisted design (CAD) and computerized instructional lab; and a graduate-level lab (advanced undergraduates can become involved in graduate-level work).
- External labs are used for surveying, building diagnostics, and surface and ground-water measurements.

Civil, Architectural and Environmental Engineering Faculty

Abieyuwa Aghayere, PhD (*University of Alberta*). Professor. Structural design - concrete, steel and wood; structural failure analysis; retrofitting of existing structures; new structural systems and materials; engineering education.

A. Emin Aktan, PhD (*University of Illinois at Urbana-Champaign*) John Roebling Professor of Infrastructure Studies. Professor. Structural engineering; health monitoring of large infrastructure systems; infrastructure evaluation; intelligent systems.

Ivan Bartoli, PhD (*University of California, San Diego*). Associate Professor. Non-destructive evaluation and structural health monitoring; dynamic identification, stress wave propagation modeling.

Robert Brehm, PhD (*Drexel University*). Associate Teaching Professor. International infrastructure delivery; response to natural catastrophes; risk assessment and mitigation strategies; project management techniques.

S.C. Jonathan Cheng, PhD (*West Virginia University*). Associate Professor. Soil mechanics; geosynthetics; probabilistic design; landfill containments; engineering education.

Peter DeCarlo, PhD (*University of Colorado*). Assistant Professor. Outdoor air quality, particulate matter size and composition instrumentation and measurements, source apportionment of ambient particulate matter, climate impacts of particulate matter.

Eugenia Ellis, RA, PhD (*Virginia Polytechnic State University*). Associate Professor. Extended-care facilities design, research on spatial visualization, perception and imagination.

Patricia Gallagher, PhD (*Virginia Polytechnic Institute*). Associate Professor. Soil mechanics; geoenvironmental; ground improvement; sustainability.

Patrick Gurian, PhD (*Carnegie-Mellon University*). Associate Professor. Risk analysis of environmental and infrastructure systems; novel adsorbent materials; environmental standard setting; Bayesian statistical modeling; community outreach and environmental health.

Charles N. Haas, PhD (*University of Illinois-Urbana*) L. D. Betz Professor and Department Head, Civil, Architectural and Environmental Engineering. Professor. Control of human exposures to and risk assessment of pathogenic organisms; water and waste treatment; homeland security.

Ahmad Hamid, PhD (*McMaster University*). Professor. Engineered masonry; seismic behavior, design and retrofit of masonry structures; development of new materials and building systems.

Y. Grace Hsuan, PhD (*Imperial College*). Professor. Durability of polymeric construction materials; advanced construction materials; and performance of geosynthetics.

Joseph B. Hughes, PhD (*University of Iowa*) Dean of the College of Engineering and Distinguished Professor. Biological processes and applications of nanotechnology in environmental systems.

L. James Lo, PhD (*University of Texas at Austin*). Assistant Professor. Computational Fluid Dynamics (CFD) and airflow simulation; Indoor Environmental Quality; Building control integration with building information management systems.

Roger Marino, PhD (*Drexel University*). Associate Teaching Professor. Fluid mechanics; water resources; engineering education; land development.

Joseph P. Martin, PhD (*Colorado State University*). Professor. Geotechnical and geoenvironmental engineering; hydrology; transportation; waste management.

James E. Mitchell, MArch (*University of Pennsylvania*) Associate Dean for Undergraduate Affairs. Professor. Architectural engineering design; building systems; engineering education.

Franco Montalto, PhD (*Cornell University*). Associate Professor. Effects of built infrastructure on societal water needs, ecohydrologic patterns and processes, ecological restoration, green design, water interventions.

Joseph V. Mullin, PhD (*Pennsylvania State University*) Associate Department Head. Teaching Professor. Structural engineering; failure analysis; experimental stress analysis; construction materials; marine structures.

Mira S. Olson, PhD (*University of Virginia*) Graduate Studies Advisor. Associate Professor. Environmental remediation; contaminant and bacterial transport in porous media and bacterial response to dynamic environments.

Michael Ryan, PhD (*Drexel University*). Assistant Teaching Professor. Microbial Source Tracking (MST); Quantitative Microbial Risk Assessment (QMRA); Dynamic Engineering Systems Modeling; Molecular Microbial Biology; Environmental Statistics; Engineering Economics; Microbiology

Christopher Sales, PhD (*University of California, Berkeley*). Assistant Professor. Environmental microbiology and biotechnology; biodegradation of environmental contaminants; microbial processes for energy and resource recovery from waste.

Yared Shifferaw, PhD (*Johns Hopkins University*). Assistant Professor. Computational and experimental mechanics; structural stability; optimization; health monitoring and hazard mitigation; sustainable structures; emerging materials; thin-walled structures and metallic structures.

Kurt Sjoblom, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Laboratory testing of geomaterials, geotechnical engineering, foundation engineering.

Sabrina Spatari, PhD (*University of Toronto*). Associate Professor. Research in industrial ecology; development and application of life cycle assessment (LCA) and material flow analysis (MFA) methods for guiding engineering and policy decisions; specific interest in biomass and bioenergy, biofuels, and urban infrastructure.

Robert Swan Associate Teaching Professor. Geotechnical and Geosynthetic Engineering; soil/geosynthetic interaction and performance; laboratory and field geotechnical/geosynthetic testing.

Michael Waring, PhD (*University of Texas-Austin*) Associate Department Head for Undergraduate Programs; Director of Architectural Engineering Program. Associate Professor. Indoor air quality and building sustainability; indoor particulate matter fate and transport; indoor chemistry and particle formation; secondary impacts of control technologies and strategies.

Jin Wen, PhD (*University of Iowa*). Associate Professor. Architectural engineering; Building Energy Efficiency; Intelligent Building; Net-zero Building; and Indoor Air Quality.

Aspasia Zerva, PhD (*University of Illinois*). Professor. Earthquake engineering; mechanics; seismology; structural reliability; system identification; advanced computational computational methods in structural analysis.

Emeritus Faculty

Harry G. Harris, PhD (*Cornell University*). Professor Emeritus. Structural models; dynamics of structures, plates and shells; industrialized building construction.

Richard Weggel, PhD (*University of Illinois*) *Samuel S. Baxter Professor Emeritus; Civil and Environmental Engineering*. Professor Emeritus. Coastal engineering; hydraulics engineering; hydrology.

Richard Woodring, PhD (*University of Illinois*) *Dean of Engineering Emeritus*. Professor Emeritus. Structural engineering, reinforced concrete.

Chemical Engineering

Major: Chemical Engineering

Degree Awarded: Bachelor of Science in Chemical Engineering (BSCHE)

Calendar Type: Quarter

Total Credit Hours: 184.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0701

Standard Occupational Classification (SOC) code: 17-2041

About the Program

The department of Chemical and Biological Engineering's chemical engineering curriculum is structured so that students progress through sequences in the fundamental physical sciences, humanities, engineering sciences, and engineering design.

Chemical engineers are concerned primarily with process engineering, the conversion of raw materials into valuable products. The products can include pharmaceuticals, specialized plastics, petrochemicals, materials for biomedical applications, and energy. The processes, which usually start out at a small laboratory scale, must be developed for production at a large chemical plant scale. The large change in scale requires careful engineering to minimize environmental contamination and to ensure public safety.

The Department of Chemical and Biological Engineering is responsible for equipping our graduates with the broad technical knowledge and teamwork skills required for them to make substantial contributions to society.

Sample Senior Design Projects

A special feature of the major is senior design. A group of students in the chemical engineering major works with a faculty advisor to develop a significant design project. Some recent examples include:

- Design of a process to make petrochemical intermediates
- Plastics recycling design
- Process design for antibiotic products

Program Educational Objectives

The chemical engineering major has four goals for its students:

- Our graduates will succeed in careers requiring strong skills in engineering, science, communication, and teamwork.
- Our graduates will continue to upgrade their technological skills through life-long learning involving self- or group-study.
- Our graduates will conduct their work with an understanding of its global impact and ethical consequences.

- Our graduates will contribute to research and development at the forefront of chemical engineering and related fields.

To help students reach these goals, the curriculum is structured so that they progress through sequences in the fundamental physical sciences, humanities, engineering sciences, and design.

The department's student outcomes reflect the skills and abilities that the curriculum is designed to provide to students by the time they graduate. These are:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- d) an ability to function on multidisciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional and ethical responsibility;
- g) an ability to communicate effectively;
- h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i) a recognition of the need for, and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for chemical engineering practice.

Additional Information

The Chemical Engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (<http://www.abet.org>).

For more information about this program, visit Drexel University's Department of Chemical and Biological Engineering (<http://www.chemeng.drexel.edu>) web page.

Degree Requirements

General Education/Liberal Studies Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV E101	The Drexel Experience	1.0
General Education Requirements*		19.0

Foundation Requirements

BIO 141	Essential Biology	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0

ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 220	Fundamentals of Materials	4.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	4.0
MATH 210	Differential Equations	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
Professional Requirements		
CHE 211	Material and Energy Balances I	4.0
CHE 212	Material and Energy Balances II	4.0
CHE 220	Computational Methods in Chemical Engineering I	3.0
CHE 230	Chemical Engineering Thermodynamics I	4.0
CHE 320	Computational Methods in Chemical Engineering II	3.0
CHE 330	Chemical Engineering Thermodynamics II	4.0
CHE 331	Separation Processes	4.0
CHE 341	Fluid Mechanics	4.0
CHE 342	Heat Transfer	4.0
CHE 343	Mass Transfer	4.0
CHE 350	Statistics and Design of Experiments	3.0
CHE 351	Chemical Engineering Laboratory I	2.5
CHE 352	Chemical Engineering Laboratory II	2.5
CHE 362	Chemical Kinetics and Reactor Design	4.0
CHE 371	Engineering Economics and Professional Practice	3.0
CHE 372	Integrated Case Studies in Chemical Engineering	3.0
CHE 453	Chemical Engineering Laboratory III	2.5
CHE 464	Process Dynamics and Control	3.0
CHE 466	Chemical Process Safety	3.0
CHE 471	Process Design I	3.0
CHE 472	Process Design II	3.0
CHE 473	Process Design III	3.0
CHEC 353	Physical Chemistry and Applications III	4.0
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
CHEM 356	Physical Chemistry Laboratory	2.0
Technical Electives**		12.0
Total Credits		184.0

* General Education Requirements (p. 229).

** An optional concentration in Biological Engineering is available. If you elect to take that option, the 12.0 technical elective credits will count toward the concentration.

Biological Engineering Concentration

Core Courses

BIO 218	Principles of Molecular Biology	4.0
BIO 270	Development Biology	3.0
BIO 306	Biochemistry Laboratory	2.0
BIO 311	Biochemistry	4.0
BIO 214	Principles of Cell Biology	3.0
CHE 360	BioProcess Principles	3.0
Complete 5 credits from the following:		
BIO 215 [WI]	Techniques in Cell Biology	
BIO 219 [WI]	Techniques in Molecular Biology	
BIO 221	Microbiology	
BIO 222	Microbiology Laboratory	
BIO 318	Biology of Cancer	
BIO 346	Stem Cell Research	
BIO 404	Structure and Function of Biomolecules	
BIO 415	Proteins	

BIO 420	Virology	
BIO 444	Human Genetics	
BIO 466	Endocrinology	
BIO I399	Independent Study in BIO	
BIO 426	Immunology	
BIO 447	Advanced Genetics and Molecular Biology	
CHE 344	Transport Phenomena in Bioengineering Processes	
CHE 364	Bioprocess Unit Operations	
CHE I399	Independent Study in CHE	
Graduate Course Options Require 3.0 GPA		
BIO 500	Biochemistry I	
BIO 615	Proteins	
BIO 650	Virology	
BIO I799	Independent Study in BIO	

Total Credits 24.0

Graduate-Level Electives

CHE 502	Mathematical Methods in Chemical Engineering	3.0
CHE 513	Chemical Engineering Thermodynamics	3.0
CHE 525	Transport Phenomena I	3.0
CHE 543	Kinetics & Catalysis I	3.0
CHE 554	Process Systems Engineering	3.0
CHE 562	Bioreactor Engineering	3.0
CHE 564	Unit Operations in Bioprocess Systems	3.0
CHE 614	Chemical Engineering Thermodynamics II	3.0

Sample Plan of Study

5 YR UG Co-op Concentration

Term 1		Credits
CHEM 101	General Chemistry I	3.5
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
Term Credits		16.5

Term 2		Credits
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		19.5

Term 3		Credits
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		17.5

Term 4		Credits
CHE 211	Material and Energy Balances I	4.0
CHE 220	Computational Methods in Chemical Engineering I	3.0
CHEM 241	Organic Chemistry I	4.0

MATH 201	Linear Algebra	4.0
	Term Credits	15.0
Term 5		
CHE 212	Material and Energy Balances II	4.0
CHE 230	Chemical Engineering Thermodynamics I	4.0
CHEM 242	Organic Chemistry II	4.0
MATH 210	Differential Equations	4.0
	Term Credits	16.0
Term 6		
CHE 330	Chemical Engineering Thermodynamics II	4.0
CHE 341	Fluid Mechanics	4.0
CHE 350	Statistics and Design of Experiments	3.0
ENGR 220	Fundamentals of Materials	4.0
	Term Credits	15.0
Term 7		
CHE 320	Computational Methods in Chemical Engineering II	3.0
CHE 342	Heat Transfer	4.0
CHE 343	Mass Transfer	4.0
CHE 351	Chemical Engineering Laboratory I	2.5
General Education Elective		3.0
	Term Credits	16.5
Term 8		
CHE 331	Separation Processes	4.0
CHE 362	Chemical Kinetics and Reactor Design	4.0
CHEC 353	Physical Chemistry and Applications III	4.0
CHEM 356	Physical Chemistry Laboratory	2.0
	Term Credits	14.0
Term 9		
CHE 352	Chemical Engineering Laboratory II	2.5
CHE 371	Engineering Economics and Professional Practice	3.0
CHE 372	Integrated Case Studies in Chemical Engineering	3.0
CHE Technical Elective		3.0
General Education Elective *		3.0
	Term Credits	14.5
Term 10		
CHE 453	Chemical Engineering Laboratory III	2.5
CHE 464	Process Dynamics and Control	3.0
CHE 471	Process Design I	3.0
CHE Technical Elective		3.0
General Education Elective *		3.0
	Term Credits	14.5
Term 11		
CHE 472	Process Design II	3.0
General Education Elective *		7.0
CHE Technical Elective		3.0
	Term Credits	13.0
Term 12		
CHE 466	Chemical Process Safety	3.0
CHE 473	Process Design III	3.0
CHE Technical Elective		3.0
General Education Elective *		3.0
	Term Credits	12.0

Total Credit: 184.0

* See degree requirements (p. 237).

Co-op/Career Opportunities

Chemical engineers tend to work for large corporations with such job assignments as process engineering, design engineering, plant operation, research and development, sales, and management. They also

work for federal and state government agencies on projects related to environmental problems, defense, energy, and health-related research.

Some major employers of Drexel's chemical engineering graduates are DuPont, Merck, BASF, ExxonMobil, Dow Chemical, and Air Products. A number of graduates go on to pursue master's and/or doctoral degrees. Graduate schools that Drexel's chemical engineers have attended include the University of California at Berkeley and Massachusetts Institute of Technology, among others.

Co-op Experiences

Drexel is located in downtown Philadelphia with easy access to major pharmaceutical, chemical, and petroleum companies. When students complete their co-op jobs, they are asked to write an overview of their experiences. These brief quotes are taken from some recent student reports:

Research assistant, chemicals manufacturer: "Conducted research in a developmental polyamide process. Aspects included scale-up from bench-scale to batch demonstration, installation and calibration of on-line composition sensors, off-line analytical techniques to assess product quality, and interfacing with plant sites to define and standardize a critical quality lab procedure. Documented results in technical memos and in a plant presentation . . . I had a lot of freedom and responsibility. It was great interacting with other researchers and technicians. Everyone was so helpful."

Co-op engineer, chemicals manufacturer: "Created material safety data sheets, which involved chemical composition, hazard communication, occupational safety and health, emergency response, and regulatory issues for numerous products and wastes. Handled domestic and international regulatory reviews. Determined hazardous waste reporting requirements, handling and disposal procedures. Evaluated toxicological and ecological data for assessment of hazard ratings. Provided input on product safety technical reports."

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Facilities

The Department of Chemical and Biological Engineering occupies the 2nd, 3rd, and 4th floors of the Center for Automation Technology. Approximately 35,000 square feet (gross) are available for the department.

Two thousand square feet of laboratory facilities are designed for the pre-junior and junior year laboratory courses. Experiments in these laboratory courses focus on applying concepts in thermodynamics, fluid mechanics, heat and mass transfer, separations, and reaction engineering. Laboratory courses are run with class sizes of 18 students or less.

The department has two computer laboratories:

- The senior design laboratory features nine booths designed for team projects. Each booth contains a work station loaded with the latest process simulation software produced by Aspen, Simulation Sciences and HYSIS. Seniors use the room heavily during their Capstone design experience, although pre-junior courses in separations and transport also include projects requiring use of the process simulation software.
- A second computer lab contains over 30 individual work stations with general and engineering-specific software.

Many undergraduate students participate in research projects in faculty laboratories as part of independent study coursework or BS/MS thesis work. Chemical engineering faculty are engaged in a wide range of research activities in areas including energy and the environment, polymer science and engineering, biological engineering, and multi-scale modeling and process systems engineering. Further details can be found on the Department of Chemical and Biological Engineering's Research Group (<http://drexel.edu/cbe/research/groups>) web page.

Dual/Accelerated Degree Accelerated Program

The accelerated program of the College of Engineering provides opportunities for highly-talented and strongly-motivated students to progress toward their educational goals essentially at their own pace. Through advanced placement, credit by examination, flexibility of scheduling, and independent study, the program makes it possible to complete the undergraduate curriculum and initiate graduate study in less than the five years required by the standard curriculum.

Bachelor's/Master's Dual Degree Program

Drexel offers a combined BS/MS degree program for our top engineering students who want to obtain both degrees in the same time period as most students obtain a Bachelor's degree. In chemical engineering, the course sequence for BS/MS students involves additional graduate courses and electives.

Chemical Engineering Faculty

Cameron F. Abrams, PhD (*University of California, Berkeley*). Professor. Molecular simulations in biophysics and materials; receptors for insulin and growth factors; and HIV-1 envelope structure and function.

Nicolas Alvarez, PhD (*Carnegie Mellon University*). Assistant Professor. Photonic crystal defect chromatography; extensional rheology of polymer/polymer composites; surfactant/polymer transport to fluid and solid interfaces; aqueous lubrication; interfacial instabilities.

Jason Baxter, PhD (*University of California, Santa Barbara*). Associate Professor. Solar cells, semiconductor nanomaterials, ultrafast spectroscopy.

Richard A. Cairncross, PhD (*University of Minnesota*). Associate Professor. Effects of microstructure on transport and properties of polymers; moisture transport and degradation on biodegradation on biodegradable polymers; production of biofuel.

Nily R. Dan, PhD (*University of Minnesota*). Associate Professor. Design of synthetic gene and drug carriers; design of polymeric drug carriers; metal cluster formation in polymeric matrices; colloidal absorption in patterned surfaces.

Aaron Fafarman, PhD (*Stanford University*). Assistant Professor. Photovoltaic energy conversion; solution-based synthesis of semiconductor thin films; colloidal nanocrystals; electromodulation and photomodulation spectroscopy.

Vibha Kalra, PhD (*Cornell University*) *Chemical and Biological Engineering*. Assistant Professor. Electrodes for energy storage and conversion; supercapacitors; Li-S batteries; fuel cells; flow batteries; electrospinning for nanofibers; molecular dynamics simulations; Nanotechnology, polymer nanocomposites.

Kenneth K.S. Lau, PhD (*Massachusetts Institute of Technology*) *Chemical and Biological Engineering*. Associate Professor. Surface science; nanotechnology; polymer thin films and coatings; chemical vapor deposition.

Raj Mutharasan, PhD (*Drexel University*) *Frank A. Fletcher Professor*. Biochemical engineering; cellular metabolism in bioreactors; biosensors.

Giuseppe R. Palmese, PhD (*University of Delaware*) *Department Head, Chemical and Biological Engineering*. Professor. Reacting polymer systems; nanostructured polymers; radiation processing of materials; composites and interfaces.

Joshua Snyder, PhD (*Johns Hopkins University*). Assistant Professor. Electrocatalysis (energy conversion/storage); heterogeneous catalysis corrosion (dealloying nanoporous metals); interfacial electrochemical phenomena in nanostructured materials; colloidal synthesis.

Masoud Soroush, PhD (*University of Michigan*). Professor. Process systems engineering; polymer engineering.

John H. Speidel, BSHE, MCHE (*University of Delaware; Illinois Institute of Technology*). Teaching Professor. Chemical process safety; process design engineering.

Maureen Tang, PhD (*University of California, Berkeley*). Assistant Professor. Batteries and fuel cells; nonaqueous electrochemistry; charge transport at interfaces.

Michael Walters, PhD (*Drexel University*). Assistant Teaching Professor. Undergraduate laboratory.

Stephen P. Wrenn, PhD (*University of Delaware*) *Assistant Dean of Graduate Affairs, College of Engineering*. Associate Professor. Biomedical engineering; biological colloids; membrane phase behavior and cholesterol transport.

Emeritus Faculty

Charles B. Weinberger, PhD (*University of Michigan*). Professor Emeritus. Suspension rheology; fluid mechanics of multi-phase systems.

Civil Engineering

Major: Civil Engineering

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 190.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0801

Standard Occupational Classification (SOC) code: 17-2051

About the Program

The civil engineering major prepares students in the fundamental principles necessary to practice this profession in any of its branches, including construction management, water resources, structural, transportation, environmental, geotechnical, and public facilities engineering.

Civil engineers are active in the planning, design, construction, research and development, operation, maintenance, and rehabilitation of large engineering systems. A particular focus is the reconstruction of the

nation's infrastructure through solutions that minimize the disruption of social and natural environments.

Civil engineering graduates are grounded in the fundamental principles necessary for the practice of this profession in any of its modern branches, including construction management, water resources engineering, structural engineering, geotechnical engineering, transportation engineering, and environmental engineering.

Seven of the required courses in the discipline include integral laboratories or field projects for both educational illustration and professional practice exposure.

Careful selection of the electives specified in the curriculum can lead to a wide variety of career objectives. For instance, students with an interest in water resources engineering may elect advanced courses in hydrology, ecology, and chemistry; select senior professional electives in the geotechnical and water resources areas; and choose appropriate topics for senior design and senior seminar. Seniors, with the approval of the department head, can elect certain graduate courses.

A special feature of the major is senior design. A group of students works with a faculty advisor to develop a significant design project selected by the group. All civil engineering students participate in a design project.

Mission Statement

The civil and architectural engineering faculty are responsible for delivering an outstanding curriculum that equips our graduates with the broad technical knowledge, design proficiency, professionalism, and communications skills required for them to make substantial contributions to society and to enjoy rewarding careers.

Program Educational Objectives

Civil engineering graduates will become professionals who analyze, design, construct, manage or operate physical infrastructure and systems, or advance knowledge of the field.

Student Outcomes

The department's student outcomes reflect the skills and abilities that the curriculum is designed to provide to students by the time they graduate. These are:

- an ability to apply knowledge of mathematics, science, and engineering;
- an ability to design and conduct experiments, as well as to analyze and interpret data;
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- an ability to function on multidisciplinary teams;
- an ability to identify, formulate, and solve engineering problems;
- an understanding of professional and ethical responsibility;
- an ability to communicate effectively;
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;

i) a recognition of the need for, and an ability to engage in life-long learning;

j) a knowledge of contemporary issues;

k) an ability to use the techniques, skills, and modern engineering tools necessary for civil engineering practice.

Additional Information

The Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (<http://www.abet.org>).

For more information about this major, contact the Department of Civil, Architectural and Environmental Engineering (<http://www.cae.drexel.edu>).

Degree Requirements

General Education/Liberal Studies Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV E101	The Drexel Experience	1.0
General Education Requirements*		21.0
Free Electives		6.0

Foundation Requirements

BIO 141	Essential Biology	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
ENGR 361	Statistical Analysis of Engineering Systems	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0

Major Requirements

CAE 491 [WI]	Senior Design Project I	3.0
CAE 492 [WI]	Senior Design Project II	3.0
CAE 493 [WI]	Senior Design Project III	3.0
CAEE 202	Introduction to Civil, Architectural & Environmental Engineering	3.0
CAEE 203	System Balances and Design in CAEE	3.0
CAEE 212	Geologic Principles for Infrastructure & Environmental Engineering	4.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
CIVE 250	Construction Materials	4.0
CIVE 310	Soil Mechanics I	4.0
CIVE 320	Introduction to Fluid Flow	3.0
CIVE 330	Hydraulics	4.0
CIVE 375	Structural Material Behavior	3.0

CIVE 410	Foundation Engineering	3.0
CIVE 430	Hydrology	3.0
CIVE 477 [WI]	Seminar	2.0
CIVE 478 [WI]	Seminar	1.0
ENVE 300	Introduction to Environmental Engineering	3.0
MEM 202	Statics	3.0
MEM 230	Mechanics of Materials I	4.0
Senior Professional Electives **		18.0
Select one of the following:		3.0
CIVE 370	Introduction to Structural Analysis	
CIVE 300	Structural Analysis I	
Based on whether or not students are pursuing a structural or non-structural concentration, students select one of the following options:		4.0
CIVE 301	Structural Design I	
CIVE 371	Introduction to Structural Design	
& CIVE 372	and Structural Laboratory	
Total Credits		190.5

* General Education Requirements (p. 229).

** A sequence of three courses in a major area of study is required, with a total of six 3-credit professional electives.

Sample Plan of Study

BS Civil Engineering

5 YR UG Co-op Concentration

Term 1		Credits
CHEM 101	General Chemistry I	3.5
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
	Term Credits	16.5
Term 2		
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
	Term Credits	19.5
Term 3		
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
	Term Credits	17.5
Term 4		
CAEE 202	Introduction to Civil, Architectural & Environmental Engineering	3.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
	Term Credits	17.0
Term 5		

CAEE 203	System Balances and Design in CAEE	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0
	Term Credits	15.0
Term 6		
CIVE 320	Introduction to Fluid Flow	3.0
ENGR 361	Statistical Analysis of Engineering Systems	3.0
ENVE 300	Introduction to Environmental Engineering	3.0
MEM 230	Mechanics of Materials I	4.0
General Education Elective *		3.0
	Term Credits	16.0
Term 7		
CAEE 212	Geologic Principles for Infrastructure & Environmental Engineering	4.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
CIVE 250	Construction Materials	4.0
CIVE 330	Hydraulics	4.0
General Education Elective *		3.0
	Term Credits	18.0
Term 8		
CIVE 310	Soil Mechanics I	4.0
CIVE 430	Hydrology	3.0
CIVE 370	Introduction to Structural Analysis	3.0
or 300	Structural Analysis I	
General Education Elective *		3.0
Free Elective		3.0
	Term Credits	16.0
Term 9		
CIVE 301	Structural Design I (Non-structural concentration takes CIVE 371 & CIVE 372)	4.0
CIVE 375	Structural Material Behavior	3.0
CIVE 410	Foundation Engineering	3.0
General Education Electives *		3.0
	Term Credits	13.0
Term 10		
CAE 491 [WI]	Senior Design Project I	3.0
CIVE 477 [WI]	Seminar	2.0
Professional Electives *		6.0
General Education Elective *		3.0
	Term Credits	14.0
Term 11		
CAE 492 [WI]	Senior Design Project II	3.0
CIVE 478 [WI]	Seminar	1.0
Professional Electives *		6.0
General Education Elective *		3.0
	Term Credits	13.0
Term 12		
CAE 493 [WI]	Senior Design Project III	3.0
Free Elective		3.0
Professional Electives *		6.0
General Education Elective *		3.0
	Term Credits	15.0
Total Credit:		190.5

* See degree requirements (p. 241).

Co-op/Career Opportunities

When students complete their co-op jobs, they are asked to write an overview of

their experiences. These brief quotes are taken from some recent student reports:

Engineering construction inspector, state department of transportation: Supervised daily activities involved in the roadway construction of the [interstate] bypass. Recorded daily visual inspection reports for soil sub-base and materials placed on site. Aided senior roadway engineers in approving grade prior to asphalt placement. Used various instruments to check temperature and depths for asphalt placement. Took part in on-site discussions with contractor to clear up any daily construction problems that would hinder quality of construction. "

Construction inspector, municipal department of public property: "Inspected work performed by private contractors on city public works construction and rehabilitation projects for adherence to contract plans and specifications. Projects included health centers, police and fire stations, libraries, city hall, transit concourses, and prisons. Responsible for daily inspection reports and overall coordination for each respective project. Also responsible for reviewing bills and writing contract modifications and amendments. . .the variety of work was excellent. "

Environmental co-op, chemicals manufacturer: "Compiled data and wrote monthly regulatory reports, in charge of hazardous waste management and small projects as needed. . . . I had my own responsibilities that had an impact on the entire company. Employer was really interested in my opinion and gave me a chance to demonstrate my abilities, but also knew when to step in. Everybody was willing to answer any questions I may have had. "

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Dual/Accelerated Degree Accelerated program

The Accelerated Program of the College of Engineering provides opportunities for highly talented and strongly motivated students to progress toward their educational goals essentially at their own pace. Primarily through advanced placement, credit by examination, flexibility of scheduling, and independent study, the program makes it possible to complete the undergraduate curriculum and initiate graduate study in less than the five years required by the standard curriculum.

Dual Degree Bachelor's Programs

A student completing the Bachelor of Science degree program in architectural engineering may complete additional courses (specified by the department) to earn the Bachelor of Science degree in civil engineering. (The reverse is difficult because of prerequisites in the sequence of architectural studio design courses, which begins in the sophomore year.)

Civil Engineering students can also complete a dual degree with the Bachelor of Science in Environmental Engineering.

Bachelor's/Master's Dual Degree Program

Exceptional students can also pursue a master of science degree in the same period as the bachelor of science.

For more information about this program, visit the Department's BS/MS Dual Degree Program (<http://www.drexel.edu/cae/academics/bs->

[environmental-engineering/Accelerated%20and%20Dual%20Degree%20Programs%20CAEE](#)) web page.

Facilities

The Department is well equipped with state-of-the-art facilities:

- The department computer labs are in operation: a computer-assisted design (CAD) and computerized instructional lab; and a graduate-level lab (advanced undergraduates can become involved in graduate-level work).
- External labs are used for surveying, building diagnostics, and surface and ground-water measurements.
- A \$4.5-million instruction and research lab renovation was funded by the National Science Foundation, alumni, and corporations.

Civil, Architectural and Environmental Engineering Faculty

Abieyuwa Aghayere, PhD (*University of Alberta*). Professor. Structural design - concrete, steel and wood; structural failure analysis; retrofitting of existing structures; new structural systems and materials; engineering education.

A. Emin Aktan, PhD (*University of Illinois at Urbana-Champaign*) *John Roebling Professor of Infrastructure Studies*. Professor. Structural engineering; health monitoring of large infrastructure systems; infrastructure evaluation; intelligent systems.

Ivan Bartoli, PhD (*University of California, San Diego*). Associate Professor. Non-destructive evaluation and structural health monitoring; dynamic identification, stress wave propagation modeling.

Robert Brehm, PhD (*Drexel University*). Associate Teaching Professor. International infrastructure delivery; response to natural catastrophes; risk assessment and mitigation strategies; project management techniques.

S.C. Jonathan Cheng, PhD (*West Virginia University*). Associate Professor. Soil mechanics; geosynthetics; probabilistic design; landfill containments; engineering education.

Peter DeCarlo, PhD (*University of Colorado*). Assistant Professor. Outdoor air quality, particulate matter size and composition instrumentation and measurements, source apportionment of ambient particulate matter, climate impacts of particulate matter.

Eugenia Ellis, RA, PhD (*Virginia Polytechnic State University*). Associate Professor. Extended-care facilities design, research on spatial visualization, perception and imagination.

Patricia Gallagher, PhD (*Virginia Polytechnic Institute*). Associate Professor. Soil mechanics; geoenvironmental; ground improvement; sustainability.

Patrick Gurian, PhD (*Carnegie-Mellon University*). Associate Professor. Risk analysis of environmental and infrastructure systems; novel adsorbent materials; environmental standard setting; Bayesian statistical modeling; community outreach and environmental health.

Charles N. Haas, PhD (*University of Illinois-Urbana*) *L. D. Betz Professor and Department Head, Civil, Architectural and Environmental Engineering*. Professor. Control of human exposures to and risk assessment of pathogenic organisms; water and waste treatment; homeland security.

Ahmad Hamid, PhD (*McMaster University*). Professor. Engineered masonry; seismic behavior, design and retrofit of masonry structures; development of new materials and building systems.

Y. Grace Hsuan, PhD (*Imperial College*). Professor. Durability of polymeric construction materials; advanced construction materials; and performance of geosynthetics.

Joseph B. Hughes, PhD (*University of Iowa*) *Dean of the College of Engineering and Distinguished Professor*. Biological processes and applications of nanotechnology in environmental systems.

L. James Lo, PhD (*University of Texas at Austin*). Assistant Professor. Computational Fluid Dynamics (CFD) and airflow simulation; Indoor Environmental Quality; Building control integration with building information management systems.

Roger Marino, PhD (*Drexel University*). Associate Teaching Professor. Fluid mechanics; water resources; engineering education; land development.

Joseph P. Martin, PhD (*Colorado State University*). Professor. Geotechnical and geoenvironmental engineering; hydrology; transportation; waste management.

James E. Mitchell, MArch (*University of Pennsylvania*) *Associate Dean for Undergraduate Affairs*. Professor. Architectural engineering design; building systems; engineering education.

Franco Montalto, PhD (*Cornell University*). Associate Professor. Effects of built infrastructure on societal water needs, ecohydrologic patterns and processes, ecological restoration, green design, water interventions.

Joseph V. Mullin, PhD (*Pennsylvania State University*) *Associate Department Head*. Teaching Professor. Structural engineering; failure analysis; experimental stress analysis; construction materials; marine structures.

Mira S. Olson, PhD (*University of Virginia*) *Graduate Studies Advisor*. Associate Professor. Environmental remediation; contaminant and bacterial transport in porous media and bacterial response to dynamic environments.

Michael Ryan, PhD (*Drexel University*). Assistant Teaching Professor. Microbial Source Tracking (MST); Quantitative Microbial Risk Assessment (QMRA); Dynamic Engineering Systems Modeling; Molecular Microbial Biology; Environmental Statistics; Engineering Economics; Microbiology

Christopher Sales, PhD (*University of California, Berkeley*). Assistant Professor. Environmental microbiology and biotechnology; biodegradation of environmental contaminants; microbial processes for energy and resource recovery from waste.

Yared Shifferaw, PhD (*Johns Hopkins University*). Assistant Professor. Computational and experimental mechanics; structural stability; optimization; health monitoring and hazard mitigation; sustainable structures; emerging materials; thin-walled structures and metallic structures.

Kurt Sjoblom, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Laboratory testing of geomaterials, geotechnical engineering, foundation engineering.

Sabrina Spatari, PhD (*University of Toronto*). Associate Professor. Research in industrial ecology; development and application of life cycle assessment (LCA) and material flow analysis (MFA) methods for

guiding engineering and policy decisions; specific interest in biomass and bioenergy, biofuels, and urban infrastructure.

Robert Swan Associate Teaching Professor. Geotechnical and Geosynthetic Engineering; soil/geosynthetic interaction and performance; laboratory and field geotechnical/geosynthetic testing.

Michael Waring, PhD (*University of Texas-Austin*) *Associate Department Head for Undergraduate Programs; Director of Architectural Engineering Program*. Associate Professor. Indoor air quality and building sustainability; indoor particulate matter fate and transport; indoor chemistry and particle formation; secondary impacts of control technologies and strategies.

Jun Wen, PhD (*University of Iowa*). Associate Professor. Architectural engineering; Building Energy Efficiency; Intelligent Building; Net-zero Building; and Indoor Air Quality.

Aspasia Zerva, PhD (*University of Illinois*). Professor. Earthquake engineering; mechanics; seismology; structural reliability; system identification; advanced computational computational methods in structural analysis.

Emeritus Faculty

Harry G. Harris, PhD (*Cornell University*). Professor Emeritus. Structural models; dynamics of structures, plates and shells; industrialized building construction.

Richard Weggel, PhD (*University of Illinois*) *Samuel S. Baxter Professor Emeritus; Civil and Environmental Engineering*. Professor Emeritus. Coastal engineering; hydraulics engineering; hydrology.

Richard Woodring, PhD (*University of Illinois*) *Dean of Engineering Emeritus*. Professor Emeritus. Structural engineering, reinforced concrete.

Computer Engineering

Major: Computer Engineering

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 192.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0901

Standard Occupational Classification (SOC) code: 15-1132; 15-1133;

15-1143; 17-2031

About the Program

The major provides a broad focus on digital circuit design, computer hardware and organization, programming and computer software, algorithms, and networks.

Computer engineers design smaller, faster, and more reliable computers and digital systems, embed microprocessors in larger systems (e.g., anti-lock brake systems), work in theoretical issues in computing, use object-oriented programming languages, and design large-scale software systems and computer networks. Computer engineers may work in positions that apply computers in control systems, digital signal processing, telecommunications, and power systems, and may design very large-scale integration (VLSI) integrated circuits and systems.

The computer engineering degree program is designed to provide our students with breadth in engineering, the sciences, mathematics, and the humanities, as well as depth in both software and hardware disciplines

appropriate for a computer engineer. It embodies the philosophy and style of the Drexel Engineering Curriculum, and will develop the student's design and analytical skills. In combination with the co-op experience, it opens to the student opportunities in engineering practice, advanced training in engineering or in other professions, and an entry to business and administration.

The computer engineering program's courses in ECE are supplemented with courses from the departments of Mathematics and Computer Science. Students gain the depth of knowledge of computer hardware and software essential for the computer engineer.

Mission Statement

The ECE Department at Drexel University (<http://drexel.edu/ece>) serves the public and the university community by providing superior career-integrated education in electrical and computer engineering; by conducting research in these fields, to generate new knowledge and technologies; and by promoting among all its constituents professionalism, social responsibility, civic engagement and leadership.

Program Educational Objectives

The Electrical and Computer Engineering Program Educational Objectives are such that its alumni, in their early years after graduation can:

1. Secure positions and continue as valued, creative, dependable, and proficient employees in a wide variety of fields and industries, in particular as electrical and computer engineers;
2. Succeed in graduate and professional studies, such as engineering, science, law, medicine and business;
3. Pursue professional development through lifelong learning opportunities for a successful and rewarding career;
4. Provide leadership in their profession, in their communities, and in the global society;
5. Contribute to their professional disciplines body of knowledge;
6. Function as responsible members of society with an awareness of the social and ethical ramifications of their work.

Student Outcomes

The department's student outcomes reflect the skills and abilities that the curriculum is designed to provide to students by the time they graduate. These are:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- d) an ability to function on multidisciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional and ethical responsibility;
- g) an ability to communicate effectively;

h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;

i) a recognition of the need for, and an ability to engage in life-long learning;

j) a knowledge of contemporary issues;

k) an ability to use the techniques, skills, and modern engineering tools necessary for computer engineering practice.

Additional Information

The Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (<http://www.abet.org>).

Additional information about the major is available on the ECE Department website (http://www.ece.drexel.edu/Undergraduate_Programs2.html).

For advising questions, please e-mail advising@ece.drexel.edu.

To make an appointment, please call 215.895.2837.

Drop-in hours: Please e-mail advising@ece.drexel.edu for up-to-date drop-in availability.

Advising

Jeffrey Birou

Associate Director of Undergraduate Advising

Bossone Research Center, Room 313

E-mail: jbirou@coe.drexel.edu

Dr. Jaudelice de Oliveira

Associate Department Head for Undergraduate Affairs

Bossone Research Center, Room 313

E-mail: jau@coe.drexel.edu

Degree Requirements

Students must take ENGL 101

General Education/Liberal Studies Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 315	Engineering Ethics	3.0
UNIV E101	The Drexel Experience	1.0
General Education Requirements *		18.0

Foundation Requirements

BIO 141	Essential Biology	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ECE 200	Digital Logic Design	4.0
ECE 201	Foundations of Electric Circuits	4.0
ECE 203	Programming for Engineers	3.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0

ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
Professional Requirements		
CS 260	Data Structures	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
ECE 361	Probability for Engineers	4.0
ECE 391	Introduction to Engineering Design Methods	1.0
ECE 491 [WI]	Senior Design Project I	2.0
ECE 492 [WI]	Senior Design Project II	2.0
ECE 493	Senior Design Project III	4.0
ECEC 301	Advanced Programming for Engineers	3.0
ECEC 302	Digital Systems Projects	4.0
ECEC 304	Design with Microcontrollers	4.0
ECEC 353	Systems Programming	3.0
ECEC 355	Computer Organization & Architecture	4.0
ECEC 357	Introduction to Computer Networks	4.0
ECEL 301 [WI]	Electrical Engineering Laboratory	2.0
ECEL 302	ECE Laboratory II	2.0
ECEL 303	ECE Laboratory III	2.0
ECES 301	Transform Methods and Filtering	4.0
MATH 221	Discrete Mathematics	3.0
Seven Computer Engineering Courses		21.0
Free Electives		11.5
Total Credits		192.0

* General Education Requirements (p. 229).

** In addition to completing 192.0 credits, students majoring in computer engineering student must have a 2.0 cumulative overall GPA and a 2.0 cumulative GPA in their Computer Engineering courses

Sample Plan of Study

5 YR Ug Co-op Concentration

Term 1		Credits
CHEM 101	General Chemistry I	3.5
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
Term Credits		16.5
Term 2		
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0

ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		19.5
Term 3		
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		17.5
Term 4		
ECE 200	Digital Logic Design	4.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		18.0
Term 5		
ECE 201	Foundations of Electric Circuits	4.0
ECE 203	Programming for Engineers	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MATH 221	Discrete Mathematics	3.0
Term Credits		16.0
Term 6		
ECEC 301	Advanced Programming for Engineers	3.0
ECEC 302	Digital Systems Projects	4.0
ECEL 301 [WI]	Electrical Engineering Laboratory	2.0
ECE 361	Probability for Engineers	4.0
General Education elective*		3.0
Term Credits		16.0
Term 7		
ECEC 304	Design with Microcontrollers	4.0
ECEC 355	Computer Organization & Architecture	4.0
ECEL 302	ECE Laboratory II	2.0
ECES 301	Transform Methods and Filtering	4.0
PHIL 315	Engineering Ethics	3.0
Term Credits		17.0
Term 8		
CS 265	Advanced Programming Tools and Techniques	3.0
ECEC 357	Introduction to Computer Networks	4.0
ECEL 303	ECE Laboratory III	2.0
One Computer Engineering elective		3.0
General Education elective*		3.0
Term Credits		15.0
Term 9		
CS 260	Data Structures	3.0
ECE 391	Introduction to Engineering Design Methods (Also offered spring term.)	1.0
ECEC 353	Systems Programming	3.0
General Education elective*		3.0
Free elective		3.0
Term Credits		13.0
Term 10		
ECE 491 [WI]	Senior Design Project I	2.0
Two Computer Engineering electives		6.0
General Education elective*		3.0
Free Elective		3.0
Term Credits		14.0
Term 11		

ECE 492 [WI]	Senior Design Project II	2.0
Two Computer Engineering electives		6.0
General Education elective*		3.0
Free elective		3.5
Term Credits		14.5
Term 12		
ECE 493	Senior Design Project III	4.0
Two Computer Engineering electives		6.0
General Education elective*		2.0
Free elective		3.0
Term Credits		15.0

Total Credit: 192.0

* See degree requirements (p. 245).

** In addition to completing 192.0 credits, students majoring in Computer Engineering must have a 2.0 cumulative overall GPA and a 2.0 cumulative GPA in their Computer Engineering courses.

Co-op/Career Opportunities

Drexel University's co-op program has an 80 year history and is one of the oldest and largest co-op programs in the world. Students graduate with 6-18 months of full time employment experience, depending on their choice of a 4-year or 5-year program. The majority of Computer Engineering students in ECE choose the 5-year program and graduate with 18 months of full-time work experience, and often receive a job offer from their third co-op employer or from a connection made from one of their co-op experiences.

Computer engineers work for computer and microprocessor manufacturers; manufacturers of digital devices for telecommunications, peripherals, electronics, control, and robotics; software engineering; the computer network industry; and related fields. A degree in computer engineering can also serve as an excellent foundation to pursue graduate professional careers in medicine, law, business, and government.

Graduates are also pursuing advanced studies in electrical and computer engineering, aerospace engineering, and mechanical engineering at such schools as MIT, Stanford, Princeton, Georgia Institute of Technology, University of California at Berkeley, University of Pennsylvania, and University of Maryland.

The Steinbright Career Development Center had a co-op placement rate of approximately 99% for electrical and computer engineering majors.

Co-op employers for computer engineering majors include:

- Comcast Corporation
- Independence Blue Cross
- Lockheed Martin
- Micron Technology, Inc
- National Board of Medical Examiners
- PJM Interconnection, LLC
- SAP America
- Susquehanna International Group LLC
- UNISYS Corporation
- Woodward McCoach, Inc.
- Amazon, Inc.
- Microsoft's Explore Internship Program
- South Korea KAIST Hubo lab

For more information about the co-op process, please contact the Steinbright Career Development Center (<http://drexel.edu/scdc>).

Dual/Accelerated Degree

Accelerated Program

The accelerated programs of the College of Engineering provide opportunities for highly talented and strongly motivated students to progress toward their educational goals essentially at their own pace. These options include opportunities for accelerated studies, dual degrees, and combined bachelor's/master's programs.

Primarily through advanced placement, credit by examination, flexibility of scheduling, and independent study, the "fast track" makes it possible to complete the undergraduate curriculum and initiate graduate study in less than the five years required by the standard curriculum.

Dual Degree Bachelor's Programs

With careful planning, students can complete both a Computer Engineering and an Electrical Engineering degree in the time usually required to complete one degree. For detailed information the student should contact the ECE advisor (<http://drexel.edu/ece/academics/undergrad/advising>).

Bachelor's/Master's Dual Degree Program

Exceptional students can also pursue a master of science degree in the same period as the bachelor of science.

For more information on these and other options, visit the Department of Electrical and Computer Engineering BS/MS (<http://drexel.edu/ece/academics/undergrad/bs-ms>) page.

Minor in Computer Engineering

The computer engineering minor is designed to provide students from other computer-intensive majors—such as computer science or other engineering majors—with a foundation of knowledge in the hardware portion of computer systems. The minor consists of a minimum of seven ECE courses. There are four required courses and an additional 12.0 credits of elective courses. Students majoring in Electrical Engineering and minoring in Computer Engineering may only choose CE minor electives from the ECEC courses.

Prerequisites

The minor assumes that students will have a background in mathematics, physics, and computer programming equivalent to that covered in the first two years of engineering.

Calculus prerequisites should include MATH 121 (p. 244), MATH 122 (p. 244) and MATH 200 (p. 244). Physics requirements are PHYS 101 (p. 244), PHYS 102 (p. 244) and PHYS 201 (p. 244). Programming experience must include ENGR 121/ENGR 122 or CS 171 (p. 244) at the minimum. CS 172 (p. 244), CS 260 (p. 244) and CS 265 (p. 244) are also recommended, and are required for some upper level ECEC courses. Courses taken to meet these requirements will not count toward the minor.

Required Courses

ECE 200	Digital Logic Design	3.0
ECEC 302	Digital Systems Projects	4.0
ECEC 355	Computer Organization & Architecture	4.0
ECEL 304	ECE Laboratory IV (prerequisite waived for minor)	2.0

Electives *	12.0
Total Credits	25.0

* Students should choose an additional 12 credits from 300- and/or 400-level Computer Engineering (ECEC) courses. All prerequisites must be satisfied.

Additional Information

Additional information about this minor is available on the ECE Department website (http://www.ece.drexel.edu/Undergraduate_Programs2.html).

For advising questions, please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu).

To make an appointment, please call 215.895.2241
Drop-in hours: Please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu) for up-to-date drop-in availability.

Facilities

Drexel University and the Electrical and Computer Engineering Department are nationally recognized for a strong history of developing innovative research. Research programs in the ECE Department prepare students for careers in research and development, and aim to endow graduates with the ability to identify, analyze, and address new technical and scientific challenges. The ECE Department is well equipped with state-of-the-art facilities in each of the following ECE Research laboratories:

Research Laboratories at the ECE Department

Adaptive Signal Processing and Information Theory Research Group

The Adaptive Signal Processing and Information Theory Research Group (<http://www.ece.drexel.edu/walsh/aspitrg/home.html>) conducts research in the area of signal processing and information theory. Our main interests are belief/expectation propagation, turbo decoding and composite adaptive system theory. We are currently doing projects on the following topics:

- i) Delay mitigating codes for network coded systems,
- ii) Distributed estimation in sensor networks via expectation propagation,
- iii) Turbo speaker identification,
- iv) Performance and convergence of expectation propagation,
- v) Investigating bounds for SINR performance of autocorrelation based channel shorteners.

Applied Networking Research Lab

Applied Networking Research Lab (ANRL) projects focus on modeling and simulation as well as experimentation in wired, wireless and sensor networks. ANRL is the home of MuTANT, a Multi-Protocol Label Switched Traffic Engineering and Analysis Testbed composed of 10 high-end Cisco routers and several PC-routers, also used to study other protocols in data networks as well as automated network configuration and management. The lab also houses a sensor network testbed.

Bioimage Laboratory

Uses computer gaming hardware for enhanced and affordable 3-D visualization, along with techniques from information theory and machine learning to combine the exquisite capabilities of the human

visual system with computational sensing techniques for analyzing vast quantities of image sequence data.

Data Fusion Laboratory

The Data Fusion Laboratory investigates problems in multisensory detection and estimation, with applications in robotics, digital communications, radar, and target tracking. Among the projects in progress: computationally efficient parallel distributed detection architectures, data fusion for robot navigation, modulation recognition and RF scene analysis in time-varying environments, pattern recognition in biological data sequences and large arrays, and hardware realizations of data fusion architectures for target detection and target tracking.

Drexel Network Modeling Laboratory

The Drexel Network Modeling Laboratory investigates problems in the mathematical modeling of communication networks, with specific focus on wireless ad hoc networks, wireless sensor networks, and supporting guaranteed delivery service models on best effort and multipath routed networks. Typical methodologies employed in our research include mathematical modeling, computer simulation, and performance optimization, often with the end goal of obtaining meaningful insights into network design principles and fundamental performance tradeoffs.

Drexel Power-Aware Computing Laboratory

The Power-Aware Computing Lab (<http://dpac.ece.drexel.edu>) investigates methods to increase energy efficiency across the boundaries of circuits, architecture, and systems. Our recent accomplishments include the Sigil profiling tool, scalable modeling infrastructure for accelerator implementations, microarchitecture-aware VDD gating algorithms, an accelerator architecture for ultrasound imaging, evaluation of hardware reference counting, hardware and operating system support for power-agile computing, and memory systems for accelerator-based architectures.

Drexel University Nuclear Engineering Education Laboratory

The field of nuclear engineering encompasses a wide spectrum of occupations, including nuclear reactor design, medical imaging, homeland security, and oil exploration. The Drexel University Nuclear Engineering Education Laboratory (DUNEEL) provides fundamental hands on understanding for power plant design and radiation detection and analysis. Software based study for power plant design, as well as physical laboratory equipment for radiation detection, strengthen the underlying concepts used in nuclear engineering such that the student will comprehend and appreciate the basic concepts and terminology used in various nuclear engineering professions. Additionally, students use the laboratory to develop methods for delivering remote, live time radiation detection and analysis. The goal of DUNEEL is to prepare students for potential employment in the nuclear engineering arena.

Drexel VLSI Laboratory

The Drexel VLSI Laboratory (http://ece.drexel.edu/faculty/taskin/wiki/visilab/index.php/Main_Page) investigates problems in the design, analysis, optimization and manufacturing of high performance (low power, high throughput) integrated circuits in contemporary CMOS and emerging technologies. Suited with industrial design tools for integrated circuits, simulation tools and measurement beds, the VLSI group is involved with digital and mixed-signal circuit design to verify the functionality of the discovered novel circuit and physical design principles. The Drexel VLSI laboratory develops design methodologies and automation tools in

these areas, particularly in novel clocking techniques, featuring resonant clocking, and interconnects, featuring wireless interconnects.

Drexel Wireless Systems Laboratory

The Drexel Wireless Systems Laboratory (DWSL) contains an extensive suite of equipment for constructing, debugging, and testing prototype wireless communications systems. Major equipment within DWSL includes:

- three software defined radio network testbeds (HYDRA, USRP, and WARP) for rapidly prototyping radio, optical and ultrasonic communications systems,
- a TDK RF anechoic chamber and EMSCAN desktop antenna pattern measurement system,
- a materials printer and printed circuit board milling machine for fabricating conformal antennas and
- wireless protocol conformance testing equipment from Aeroflex.

The lab is also equipped with network analyzers, high speed signal generators, oscilloscopes, and spectrum analyzers as well as several Zigbee development platforms for rapidly prototyping sensor networks.

DWSL personnel also collaborate to create wearable, fabric based transceivers through collaboration with the Shima Seiki Haute Laboratory in the Drexel ExCITE Center. The knitting equipment at Drexel includes sixteen SDS-ONE APEX3 workstations and four state-of-the-art knitting machines. The workstations accurately simulate fabric construction and provide researchers and designers the opportunity to program, create and simulate textile prototypes, import CAD specifications of final products, and produce made-to-measure or mass-produced pieces on Shima Seiki knitting machines. For testing smart textiles for biomedical, DWSL personnel also have collaborators in the Center for Interdisciplinary Clinical Simulation and Practice (CICSP) in the Drexel College of Medicine which provides access to medical mannequin simulators.

Ecological and Evolutionary Signal-processing and Informatics Laboratory

The Ecological and Evolutionary Signal-processing and Informatics Laboratory (EESI) (<http://www.ece.drexel.edu/gailr/EESI>) seeks to solve problems in high-throughput genomics and engineer better solutions for biochemical applications. The lab's primary thrust is to enhance the use of high-throughput DNA sequencing technologies with pattern recognition and signal processing techniques. Applications include assessing the organism content of an environmental sample, recognizing/classifying potential and functional genes, inferring environmental factors and inter-species relationships, and inferring microbial evolutionary relationships from short-read DNA/RNA fragments. The lab also investigates higher-level biological systems such as modeling and controlling chemotaxis, the movement of cells.

Electric Power Engineering Center

This newly established facility makes possible state-of-the-art research in a wide variety of areas, ranging from detailed theoretical model study to experimental investigation in its high voltage laboratories. The mission is to advance and apply scientific and engineering knowledge associated with the generation, transmission, distribution, use, and conservation of electric power. In pursuing these goals, this center works with electric utilities, state and federal agencies, private industries, nonprofit organizations and other universities on a wide spectrum of projects. Research efforts, both theoretical and experimental, focus on the solution of those problems currently faced by the electric power

industry. Advanced concepts for electric power generation are also under investigation to ensure that electric power needs will be met at the present and in the future.

Electronic Design Automation Facility

Industrial-grade electronic design automation software suite and integrated design environment for digital, analog and mixed-signal systems development. Field Programmable Gate Array (FPGA) development hardware. Most up-to-date FPGA/embedded system development hardware kits. Printed circuit board production facility. Also see Drexel VLSI Laboratory.

Microwave-Photonics Device Laboratories

The laboratory is equipped with test and measurement equipment for high-speed analog and digital electronics and fiber optic systems. The test equipment includes network analyzers from Agilent (100kHz- 1.3 GHz and 45 Mhz-40 GHz), and Anritsu (45 MHz-6 GHz); spectrum analyzers from Tektronix, HP, and Agilent with measurement capability of DC to 40 GHz and up to 90 GHz using external mixers; signal generators and communication channel modulators from HP, Rhode-Schwartz, Systron Donner, and Agilent; microwave power meter and sensor heads, assortment of passive and active microwave components up to 40 GHz ; data pattern generator and BER tester up to 3Gb/s; optical spectrum analyzer from Anritsu and power meters from HP; single and multimode fiber optic based optical transmitter and receiver boards covering ITU channels at data rates up to 10Gb/s; passive optical components such as isolator, filter, couplers, optical connectors and fusion splicer; LPKF milling machine for fabrication of printed circuit boards; wire-bonding and Cascade probe stations; Intercontinental test fixtures for testing of MMIC circuits and solid-state transistors; state-of-the-art microwave and electromagnetic CAD packages such as Agilent ADS, ANSYS HFSS, and COMSOL multi-physics module.

Music and Entertainment Technology Laboratory

The Music and Entertainment Technology Laboratory (MET-lab) is devoted to research in digital media technologies that will shape the future of entertainment, especially in the areas of sound and music. We employ digital signal processing and machine learning to pursue novel applications in music information retrieval, music production and processing technology, and new music interfaces. The MET-lab is also heavily involved in outreach programs for K-12 students and hosts the Summer Music Technology program, a one-week learning experience for high school students. Lab facilities include a sound isolation booth for audio and music recording, a digital audio workstation running ProTools, two large multi-touch display interfaces of our own design, and a small computing cluster for distributed processing.

NanoPhotonics+ Lab (<http://drexelnanophotonics.com>)

Our research is primarily in the area of nanophotonics with a focus on the nanoscale interaction of light with matter. Interests include: liquid crystal/polymer composites for gratings, lenses and HOEs; liquid crystal interactions with surfaces and in confined nanospaces; alternative energy generation through novel photon interactions; ink-jet printed conducting materials for RF and photonic applications; and the creation and development of smart textiles technologies including soft interconnects, sensors, and wireless implementations.

Opto-Electro-Mechanical Laboratory

This lab concentrates on the system integration on optics, electronics, and mechanical components and systems, for applications in imaging,

communication, and biomedical research. Research areas include: Programmable Imaging with Optical Micro-electrical-mechanical systems (MEMS), in which microscopic mirrors are used to image light into a single photodetector; Pre-Cancerous Detection using White Light Spectroscopy, which performs a cellular size analysis of nuclei in tissue; Free-space Optical Communication using Space Time Coding, which consists of diffused light for computer-to-computer communications, and also tiny lasers and detectors for chip-to-chip communication; Magnetic Particle Locomotion, which showed that particles could swim in a uniform field; and Transparent Antennas using Polymer, which enables antennas to be printed through an ink-jet printer.

Plasma and Magnetics Laboratory

Research is focused on applications of electrical and magnetic technologies to biology and medicine. This includes the subjects of non-thermal atmospheric pressure plasma for medicine, magnetic manipulation of particles for drug delivery and bio-separation, development of miniature NMR sensors for cellular imaging and carbon nanotube cellular probes.

Power Electronics Research Laboratory

The Power Electronics Research Laboratory (PERL) is involved in circuit and design simulation, device modeling and simulation, and experimental testing and fabrication of power electronic circuits. The research and development activities include electrical terminations, power quality, solar photovoltaic systems, GTO modeling, protection and relay coordination, and solid-state circuit breakers. The analysis tools include EMPT, SPICE, and others, which have been modified to incorporate models of such controllable solid-state switches as SCRs, GTOs, and MOSFETs. These programs have a wide variety and range of modeling capabilities used to model electromagnetics and electromechanical transients ranging from microseconds to seconds in duration. The PERL is a fully equipped laboratory with 42 kVA AC and 70 kVA DC power sources and data acquisition systems, which have the ability to display and store data for detailed analysis. Some of the equipment available is a distribution and HV transformer and three phase rectifiers for power sources and digital oscilloscopes for data measuring and experimental analysis. Some of the recent studies performed by the PERL include static VAR compensators, power quality of motor controllers, solid-state circuit breakers, and power device modeling which have been supported by PECO, GE, Gould, and EPRI.

RE Touch Lab

The RE Touch Lab is investigating the perceptual and mechanical basis of active touch perception, or haptics, and the development of new technologies for stimulating the sense of touch, allowing people to touch, feel, and interact with digital content as seamlessly as we do with objects in the real world. We study the scientific foundations of haptic perception and action, and the neuroscientific and biomechanical basis of touch, with a long-term goal of uncovering the fundamental perceptual and mechanical computations that enable haptic interaction. We also create new technologies for rendering artificial touch sensations that simulate those that are experienced when interacting with real objects, inspired by new findings on haptic perception.

Testbed for Power-Performance Management of Enterprise Computing Systems

This computing testbed is used to validate techniques and algorithms aimed at managing the performance and power consumption of enterprise computing systems. The testbed comprises a rack of Dell 2950 and Dell 1950 PowerEdge servers, as well as assorted desktop machines,

networked via a gigabit switch. Virtualization of this cluster is enabled by VMWare's ESX Server running the Linux RedHat kernel. It also comprises of a rack of ten Apple Xserve machines networked via a gigabit switch. These servers run the OS X Leopard operating systems and have access to a RAID with TBs of total disk capacity.

Computer Engineering Faculty

Suryadevara Basavaiah, PhD (*University of Pennsylvania*). Teaching Professor. Computer engineering; computer engineering education; custom circuit design; VLSI technology; process and silicon fabrication

Tom Chmielewski, PhD (*Drexel University*). Assistant Teaching Professor. Modeling and simulation of electro-mechanical systems; optimal, adaptive and non-linear control; DC motor control; system identification; kalman filters (smoothing algorithms, tracking); image processing; robot design; biometric technology and design of embedded systems for control applications utilizing MATLAB and SIMULINK

Fernand Cohen, PhD (*Brown University*). Professor. Surface modeling; tissue characterization and modeling; face modeling; recognition and tracking.

Andrew Cohen, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Image processing; multi-target tracking; statistical pattern recognition and machine learning; algorithmic information theory; 5-D visualization

Kapil Dandekar, PhD (*University of Texas-Austin*) *Director of the Drexel Wireless Systems Laboratory (DWSL); Associate Dean of Research, College of Engineering*. Professor. Cellular/mobile communications and wireless LAN; smart antenna/MIMO for wireless communications; applied computational electromagnetics; microwave antenna and receiver development; free space optical communication; ultrasonic communication; sensor networks for homeland security; ultrawideband communication.

Afshin Daryoush, ScD (*Drexel University*). Professor. Digital and microwave photonics; nonlinear microwave circuits; RFIC; medical imaging.

Bruce A. Eisenstein, PhD (*University of Pennsylvania*) *Vice Dean, College of Engineering; Arthur J. Rowland Professor*. Professor. Pattern recognition; estimation; decision theory.

Adam K. Fontecchio, PhD (*Brown University*) *Vice Dean, Graduate College*. Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Gary Friedman, PhD (*University of Maryland-College Park*). Professor. Biological and biomedical applications of nanoscale magnetic systems.

Eli Fromm, PhD (*Jefferson Medical College*) *LeRoy A. Brothers University Professor / Director for Center of Educational Research*. Professor. Engineering education; academic research policy; bioinstrumentation; physiologic systems.

Edwin L. Gerber, PhD (*University of Pennsylvania*). Professor. Computerized instruments and measurements; undergraduate engineering education.

Allon Guez, PhD (*University of Florida*). Professor. Intelligent control systems; robotics, biomedical, automation and manufacturing; business systems engineering.

Peter R. Herczfeld, PhD (*University of Minnesota*) Lester A. Kraus Professor/Director, Center for Microwave/Lightwave Engineering. Professor. Lightwave technology; microwaves; millimeter waves; fiberoptic and integrated optic devices.

Leonid Hrebien, PhD (*Drexel University*). Professor. Tissue excitability; acceleration effects on physiology; bioinformatics.

Nagarajan Kandasamy, PhD (*University of Michigan*) Associate Department Head for Graduate Affairs. Associate Professor. Embedded systems, self-managing systems, reliable and fault-tolerant computing, distributed systems, computer architecture, and testing and verification of digital systems.

Bruce Katz, PhD (*University of Illinois*). Adjunct Professor. Speech communication and computer science; artificial intelligence.

Youngmoo Kim, PhD (*MIT*). Associate Professor. Audio and music signal processing, voice analysis and synthesis, music information retrieval, machine learning.

Timothy P. Kurzweg, PhD (*University of Pittsburgh*). Associate Professor. Micro-optical systems; optical spectroscopy; programmable imaging with MEMS; bio-sensors; diffuse optical communication; MEMS fabrication; diffractive optics; optical automation; optical modeling and simulation; magnetic particle locomotion; meta-materials; reconfigurable antennas

Karen Miu, PhD (*Cornell University*). Professor. Power systems; distribution networks; distribution automation; optimization; system analysis.

Bahram Nabet, PhD (*University of Washington*) Associate Dean for Special Projects, College of Engineering; Electrical and Computer Engineering. Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Prawat Nagvajara, Ph.D. (*Boston University*). Associate Professor. System on a chip; embedded systems; power grid computation; testing of computer hardware; fault-tolerant computing; VLSI systems; error control coding.

Dagmar Niebur, PhD (*Swiss Federal Institute of Technology*). Associate Professor. Intelligent systems; dynamical systems; power system monitoring and control.

Chika Nwankpa, PhD (*Illinois Institute of Technology*) ECE Department Head. Professor. Power system dynamics; power electronic switching systems; optically controlled high power switches.

Christopher Peters, PhD (*University of Michigan*). Teaching Professor. Nuclear reactor design; ionizing radiation detection; nuclear forensics; power plant reliability and risk analysis; naval/marine power and propulsion; directed energy/high power microwaves; nonstationary signal processing; radar; electronic survivability/susceptibility to harsh environments; electronic warfare

Karkal S. Prahbu, PhD (*Harvard University*). Auxiliary Professor. Computer and software engineering; advanced microprocessors and distributed operating systems.

Gail L. Rosen, PhD (*Georgia Institute of Technology*). Associate Professor. Signal processing, signal processing for biological analysis and modeling, bio-inspired designs, source localization and tracking.

Ionnis Savidis, PhD (*University of Rochester*). Assistant Professor. Analysis, modeling, and design methodologies for high performance

digital and mixed-signal integrated circuits; Emerging integrated circuit technologies; Electrical and thermal modeling and characterization, signal and power integrity, and power and clock delivery for 3-D IC technologies

Kevin J. Scoles, PhD (*Dartmouth College*). Associate Professor. Microelectronics; electric vehicles; solar energy; biomedical electronics.

Harish Sethu, PhD (*Lehigh University*). Associate Professor. Protocols, architectures and algorithms in computer networks; computer security; mobile ad hoc networks; large-scale complex adaptive networks and systems.

James Shackleford, PhD (*Drexel University*). Assistant Professor. Medical image processing, high performance computing, embedded systems, computer vision, machine learning

P. Mohana Shankar, PhD (*Indian Institute of Technology*) Allen Rothwarf Professor of Electrical and Computer Engineering. Professor. Wireless communications; biomedical ultrasonics; fiberoptic bio-sensors.

Matthew Stamm, PhD (*University of Maryland, College Park*). Assistant Professor. Information Security; multimedia forensics and anti-forensics; information verification; adversarial dynamics; signal processing

Jauelice Cavalcante de Oliveira, PhD (*Georgia Institute of Technology*). Associate Professor. Software-defined networking; social and economic networks; network security; design and analysis of protocols, algorithms and architectures in computer networks, particularly solutions for the Internet of Things

Construction Management

Major: Construction Management

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 184.5

Co-op Options: Three Co-op (Five years)

Classification of Instructional Programs (CIP) code: 52.2001

Standard Occupational Classification (SOC) code: 11-9021

About the Program

Construction management is a dynamic profession that is a combination of art and science. While an understanding of the technical aspects of construction is extremely important, it is also essential that construction professionals have knowledge of the business and management aspects of the profession. While construction has traditionally been a very conservative industry, the increasing rate of technological development and competition in the industry serves to accelerate the development of new construction methods, equipment, materials, and management techniques. As a result of these forces, there is an increasing need for innovative and professionally competent construction professionals.

The Construction Management major prepares students for all phases of operation and management of the construction organization including cost estimating, project scheduling, and planning. Students are able to choose from a wide range of subjects in the social sciences and humanities to satisfy electives in the liberal arts and free elective requirements. Pursuing part-time, degree completion on average takes six years.

Students in Drexel's Construction Management program receive broad academic, technical, business, and construction management courses that are designed to produce well-rounded construction professionals. Students interested in extending their construction management studies

into real estate development should consider the concentration in real estate. This concentration in real estate is designed for students to attain the knowledge and skills required to create and maintain built environments for living, working and entertainment purposes, as well as to explore issues in the real estate development process and the industry as a whole.

Program Delivery Options

Program delivery options for the Construction Management program include:

- A traditional 5-year with co-op
- A part-time study option
- The Drexel University and Burlington County College (BCC) option (Available for currently enrolled, full-time Drexel at BCC Construction Management Students): Drexel University and Burlington County College (BCC) joined together to create a unique educational opportunity: Drexel at BCC. This partnership enabled BCC students to earn a bachelor's degree from Drexel University while remaining on BCC's Mount Laurel campus. ***Drexel University has elected to phase out its Drexel at BCC on-site program and will no longer be accepting students.***

Additional Information

For additional information, visit the Construction Management (<http://drexel.edu/engmgmt/cmgt>) website or contact:

Jessica Cruz
215.895.5943
jc635@drexel.edu

Degree Requirements

English/Communication

COM 230	Techniques of Speaking	3.0
COM 270 [WI]	Business Communication	3.0
COM 310 [WI]	Technical Communication	3.0
COM 330	Professional Presentations	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Mathematics

MATH 110	Precalculus	3.0
MATH 121	Calculus I	4.0

Science

CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
ENVS 260	Environmental Science and Society	3.0
GEO 101	Physical Geology	4.0
PHYS 182	Applied Physics I	3.0

Business

ACCT 110	Accounting for Professionals	4.0
BLAW 201	Business Law I	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
HRMT 323	Principles of Human Resource Administration	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0

Humanities and Social Science

PHIL 301	Business Ethics	3.0
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Three Humanities and Social Science Electives	9.0
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Professional Core - Construction Science

CMGT 161	Building Materials and Construction Methods I	3.0
CMGT 162	Building Materials and Construction Methods II	3.0
CMGT 163	Building Materials and Construction Methods III	3.0
CMGT 251	Construction Surveying	3.0
CMGT 263	Understanding Construction Drawings	3.0
CMGT 266	Building Systems I	3.0
CMGT 267	Building Systems II	3.0
CMGT 365	Soil Mechanics in Construction	4.0
CMGT 371	Structural Aspects in Construction I	3.0
CMGT 372	Structural Aspects in Construction II	3.0

Professional Core - Construction

CMGT 101	Introduction to Construction Management	3.0
CMGT 240 [WI]	Economic Planning for Construction	3.0
CMGT 261	Construction Safety	3.0
CMGT 262	Building Codes	3.0
CMGT 361	Contracts And Specifications I	3.0
CMGT 362	Contracts and Specifications II	3.0
CMGT 363	Estimating I	3.0
CMGT 364	Estimating II	3.0
CMGT 450	Management of Field Operations	3.0
CMGT 461	Construction Project & Company Management	3.0
CMGT 463	Value Engineering	3.0
CMGT 467	Techniques of Project Control	4.0

Construction Electives

Select four of the following:	12.0
CMGT 265	Information Technologies in Construction
CMGT 355	Introduction to Sustainability in Construction
CMGT 451	Heavy Construction Principles & Practices
CMGT 465	Marketing Construction Services
CMGT 468	Real Estate
CMGT 469	Construction Seminar: Contemporary Issues
CMGT 470	Productivity in Construction
Other Approved CMGT Elective *	

Construction Capstone

CMGT I499	Independent Study in CMGT	3.0
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University Requirements

CIVC 101	Introduction to Civic Engagement	1.0
UNIV G101	The Drexel Experience	1.0

Free Electives

Total Credits	184.5
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* Students may choose another construction elective but the permission of the Program is required.

Sample Plan of Study

Term 1		Credits
CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
CMGT 101	Introduction to Construction Management	3.0
CMGT 161	Building Materials and Construction Methods I	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 110	Precalculus	3.0
UNIV E101	The Drexel Experience	1.0
Term Credits		18.5
Term 2		
ACCT 110	Accounting for Professionals	4.0
CIVC 101	Introduction to Civic Engagement	1.0
CMGT 162	Building Materials and Construction Methods II	3.0

ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 121	Calculus I	4.0
Term Credits		15.0
Term 3		
CMGT 163	Building Materials and Construction Methods III	3.0
CMGT 263	Understanding Construction Drawings	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHYS 182	Applied Physics I	3.0
Term Credits		16.0
Term 4		
CMGT 261	Construction Safety	3.0
COM 230	Techniques of Speaking	3.0
ECON 202	Principles of Macroeconomics	4.0
Free elective		3.0
Term Credits		13.0
Term 5		
CMGT 262	Building Codes	3.0
COM 270 [WI]	Business Communication	3.0
GEO 101	Physical Geology	4.0
PHIL 301	Business Ethics	3.0
Humanities/Social science elective		3.0
Term Credits		16.0
Term 6		
CMGT 240 [WI]	Economic Planning for Construction	3.0
CMGT 266	Building Systems I	3.0
CMGT 371	Structural Aspects in Construction I	3.0
COM 310 [WI]	Technical Communication	3.0
ORGB 300 [WI]	Organizational Behavior	4.0
Term Credits		16.0
Term 7		
BLAW 201	Business Law I	4.0
CMGT 267	Building Systems II	3.0
CMGT 372	Structural Aspects in Construction II	3.0
COM 330	Professional Presentations	3.0
Free elective		3.0
Term Credits		16.0
Term 8		
CMGT 251	Construction Surveying	3.0
CMGT 361	Contracts And Specifications I	3.0
CMGT 363	Estimating I	3.0
ENVS 260	Environmental Science and Society	3.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		16.0
Term 9		
CMGT 362	Contracts and Specifications II	3.0
CMGT 364	Estimating II	3.0
HRMT 323	Principles of Human Resource Administration	4.0
Construction Management elective*		3.0
Humanities/Social science elective		3.0
Term Credits		16.0
Term 10		
CMGT 365	Soil Mechanics in Construction	4.0
CMGT 450	Management of Field Operations	3.0
CMGT 467	Techniques of Project Control	4.0
FIN 301	Introduction to Finance	4.0
Term Credits		15.0
Term 11		
CMGT 461	Construction Project & Company Management	3.0
Two Construction Management electives*		6.0

Humanities/Social science elective		3.0
Free elective		3.0
Term Credits		15.0
Term 12		
CMGT 463	Value Engineering	3.0
CMGT I499	Independent Study in CMGT	3.0
Construction Management elective*		3.0
Free elective		3.0
Term Credits		12.0
Total Credit: 184.5		

* See degree requirements (p.).

Real Estate Concentration

The concentration in real estate provides students with training in issues such as project finance, real estate as investment, design and construction, operations, development law, environmental remediation, public policy, market analysis, and architecture. For this specialization, students take the same Construction Management (CMGT) core requirements, replacing some electives with the concentration-specific courses.

English/Communication

COM 230	Techniques of Speaking	3.0
COM 270 [WI]	Business Communication	3.0
COM 310 [WI]	Technical Communication	3.0
COM 330	Professional Presentations	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Mathematics

MATH 110	Precalculus	3.0
MATH 121	Calculus I	4.0

Science

ENVS 260	Environmental Science and Society	3.0
CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
GEO 101	Physical Geology	4.0
PHYS 182	Applied Physics I	3.0

Business

ACCT 110	Accounting for Professionals	4.0
BLAW 201	Business Law I	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
HRMT 323	Principles of Human Resource Administration	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0

Humanities and Social Science

PHIL 301	Business Ethics	3.0
Three Humanities and Social Science Electives		9.0

Professional Core - Construction Science

CMGT 161	Building Materials and Construction Methods I	3.0
CMGT 162	Building Materials and Construction Methods II	3.0
CMGT 163	Building Materials and Construction Methods III	3.0
CMGT 251	Construction Surveying	3.0
CMGT 263	Understanding Construction Drawings	3.0
CMGT 266	Building Systems I	3.0
CMGT 267	Building Systems II	3.0
CMGT 365	Soil Mechanics in Construction	4.0

CMGT 371	Structural Aspects in Construction I	3.0
CMGT 372	Structural Aspects in Construction II	3.0
Professional Core - Construction		
CMGT 240 [WI]	Economic Planning for Construction	3.0
CMGT 101	Introduction to Construction Management	3.0
CMGT 261	Construction Safety	3.0
CMGT 262	Building Codes	3.0
CMGT 361	Contracts And Specifications I	3.0
CMGT 362	Contracts and Specifications II	3.0
CMGT 363	Estimating I	3.0
CMGT 364	Estimating II	3.0
CMGT 450	Management of Field Operations	3.0
CMGT 461	Construction Project & Company Management	3.0
CMGT 463	Value Engineering	3.0
CMGT 467	Techniques of Project Control	4.0
Concentration in Real Estate		
ARCH 432	The Development Process	3.0
CMGT 468	Real Estate	3.0
REAL 310	Introduction to Real Estate	3.0
REAL 320	Real Estate Law - Principle & Practice	3.0
REAL 330	Facilities Management	3.0
REAL 470	Real Estate Investments - Market & Feasibility Analysis	3.0
University Requirements		
Free Electives		9.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV E101	The Drexel Experience	1.0
Total Credits		184.5

Career Opportunities

The graduates of the construction management program have secured positions as project managers, estimators, schedulers, and field superintendents for general contractors, subcontractors, and construction managers. Many are employed as owner representatives working for architectural firms, consulting engineering firms, commercial companies and institutions that have needs for building or other construction projects. Some have risen to executive positions within companies while others own their own firms. Graduates have also returned to the program after obtaining positions in the field to teach and share expertise.

The College of Engineering offers a Bachelor of Science in Construction Management as well as a Certificate Program in Construction Management. Depending on student goals, each option provides a strong educational foundation for successful performance and/or entrance into the construction industry.

Employers

Some of the companies that have hired Drexel students as co-op or full-time employees:

- Gilbane Building Company
- L.F. Driscoll Construction Company
- Allan Myers
- Pennoni Associates
- Brandywine Realty Trust
- Turner Construction Company
- Intech Construction Managers
- Urban Engineers, Inc.

Potential Careers

Construction Manager: Coordinates a venture from its initial development through final construction. Develops a schedule and ensures the project is completed on time and within budget. Obtains necessary licenses and permits and oversees the progress of the project.

Cost Estimator: Prepares information about costs that are necessary for a business to bid on a contract or to determine the profitability of a proposed product. Assembles information about factors that can influence costs such as materials, labor, location, and special machinery requirements, including computer hardware and software.

Project Manager: Develops requirements, budgets, and timetables for a firm's construction plans to ensure that the projects are successful. Determines the tasks to complete, assigns responsibilities to team members, and sees the project through from conception to completion.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more information on career opportunities.

Minor in Construction Management

Students in civil engineering, architectural engineering and architecture may select to pursue construction management as a minor area of study. Because construction is inherently related to design in these disciplines, the construction management minor can be a natural extension of each field of study.

The requirements for the minor include:

- Completion of a minimum of 24.0 credits.
- Courses used to fulfill general education requirements may not be counted toward an academic minor.
- Up to nine credits earned within the student's major may be counted toward the minor with minor department approval.
- Prerequisite courses may be counted toward the minor if recommended by the minor department.

Required Courses

CMGT 161	Building Materials and Construction Methods I	3.0
CMGT 162	Building Materials and Construction Methods II	3.0
CMGT 361	Contracts And Specifications I	3.0
CMGT 362	Contracts and Specifications II	3.0
CMGT 363	Estimating I	3.0
CMGT 467	Techniques of Project Control	4.0
Select two of the following:		6.0
CMGT 261	Construction Safety	
CMGT 263	Understanding Construction Drawings	
CMGT 364	Estimating II	
CMGT 461	Construction Project & Company Management	
CMGT 463	Value Engineering	
CMGT 465	Marketing Construction Services	

* Choice of electives must be approved by the department based on the student's major field and prior experience.

Certain courses within the student's major may also be used to meet the minor requirements. These include:

ARCH 261	Environmental Systems I	3.0
ARCH 262	Environmental Systems II	3.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
ARCH 161	Architectural Construction	3.0
Total Credits		12.0

* ARCH 161 can be substituted for CMGT 161 for Architects. An elective may be substituted for CMGT 162.

Construction Management Faculty

Robert Beard, PhD (*Georgia Institute of Technology*). Associate Clinical Professor. Project and Program Management; Entrepreneurship in design and construction; Integrated project delivery systems; History of engineering and construction; Sustainable design and construction.

Douglas Carney, MBA, AIA (*Eastern University*). Clinical Professor. Architecture; Contract management; Master planning; Site analysis; Feasibility and zoning issues; Space needs and program development; Code analysis and compliance studies; project scheduling.

Charles Cook, PhD (*New York University*). Assistant Clinical Professor. Construction management; project management; leadership and teambuilding; oral and written communication.

Christine M. Fiori, PhD (*Drexel University*) *Program Director*. Clinical Professor. Improving the delivery of safety education in construction curriculum; Ancient construction techniques; Design and construction in developing countries; Leadership in construction; Workforce development

Kenneth S. Sands, PhD (*Virginia Tech*). Associate Clinical Professor. Workforce development and lifelong learning; ethics and construction education; transformative safety leadership for construction education; sustainable facilities and infrastructure.

Richard Sievert, PhD (*Northwestern University*). Associate Clinical Professor. Project management and construction management; value engineering; cost reduction and waste minimization; facilities planning and management; marketing and selling professional services; quality management, engineering and construction business administration.

Electrical Engineering

Major: Electrical Engineering

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 192.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.1001

Standard Occupational Classification (SOC) code: 17-2071

About the Program

The electrical engineering major emphasizes the fundamentals of electrical engineering, hands-on learning, and flexibility in course selection to satisfy diverse career goals. Students choose one or more areas of study beginning in their pre-junior year.

State-of-the-art interdisciplinary courses have been developed to prepare the Drexel engineer for the technical challenges and the business atmosphere of the 21st century. Strong emphasis is given to the role of the engineer in the global competitive economy, and to the need to work closely with experts and practitioners in many fields.

Students can choose courses in various areas of study, including telecommunications, digital signal processing, electronics, power and systems and control.

Mission Statement

The ECE Department at Drexel University serves the public and the university community by providing superior career-integrated education in electrical and computer engineering; by conducting research in these fields, to generate new knowledge and technologies; and by promoting among all its constituents professionalism, social responsibility, civic engagement and leadership.

Program Educational Objectives

The Electrical and Computer Engineering Program Educational Objectives are that its alumni in their early years after graduation:

1. Secure positions and continue as valued, creative, dependable, and proficient employees in a wide variety of fields and industries, in particular as electrical and computer engineers;
2. Succeed in graduate and professional studies, such as engineering, science, law, medicine and business;
3. Pursue professional development through lifelong learning opportunities for a successful and rewarding career;
4. Provide leadership in their profession, in their communities, and in the global society;
5. Contribute to their professional disciplines body of knowledge;
6. Function as responsible members of society with an awareness of the social and ethical ramifications of their work.

Student Outcomes

The department's student outcomes reflect the skills and abilities that the curriculum is designed to provide to students by the time they graduate. These are:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- d) an ability to function on multidisciplinary teams;
- e) ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional and ethical responsibility;
- g) an ability to communicate effectively;
- h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i) a recognition of the need for, and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.

Areas of Study

Telecommunications and Digital Signal Processing (DSP)

Telecommunications and digital signal processing (DSP) are two of the fastest-growing fields of electrical engineering. The telecommunications and DSP areas of study prepare students for mastery of fundamental and applied knowledge in the theory and the technology of the transmission and processing of information-bearing signals such as voice, audio, data, images, and video. The curriculum includes core courses in electromagnetic propagation, communication devices and media, signal processing, analog and digital communication. Complementary electives can be taken in computers, electronics, control systems, and electric power systems.

Career opportunities include design and development of digital communications systems and telephony, speech recognition systems, fiber-optic networks, digital radio, medical diagnostic image processing, high-definition television, cellular and wireless communications, satellite communications, networked multimedia communications, and personal communication systems.

Electronics

The electronics area of study constitutes the study of electronic and optical semiconductor devices; analog and digital electronic circuits; and generation, transmission, and reception of information both in optical and microwave frequency ranges and guided or free-space conditions.

Career opportunities include jobs in telecommunications (optical, wireless, wired, satellite, and radar), VLSI (analog and digital), aerospace, remote sensing and instrumentation, computer circuitry interface, biomedical instrumentation, semiconductor device fabrication, and transportation.

Power and Systems/Control

Power and Systems/Control has at its core the areas of controls engineering and electric power engineering, the classic core of electrical engineering, and exploits the synergies between these two areas. These areas of study explores subjects such as modeling, analysis and control of dynamic systems including power systems, planning and optimization, electromechanical energy conversion, motor operation and control, transformers, power electronics, sensors and actuators, and the electrical and economic structure of the power industry. These areas of study offer access to two state-of-the-art laboratories. In the Interconnected Power System Laboratory, students can operate and control a small power system through the fusing of computer software and hardware technology with high-voltage, high-power technology. The Ortlip Systems Laboratory houses various experiments in sensing, feedback, and control. Both laboratories stress the use of modeling software, especially MATLAB, and the integrated use of computers and hardware.

Career opportunities include options ranging from manufacturing, the power industry (generation, transmission, distribution, marketing, and consumption), robotics, and transportation to Wall Street.

Additional Information

The Electrical Engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (<http://www.abet.org>).

Additional information about the major is available on the ECE Department website (http://www.ece.drexel.edu/Undergraduate_Programs2.html).

For advising questions, please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu).

To make an appointment, please call 215.895.2837.

Drop-in hours: Please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu) for up-to-date drop-in availability.

Advising

Jeffrey Birou

Associate Director of Undergraduate Advising

Bossone Research Center, Room 313

E-mail: jbirou@coe.drexel.edu (jbirou@coe.drexel.edu)

Dr. Jaudelice de Oliveira

Associate Department Head for Undergraduate Affairs

Bossone Research Center, Room 313

E-mail: jau@coe.drexel.edu (jau@coe.drexel.edu)

Degree Requirements

In addition to completing 192.0 credits, students majoring in electrical engineering student must have a 2.0 cumulative overall GPA and a 2.0 cumulative GPA in their Electrical Engineering courses.

General Education/Liberal Studies Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 315	Engineering Ethics	3.0
UNIV E101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
General Education Courses *		18.0

Foundation Requirements

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
BIO 141	Essential Biology	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ECE 200	Digital Logic Design	4.0
ECE 201	Foundations of Electric Circuits	4.0
ECE 203	Programming for Engineers	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0

Sophomore Engineering Elective Options

Select one of the following:	3.0-4.0
ENGR 210 Introduction to Thermodynamics	
MATH 221 Discrete Mathematics	
Professional Requirements	
ECEL 301 [WI] Electrical Engineering Laboratory	2.0
ECEL 302 ECE Laboratory II	2.0
ECEL 303 ECE Laboratory III	2.0
ECE 361 Probability for Engineers	4.0
ECES 301 Transform Methods and Filtering	4.0
ECES 303 Transform Methods II	3.0
ECE 391 Introduction to Engineering Design Methods	1.0
ECE 491 [WI] Senior Design Project I	2.0
ECE 492 [WI] Senior Design Project II	2.0
ECE 493 Senior Design Project III	4.0
13 ECE Electives	42.0
Math Elective **	3.0
Free Electives	12.5
Total Credits	192.0-193.0

* General Education Courses (p. 229).

** The math elective is a 3.0-4.5 credit course from MATH at a 200-level or higher. MATH 291 (Complex & Vector Analysis) is recommended for EE majors.

Sample Plan of Study

5 YR UG Co-op Concentration

Term 1		Credits
CHEM 101	General Chemistry I	3.5
COOP 101	Career Management and Professional Development	0.0
ENGR 121	Computation Lab I	2.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
	Term Credits	16.5
Term 2		
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 122	Computation Lab II	1.0
ENGR 102	Engineering Design Laboratory II	2.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
	Term Credits	19.5
Term 3		
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
	Term Credits	17.5
Term 4		
ECE 200	Digital Logic Design	4.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
	Term Credits	18.0

Term 5		
ECE 201	Foundations of Electric Circuits	4.0
ECE 203	Programming for Engineers	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 232	Dynamic Engineering Systems	3.0
Math Elective **		3.0
	Term Credits	16.0
Term 6		
ECES 301	Transform Methods and Filtering	4.0
ECE 361	Probability for Engineers	4.0
ECEL 301 [WI]	Electrical Engineering Laboratory	2.0
One ECE Elective *		3.0
Sophomore Engineering Elective *		3.0
	Term Credits	16.0
Term 7		
ECES 303	Transform Methods II	3.0
ECEL 302	ECE Laboratory II	2.0
PHIL 315	Engineering Ethics	3.0
Two ECE Elective *		6.0
Free elective		3.0
	Term Credits	17.0
Term 8		
ECEL 303	ECE Laboratory III	2.0
Two ECE Electives *		6.0
General Education elective *		3.0
Free elective		3.0
	Term Credits	14.0
Term 9		
ECE 391	Introduction to Engineering Design Methods (Also offered spring term.)	1.0
Two ECE Electives *		6.0
General Education elective *		3.0
Free elective		3.0
	Term Credits	13.0
Term 10		
ECE 491 [WI]	Senior Design Project I	2.0
Two ECE Electives *		6.0
Two General Education electives *		6.0
	Term Credits	14.0
Term 11		
ECE 492 [WI]	Senior Design Project II	2.0
Two ECE Electives *		7.0
General Education elective *		3.0
Free elective		4.5
	Term Credits	16.5
Term 12		
ECE 493	Senior Design Project III	4.0
Two ECE Electives *		7.0
General Education elective *		3.0
	Term Credits	14.0
Total Credit:	192.0	

* See degree requirements (p. 256).

Co-op/Career Opportunities

Top co-op employers for electrical engineering majors include:

- AT&T Mobility
- Central Intelligence Agency
- Comcast Corporation

- EwingCole
- Exelon Corporation (PECO)
- Lockheed Martin
- NAVSEA
- PJM Interconnection LLC
- Schweitzer Engineering Laboratories Inc
- U.S. Federal Aviation Administration
- Singapore as a Apple iPhone App Developer
- Vietnam as a Game Developer for Glass Egg

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) for more detailed information on co-op and post-graduate opportunities.

Drexel University's co-op program has a 80 year history and is one of the oldest and largest co-op programs in the world. Students graduate with 6-18 months of full time employment experience, depending on their choice of a 4-year or 5-year program. The majority of Computer Engineering students in ECE choose the 5-year program and graduate with 18 months of full-time work experience, and often receive a job offer from their third co-op employer or from a connection made from one of their co-op experiences.

Electrical engineers are employed in corporations, government agencies, and other organizations. In their work, these engineers are developers of electrical equipment for digital communications (such as satellite communication, fiber-optic networks, and coding and cryptography), mobile radio, radar and surveillance, process control, robotics, speech processing, aerospace circuitry, power generation and distribution, computer hardware and software, computer networks, sensor technology, counter-crime measures, electronic compatibility, consumer electronics, and related fields.

Graduates are also pursuing advanced studies in electrical and computer engineering, aerospace engineering, and mechanical engineering at such schools as MIT, Stanford, Princeton, Georgia Institute of Technology, University of California at Berkeley, University of Pennsylvania, and University of Maryland.

The Steinbright Career Development Center had a co-op placement rate of approximately 99% for electrical and computer engineering majors.

A degree in electrical engineering can also serve as an excellent foundation to pursue graduate professional careers in medicine, law, business, and government.

Dual/Accelerated Degree Accelerated Program

The accelerated programs of the College of Engineering provide opportunities for highly talented and strongly motivated students to progress toward their educational goals essentially at their own pace. These options include opportunities for accelerated studies, dual degrees, and combined bachelor's/master's programs.

Primarily through advanced placement, credit by examination, flexibility of scheduling, and independent study, the "fast track" makes it possible to complete the undergraduate curriculum and initiate graduate study in less than the five years required by the standard curriculum.

Dual Degree Bachelor's Programs

With careful planning, students can complete both an Electrical Engineering degree and a Computer Engineering degree in the time usually required to complete one degree. For detailed information the student should contact the ECE advisor (<http://drexel.edu/ece/academics/undergrad/advising>).

Bachelor's/Master's Dual Degree Program

Exceptional students can also pursue a master of science degree in the same period as the bachelor of science.

For more information on these and other options, visit the Department of Electrical and Computer Engineering BS/MS (<http://drexel.edu/ece/academics/undergrad/bs-ms>) page.

Minor in Electrical Engineering

This minor is designed to provide other engineering majors or students from other disciplines an introduction to the wide-ranging content of the electrical engineering major. The minor consists of a minimum of nine ECE courses resulting in 26.0 credits. There are six required courses and an additional 9 credits of elective courses.

Prerequisites

The minor assumes that students will have a background in mathematics and physics equivalent to that covered in the first two years of the engineering curriculum. In mathematics, this would cover calculus and differential equations. Knowledge of linear algebra is also recommended. Courses taken to meet these requirements will not count toward the minor.

Required Courses

ECE 200	Digital Logic Design	3.0
ECE 201	Foundations of Electric Circuits	3.0
ECEL 301 [WI]	Electrical Engineering Laboratory	2.0
ECEL 302	ECE Laboratory II	2.0
ECES 301	Transform Methods and Filtering	4.0
ECES 303	Transform Methods II	3.0
Electives *		9.0
Total Credits		26.0

* Students should choose 9 credits from the 300- and/or 400-level ECE courses. These courses can come from the Computer (ECEC), Electrophysics (ECEE), Electric Power (ECEP), or Systems (ECES) groups. All prerequisites must be satisfied. Students majoring in Computer Engineering and minoring in Electrical Engineering may **only** choose elective courses from the ECEE, ECEP, and ECES course groups.

Additional information

Additional information about this minor is available on the ECE Department website (<http://www.drexel.edu/ece/academics/undergrad/minors>).

For advising questions, please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu).

To make an appointment, please call 215.895.2241
Drop-in hours: Please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu) for up-to-date drop-in availability.

Facilities

Drexel University and the Electrical and Computer Engineering Department are nationally recognized for a strong history of developing innovative research. Research programs in the ECE Department prepare students for careers in research and development, and aim to endow graduates with the ability to identify, analyze, and address new technical and scientific challenges. The ECE Department is well equipped with state-of-the-art facilities in each of the following ECE Research laboratories:

Research Laboratories at the ECE Department

Adaptive Signal Processing and Information Theory Research Group

The Adaptive Signal Processing and Information Theory Research Group (<http://www.ece.drexel.edu/walsh/asptirg/home.html>) conducts research in the area of signal processing and information theory. Our main interests are belief/expectation propagation, turbo decoding and composite adaptive system theory. We are currently doing projects on the following topics:

- i) Delay mitigating codes for network coded systems,
- ii) Distributed estimation in sensor networks via expectation propagation,
- iii) Turbo speaker identification,
- iv) Performance and convergence of expectation propagation,
- v) Investigating bounds for SINR performance of autocorrelation based channel shorteners.

Applied Networking Research Lab

Applied Networking Research Lab (ANRL) projects focus on modeling and simulation as well as experimentation in wired, wireless and sensor networks. ANRL is the home of MuTANT, a Multi-Protocol Label Switched Traffic Engineering and Analysis Testbed composed of 10 high-end Cisco routers and several PC-routers, also used to study other protocols in data networks as well as automated network configuration and management. The lab also houses a sensor network testbed.

Bioimage Laboratory

Uses computer gaming hardware for enhanced and affordable 3-D visualization, along with techniques from information theory and machine learning to combine the exquisite capabilities of the human visual system with computational sensing techniques for analyzing vast quantities of image sequence data.

Data Fusion Laboratory

The Data Fusion Laboratory investigates problems in multisensory detection and estimation, with applications in robotics, digital communications, radar, and target tracking. Among the projects in progress: computationally efficient parallel distributed detection architectures, data fusion for robot navigation, modulation recognition and RF scene analysis in time-varying environments, pattern recognition in biological data sequences and large arrays, and hardware realizations of data fusion architectures for target detection and target tracking.

Drexel Network Modeling Laboratory

The Drexel Network Modeling Laboratory investigates problems in the mathematical modeling of communication networks, with specific focus on wireless ad hoc networks, wireless sensor networks, and supporting guaranteed delivery service models on best effort and multipath routed networks. Typical methodologies employed in our research

include mathematical modeling, computer simulation, and performance optimization, often with the end goal of obtaining meaningful insights into network design principles and fundamental performance tradeoffs.

Drexel Power-Aware Computing Laboratory

The Power-Aware Computing Lab (<http://dpac.ece.drexel.edu>) investigates methods to increase energy efficiency across the boundaries of circuits, architecture, and systems. Our recent accomplishments include the Sigil profiling tool, scalable modeling infrastructure for accelerator implementations, microarchitecture-aware VDD gating algorithms, an accelerator architecture for ultrasound imaging, evaluation of hardware reference counting, hardware and operating system support for power-agile computing, and memory systems for accelerator-based architectures.

Drexel University Nuclear Engineering Education Laboratory

The field of nuclear engineering encompasses a wide spectrum of occupations, including nuclear reactor design, medical imaging, homeland security, and oil exploration. The Drexel University Nuclear Engineering Education Laboratory (DUNEEL) provides fundamental hands on understanding for power plant design and radiation detection and analysis. Software based study for power plant design, as well as physical laboratory equipment for radiation detection, strengthen the underlying concepts used in nuclear engineering such that the student will comprehend and appreciate the basic concepts and terminology used in various nuclear engineering professions. Additionally, students use the laboratory to develop methods for delivering remote, live time radiation detection and analysis. The goal of DUNEEL is to prepare students for potential employment in the nuclear engineering arena.

Drexel VLSI Laboratory

The Drexel VLSI Laboratory (http://ece.drexel.edu/faculty/taskin/wiki/visilab/index.php/Main_Page) investigates problems in the design, analysis, optimization and manufacturing of high performance (low power, high throughput) integrated circuits in contemporary CMOS and emerging technologies. Suited with industrial design tools for integrated circuits, simulation tools and measurement beds, the VLSI group is involved with digital and mixed-signal circuit design to verify the functionality of the discovered novel circuit and physical design principles. The Drexel VLSI laboratory develops design methodologies and automation tools in these areas, particularly in novel clocking techniques, featuring resonant clocking, and interconnects, featuring wireless interconnects.

Drexel Wireless Systems Laboratory

The Drexel Wireless Systems Laboratory (DWSL) contains an extensive suite of equipment for constructing, debugging, and testing prototype wireless communications systems. Major equipment within DWSL includes:

- three software defined radio network testbeds (HYDRA, USRP, and WARP) for rapidly prototyping radio, optical and ultrasonic communications systems,
- a TDK RF anechoic chamber and EMSCAN desktop antenna pattern measurement system,
- a materials printer and printed circuit board milling machine for fabricating conformal antennas and
- wireless protocol conformance testing equipment from Aeroflex.

The lab is also equipped with network analyzers, high speed signal generators, oscilloscopes, and spectrum analyzers as well as several Zigbee development platforms for rapidly prototyping sensor networks.

DWSL personnel also collaborate to create wearable, fabric based transceivers through collaboration with the Shima Seiki Haute Laboratory in the Drexel ExCITe Center. The knitting equipment at Drexel includes sixteen SDS-ONE APEX3 workstations and four state-of-the-art knitting machines. The workstations accurately simulate fabric construction and provide researchers and designers the opportunity to program, create and simulate textile prototypes, import CAD specifications of final products, and produce made-to-measure or mass-produced pieces on Shima Seiki knitting machines. For testing smart textiles for biomedical, DWSL personnel also have collaborators in the Center for Interdisciplinary Clinical Simulation and Practice (CICSP) in the Drexel College of Medicine which provides access to medical mannequin simulators.

Ecological and Evolutionary Signal-processing and Informatics Laboratory

The Ecological and Evolutionary Signal-processing and Informatics Laboratory (EESI) (<http://www.ece.drexel.edu/gailr/EESI>) seeks to solve problems in high-throughput genomics and engineer better solutions for biochemical applications. The lab's primary thrust is to enhance the use of high-throughput DNA sequencing technologies with pattern recognition and signal processing techniques. Applications include assessing the organism content of an environmental sample, recognizing/classifying potential and functional genes, inferring environmental factors and interspecies relationships, and inferring microbial evolutionary relationships from short-read DNA/RNA fragments. The lab also investigates higher-level biological systems such as modeling and controlling chemotaxis, the movement of cells.

Electric Power Engineering Center

This newly established facility makes possible state-of-the-art research in a wide variety of areas, ranging from detailed theoretical model study to experimental investigation in its high voltage laboratories. The mission is to advance and apply scientific and engineering knowledge associated with the generation, transmission, distribution, use, and conservation of electric power. In pursuing these goals, this center works with electric utilities, state and federal agencies, private industries, nonprofit organizations and other universities on a wide spectrum of projects. Research efforts, both theoretical and experimental, focus on the solution of those problems currently faced by the electric power industry. Advanced concepts for electric power generation are also under investigation to ensure that electric power needs will be met at the present and in the future.

Electronic Design Automation Facility

Industrial-grade electronic design automation software suite and integrated design environment for digital, analog and mixed-signal systems development. Field Programmable Gate Array (FPGA) development hardware. Most up-to-date FPGA/embedded system development hardware kits. Printed circuit board production facility. Also see Drexel VLSI Laboratory.

Microwave-Photonics Device Laboratories

The laboratory is equipped with test and measurement equipment for high-speed analog and digital electronics and fiber optic systems. The test equipment includes network analyzers from Agilent (100kHz- 1.3 GHz and 45 Mhz-40 GHz), and Anritsu (45 MHz-6 GHz); spectrum analyzers from Tektronix, HP, and Agilent with measurement capability of DC

to 40 GHz and up to 90 GHz using external mixers; signal generators and communication channel modulators from HP, Rhode-Schwartz, Systron Donner, and Agilent; microwave power meter and sensor heads, assortment of passive and active microwave components up to 40 GHz ; data pattern generator and BER tester up to 3Gb/s; optical spectrum analyzer from Anritsu and power meters from HP; single and multimode fiber optic based optical transmitter and receiver boards covering ITU channels at data rates up to 10Gb/s; passive optical components such as isolator, filter, couplers, optical connectors and fusion splicer; LPKF milling machine for fabrication of printed circuit boards; wire-bonding and Cascade probe stations; Intercontinental test fixtures for testing of MMIC circuits and solid-state transistors; state-of-the-art microwave and electromagnetic CAD packages such as Agilent ADS, ANSYS HFSS, and COMSOL multi-physics module.

Music and Entertainment Technology Laboratory

The Music and Entertainment Technology Laboratory (MET-lab) is devoted to research in digital media technologies that will shape the future of entertainment, especially in the areas of sound and music. We employ digital signal processing and machine learning to pursue novel applications in music information retrieval, music production and processing technology, and new music interfaces. The MET-lab is also heavily involved in outreach programs for K-12 students and hosts the Summer Music Technology program, a one-week learning experience for high school students. Lab facilities include a sound isolation booth for audio and music recording, a digital audio workstation running ProTools, two large multi-touch display interfaces of our own design, and a small computing cluster for distributed processing.

NanoPhotonics+ Lab (<http://drexelnanophotonics.com>)

Our research is primarily in the area of nanophotonics with a focus on the nanoscale interaction of light with matter. Interests include: liquid crystal/polymer composites for gratings, lenses and HOEs; liquid crystal interactions with surfaces and in confined nanospaces; alternative energy generation through novel photon interactions; ink-jet printed conducting materials for RF and photonic applications; and the creation and development of smart textiles technologies including soft interconnects, sensors, and wireless implementations.

Opto-Electro-Mechanical Laboratory

This lab concentrates on the system integration on optics, electronics, and mechanical components and systems, for applications in imaging, communication, and biomedical research. Research areas include: Programmable Imaging with Optical Micro-electrical-mechanical systems (MEMS), in which microscopic mirrors are used to image light into a single photodetector; Pre-Cancerous Detection using White Light Spectroscopy, which performs a cellular size analysis of nuclei in tissue; Free-space Optical Communication using Space Time Coding, which consists of diffused light for computer-to-computer communications, and also tiny lasers and detectors for chip-to-chip communication; Magnetic Particle Locomotion, which showed that particles could swim in a uniform field; and Transparent Antennas using Polymer, which enables antennas to be printed through an ink-jet printer.

Plasma and Magnetism Laboratory

Research is focused on applications of electrical and magnetic technologies to biology and medicine. This includes the subjects of non-thermal atmospheric pressure plasma for medicine, magnetic manipulation of particles for drug delivery and bio-separation,

development of miniature NMR sensors for cellular imaging and carbon nanotube cellular probes.

Power Electronics Research Laboratory

The Power Electronics Research Laboratory (PERL) is involved in circuit and design simulation, device modeling and simulation, and experimental testing and fabrication of power electronic circuits. The research and development activities include electrical terminations, power quality, solar photovoltaic systems, GTO modeling, protection and relay coordination, and solid-state circuit breakers. The analysis tools include EMPT, SPICE, and others, which have been modified to incorporate models of such controllable solid-state switches as SCRs, GTOs, and MOSFETs. These programs have a wide variety and range of modeling capabilities used to model electromagnetics and electromechanical transients ranging from microseconds to seconds in duration. The PERL is a fully equipped laboratory with 42 kVA AC and 70 kVA DC power sources and data acquisition systems, which have the ability to display and store data for detailed analysis. Some of the equipment available is a distribution and HV transformer and three phase rectifiers for power sources and digital oscilloscopes for data measuring and experimental analysis. Some of the recent studies performed by the PERL include static VAR compensators, power quality of motor controllers, solid-state circuit breakers, and power device modeling which have been supported by PECO, GE, Gould, and EPRI.

RE Touch Lab

The RE Touch Lab is investigating the perceptual and mechanical basis of active touch perception, or haptics, and the development of new technologies for stimulating the sense of touch, allowing people to touch, feel, and interact with digital content as seamlessly as we do with objects in the real world. We study the scientific foundations of haptic perception and action, and the neuroscientific and biomechanical basis of touch, with a long-term goal of uncovering the fundamental perceptual and mechanical computations that enable haptic interaction. We also create new technologies for rendering artificial touch sensations that simulate those that are experienced when interacting with real objects, inspired by new findings on haptic perception.

Testbed for Power-Performance Management of Enterprise Computing Systems

This computing testbed is used to validate techniques and algorithms aimed at managing the performance and power consumption of enterprise computing systems. The testbed comprises a rack of Dell 2950 and Dell 1950 PowerEdge servers, as well as assorted desktop machines, networked via a gigabit switch. Virtualization of this cluster is enabled by VMWare's ESX Server running the Linux RedHat kernel. It also comprises of a rack of ten Apple Xserve machines networked via a gigabit switch. These servers run the OS X Leopard operating systems and have access to a RAID with TBs of total disk capacity.

Electrical Engineering Faculty

Suryadevara Basavaiah, PhD (*University of Pennsylvania*). Teaching Professor. Computer engineering; computer engineering education; custom circuit design; VLSI technology; process and silicon fabrication

Tom Chmielewski, PhD (*Drexel University*). Assistant Teaching Professor. Modeling and simulation of electro-mechanical systems; optimal, adaptive and non-linear control; DC motor control; system identification; kalman filters (smoothing algorithms, tracking); image processing; robot design;

biometric technology and design of embedded systems for control applications utilizing MATLAB and SIMULINK

Fernand Cohen, PhD (*Brown University*). Professor. Surface modeling; tissue characterization and modeling; face modeling; recognition and tracking.

Andrew Cohen, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Image processing; multi-target tracking; statistical pattern recognition and machine learning; algorithmic information theory; 5-D visualization

Kapil Dandekar, PhD (*University of Texas-Austin*) *Director of the Drexel Wireless Systems Laboratory (DWSL); Associate Dean of Research, College of Engineering*. Professor. Cellular/mobile communications and wireless LAN; smart antenna/MIMO for wireless communications; applied computational electromagnetics; microwave antenna and receiver development; free space optical communication; ultrasonic communication; sensor networks for homeland security; ultrawideband communication.

Afshin Daryoush, ScD (*Drexel University*). Professor. Digital and microwave photonics; nonlinear microwave circuits; RFIC; medical imaging.

Bruce A. Eisenstein, PhD (*University of Pennsylvania*) *Vice Dean, College of Engineering; Arthur J. Rowland Professor*. Professor. Pattern recognition; estimation; decision theory.

Adam K. Fontecchio, PhD (*Brown University*) *Vice Dean, Graduate College*. Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Gary Friedman, PhD (*University of Maryland-College Park*). Professor. Biological and biomedical applications of nanoscale magnetic systems.

Eli Fromm, PhD (*Jefferson Medical College*) *LeRoy A. Brothers University Professor / Director for Center of Educational Research*. Professor. Engineering education; academic research policy; bioinstrumentation; physiologic systems.

Edwin L. Gerber, PhD (*University of Pennsylvania*). Professor. Computerized instruments and measurements; undergraduate engineering education.

Allon Guez, PhD (*University of Florida*). Professor. Intelligent control systems; robotics, biomedical, automation and manufacturing; business systems engineering.

Peter R. Herczfeld, PhD (*University of Minnesota*) *Lester A. Kraus Professor/Director, Center for Microwave/Lightwave Engineering*. Professor. Lightwave technology; microwaves; millimeter waves; fiberoptic and integrated optic devices.

Leonid Hrebien, PhD (*Drexel University*). Professor. Tissue excitability; acceleration effects on physiology; bioinformatics.

Nagarajan Kandasamy, PhD (*University of Michigan*) *Associate Department Head for Graduate Affairs*. Associate Professor. Embedded systems, self-managing systems, reliable and fault-tolerant computing, distributed systems, computer architecture, and testing and verification of digital systems.

Bruce Katz, PhD (*University of Illinois*). Adjunct Professor. Speech communication and computer science; artificial intelligence.

Youngmoo Kim, PhD (*MIT*). Associate Professor. Audio and music signal processing, voice analysis and synthesis, music information retrieval, machine learning.

Timothy P. Kurzweg, PhD (*University of Pittsburgh*). Associate Professor. Micro-optical systems; optical spectroscopy; programmable imaging with MEMS; bio-sensors; diffuse optical communication; MEMS fabrication; diffractive optics; optical automation; optical modeling and simulation; magnetic particle locomotion; meta-materials; reconfigurable antennas

John Lacontora, PhD (*New Jersey Institute of Technology*). Associate Research Professor. Service engineering; industrial engineering.

Karen Miu, PhD (*Cornell University*). Professor. Power systems; distribution networks; distribution automation; optimization; system analysis.

Bahram Nabet, PhD (*University of Washington*) Associate Dean for *Special Projects, College of Engineering; Electrical and Computer Engineering*. Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Prawat Nagvajara, Ph.D. (*Boston University*). Associate Professor. System on a chip; embedded systems; power grid computation; testing of computer hardware; fault-tolerant computing; VLSI systems; error control coding.

Dagmar Niebur, PhD (*Swiss Federal Institute of Technology*). Associate Professor. Intelligent systems; dynamical systems; power system monitoring and control.

Chika Nwankpa, PhD (*Illinois Institute of Technology*) *ECE Department Head*. Professor. Power system dynamics; power electronic switching systems; optically controlled high power switches.

Christopher Peters, PhD (*University of Michigan*). Teaching Professor. Nuclear reactor design; ionizing radiation detection; nuclear forensics; power plant reliability and risk analysis; naval/marine power and propulsion; directed energy/high power microwaves; nonstationary signal processing; radar; electronic survivability/susceptibility to harsh environments; electronic warfare

Karkal S. Prahbu, PhD (*Harvard University*). Auxiliary Professor. Computer and software engineering; advanced microprocessors and distributed operating systems.

William C. Regli, PhD (*University of Maryland-College Park*). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Gail L. Rosen, PhD (*Georgia Institute of Technology*). Associate Professor. Signal processing, signal processing for biological analysis and modeling, bio-inspired designs, source localization and tracking.

Ionnis Savidis, PhD (*University of Rochester*). Assistant Professor. Analysis, modeling, and design methodologies for high performance digital and mixed-signal integrated circuits; Emerging integrated circuit technologies; Electrical and thermal modeling and characterization, signal and power integrity, and power and clock delivery for 3-D IC technologies

Kevin J. Scoles, PhD (*Dartmouth College*). Associate Professor. Microelectronics; electric vehicles; solar energy; biomedical electronics.

Harish Sethu, PhD (*Lehigh University*). Associate Professor. Protocols, architectures and algorithms in computer networks; computer security;

mobile ad hoc networks; large-scale complex adaptive networks and systems.

James Shackelford, PhD (*Drexel University*). Assistant Professor. Medical image processing, high performance computing, embedded systems, computer vision, machine learning

P. Mohana Shankar, PhD (*Indian Institute of Technology*) *Allen Rothwarf Professor of Electrical and Computer Engineering*. Professor. Wireless communications; biomedical ultrasonics; fiberoptic bio-sensors.

Jonathan E. Spanier, PhD (*Columbia University*) *Associate Dean, Strategic Planning, College of Engineering*. Professor. Light-matter interactions in electronic materials, including ferroelectric semiconductors, complex oxide thin film science; laser spectroscopy, including Raman scattering.

Matthew Stamm, PhD (*University of Maryland, College Park*). Assistant Professor. Information Security; multimedia forensics and anti-forensics; information verification; adversarial dynamics; signal processing

Jauelice Cavalcante de Oliveira, PhD (*Georgia Institute of Technology*). Associate Professor. Software-defined networking; social and economic networks; network security; design and analysis of protocols, algorithms and architectures in computer networks, particularly solutions for the Internet of Things

Engineering

Major: Engineering

Degree Awarded: Bachelor of Science in Engineering (BSE)

Calendar Type: Quarter

Total Credit Hours: 180.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional (CIP) code: 14.0101

Standard Occupational Classification (SOC) code: 17-2199

About the Program

The Bachelor of Science in Engineering major is an interdisciplinary engineering major for students who do not intend to be practicing engineers. Students in the Bachelor of Science in Engineering major combine a rigorous engineering education in the College of Engineering with interdisciplinary studies in fields outside of engineering such as law, medicine, business, entrepreneurship, teaching, international studies, public policy, music, art, environmental studies, and more. The Bachelor of Science in Engineering major provides a strong grounding in the foundations of engineering, in quantitative skills, and in the analytic processes that engineers use in design of practical technology.

Drexel's Bachelor of Science in Engineering major was developed to provide students with educational and professional challenges not available in the traditional engineering curriculum.

Program Objectives

The key objectives of the Bachelor of Science in Engineering program are to provide the student with:

- a strong foundation in science and mathematics
- a foundation of the fundamentals of engineering as a discipline

- a strong grounding in a second cognate area (either technical, pre-professional, cultural, global, or another area worked out between the student and his/her advisor)
- an integrating experience that ties the technical and the cognate areas together. Examples of such experiences may be, but are not limited to, research projects, capstone designs, a public service assignment, etc.

Additional Information

Additional information about the Bachelor of Science in Engineering program is available on the Bachelor of Science in Engineering website.

Degree Requirements

General Education/Liberal Studies Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV E101	The Drexel Experience	1.0
General Education Requirements *		24.0
Free Electives		24.0

Math and Science Requirements

BIO 141	Essential Biology	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0

Core Curriculum Requirements

ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0

Engineering Requirements

As part of the 45.0 credits of Engineering requirements, students must include a capstone experience (Senior design sequence, research project, etc.) 45.0

Technical Electives

Students select 18.0 credits of 200-level (or higher) courses in BMES, MATH, CHEM, PHYS, BIO or College of Engineering courses. Advisor approval is required for technical electives. 18.0

Total Credits 180.5

* General Education Requirements. (p. 229)

Sample Plan of Study

5 YR UG Co-op Concentration

Term 1		Credits
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0

ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
Term Credits		16.5

Term 2

CIVC 101	Introduction to Civic Engagement	1.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		19.5

Term 3

BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		17.5

Term 4

ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Engineering course *		3.0
Term Credits		13.0

Term 5

ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 232	Dynamic Engineering Systems	3.0
Engineering course *		3.0
General Education elective *		3.0
Free elective		3.0
Term Credits		15.0

Term 6

Two Engineering courses *		6.0
General Education elective *		3.0
Free elective		3.0
Term Credits		12.0

Term 7

Two Engineering courses *		6.0
General Education elective *		3.0
Technical elective		3.0
Free elective		3.0
Term Credits		15.0

Term 8

Two Engineering courses *		6.0
General Education elective *		3.0
Technical elective		3.0
Free elective		3.0
Term Credits		15.0

Term 9

Two Engineering courses *		6.0
General Education elective *		3.0
Technical elective		3.0
Free elective		3.0
Term Credits		15.0

Term 10

Senior Design Project I or Capstone course *		3.0
Engineering course *		3.0

General Education elective*	3.0
Technical elective	3.0
Free elective	3.0
Term Credits	15.0
Term 11	
Senior Design Project II or Capstone course*	3.0
Engineering course*	3.0
General Education elective*	3.0
Technical elective	3.0
Free elective	3.0
Term Credits	15.0
Term 12	
Senior Design Project III or Capstone course*	3.0
General Education elective*	3.0
Technical elective	3.0
Free elective	3.0
Term Credits	12.0
Total Credit: 180.5	

* See degree requirements (p. 263).

Facilities

From the start of their freshman year, students learn to use the equipment they are likely to need in their careers, such as oscilloscopes, signal generators, amplifiers, and power supplies. These skills make students more useful as co-op employees and give them a competitive advantage in their engineering careers.

Computer/Design Center

The Drexel Curriculum boasts two types of lab experience: Instrumentation and Computer Design. Instrumentation Labs introduce Engineering Majors to the sight, sound, and feel of equipment such as digital multimeters, power supplies, oscilloscopes, and waveform generators. The Computer Labs imbue these pre-engineers with knowledge of software which will be vital in today's work environment.

Engineering Technology

Major: Engineering Technology

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 187.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional (CIP) code: 15.0000

Standard Occupational Classification (SOC) code: 17-3029

About the Program

The degree is *Engineering Technology*, the career is *Engineering*.™

Engineering Technology is a branch of engineering that emphasizes practice and the application of theory to solve real-world problems. Although the subject areas of core courses in both engineering technology and traditional engineering are similar, engineering technology courses stress the application of engineering techniques, while traditional engineering courses focus on the development of concepts.

To meet the increasing need for engineering technologists, the BS in Engineering Technology program at Drexel University is organized around

a practice-based learning approach to knowledge development. There is extensive use of hands-on laboratory exercises in a majority of the classes. Due to its application-oriented focus, the program is ideally suited for students who plan to pursue careers in a variety of design-, production-, and service-related positions and who learn best by seeing concepts put into practice.

As Engineering Technology students advance, the practice-based approach leads them to skills in the practical and immediate use of technology. *Engineering Technology graduates focus on using current and emerging technologies to solve applied engineering problems that industry faces.*

The state-of-the-art technology at the heart of the practice-based laboratories, allows graduates to be well versed in the application of modern technology to production-level engineering problems. Through real world industry-sponsored capstone projects, internships with local companies, etc., students in the Engineering Technology program frequently become closely connected to the regional industry and often end up employed with those local industries.

Concentrations are available in biomedical, electrical, mechanical, and industrial engineering technology:

- Biomedical Engineering Technology (p. 265)
- Electrical Engineering Technology (p. 267)
- Industrial Engineering Technology (p. 268)
- Mechanical Engineering Technology (p. 270)

All students enrolled in the program are required to take general education courses, including mathematics, sciences and liberal arts. All concentrations consist of core fundamental courses, technical electives, free electives, and a three-term senior design project, reflecting industrial practices. During their sophomore year, students need to choose one of the four available concentrations.

The program includes full-time and part-time enrollment options. Students pursuing the full-time option can opt for a four-year program with a six-month internship or a five-year program with three six-month co-op cycles.

Engineering technology graduates are uniquely qualified to serve in a variety of functions requiring traditional and nontraditional technological skills. The program also prepares students for graduate study in a variety of fields, including engineering technology, engineering management, business administration, and health-care.

Mission

The mission of the Engineering Technology program is to provide contemporary students with an academic foundation and practical education in engineering technology through an outstanding curriculum and applied research program, and the participation of our students in one of the nation's most successful cooperative educational programs.

Engineering Technology Program Educational Objectives

The Engineering Technology program produces graduates who:

- apply discipline-specific theory, experiments and real world experience to interpret, analyze and solve current and emerging technical problems;
- communicate clearly and persuasively with technical and non-technical people in oral, written and graphical forms;

- function individually and on teams to design quality systems, components or processes in a timely, responsible and creative manner;
- demonstrate behavior consistent with professional ethics and are cognizant of social concerns as they relate to the practice of engineering technology;
- strive for professional growth and engage in lifelong learning.

Engineering Technology Student Outcomes

The program's outcomes reflect the skills and abilities that the curriculum is designed to provide to students by the time they graduate. These are:

- an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;
- an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
- an ability to conduct standard tests and measurements, to conduct, analyze, and interpret experiments, and to apply experimental results to improve processes;
- an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
- an ability to function effectively as a member or leader on a technical team;
- an ability to identify, analyze, and solve broadly-defined engineering technology problems;
- an ability to apply written, oral, and graphical communication in both technical and non-technical environments, and an ability to identify and use appropriate technical literature;
- an understanding of the need for and an ability to engage in self-directed continuing professional development;
- an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
- a knowledge of the impact of engineering technology solutions in a societal and global context;
- a commitment to quality, timeliness, and continuous improvement.

Additional Information

The Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET. (<http://www.abet.org>)

For additional information, please visit the Engineering Technology (<http://www.drexel.edu/engtech>) web page.

Career Opportunities

The Engineering Technology program is designed to meet employers' growing needs for college-educated problem-solvers, created by the technology revolution. Career opportunities in engineering technology are virtually limitless with at least 5,500 companies in the region offering more than 150 current job openings for engineering technologists. As a leading urban university in the Greater Philadelphia region, Drexel's location offers access to a vast number of industries including:

- Defense
- Aerospace

- Power generation
- Public utilities
- Shipbuilding
- Railroad
- Manufacturing
- Environmental
- Chemical
- Pharmaceutical
- Medical care

With the skills developed in this program, students will be able to integrate academic theory and professional practice in order to communicate effectively with engineers from different fields, scientists, the production workforce, marketing professionals, company management, and ultimately the customer. Students may participate in the design, development, testing, and manufacturing of industrial machinery, electric and electronic equipment, medical devices, consumer products, and other equipment.

Engineering technologists can serve in industry in many capacities; some fields include:

- Automation design and process engineering
- Mechanical/production engineering
- Electrical engineering and electronics
- Field engineering
- Systems engineering and management
- Environmental engineering
- Quality control
- Sales and customer service
- Systems/programming
- Testing engineering

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on post-graduate opportunities.

Engineering Technology

Biomedical Engineering Technology Concentration

The biomedical engineering technology concentration focuses on the practice of medical equipment operation and support in the clinical environment. This concentration provides students with the knowledge they need to work in the medical field operating complicated diagnostic and patient care equipment.

During the first three years, students of all concentrations in engineering technology take electrical, mechanical, and industrial courses to get a solid, systematic background in different engineering fields. Students are required to complete general and concentration engineering technology courses, technical electives, and free elective courses that permit students great latitude in tailoring the program of study to match their career goals.

Biomedical Engineering Technology Concentration

Degree Requirements

Humanities and Social Sciences Requirements

COM 111	Principles of Communication	3.0
COM 230	Techniques of Speaking	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 285	Technology in Historical Perspective	4.0
PHIL 315	Engineering Ethics	3.0
General Educational Electives		9.0

Basic Science Requirements

CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
PHYS 103	General Physics I	4.0
PHYS 104	General Physics II	4.0

Mathematics Requirements

MATH 110	Precalculus	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
STAT 201	Introduction to Business Statistics	4.0

Engineering Technology Core

EET 102	Introduction to Engineering Technology	3.0
EET 201	Circuit Analysis I	4.0
EET 202	Circuit Analysis II	4.0
EET 204	Introduction to Nanotechnology	3.0
EET 205	Digital Electronics	4.0
EET 208	Introduction to Programming for Embedded Systems	3.0
EET 209	Fundamentals of Virtual Instrumentation	3.0
EET 311	Modeling of Engineering Systems	4.0
EET 319	PLC Fundamentals	4.0
EET 333 [WI]	Non-Destructive Evaluation of Materials	4.0
EET 401	Applied Microcontrollers	4.0
MET 100	Graphical Communication	3.0
MET 101	Engineering Materials	3.0
MET 204	Applied Quality Control	3.0
MET 205	Robotics and Mechatronics	3.0
MET 209	Fluid Power	3.0
MET 213	Applied Mechanics	4.0
MHT 205	Thermodynamics I	3.0
MHT 226	Measurement Techniques and Instrumentation	3.0
INDE 240	Technology Economics	3.0
INDE 370	Industrial Project Management	3.0

Biomedical Engineering Technology Concentration Requirements

BET 301	Healthcare Technology	3.0
BET 302	Biomedical Electronics	4.0
BET 303	Medical Imaging Systems	3.0
BET 307	Applied Biomedical Instrumentation	3.0
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 335	Biomedical Informatics I	3.0
BMES 391	Biomedical Instrumentation I	3.0
BMES 488	Medical Device Development	3.0

Technical Electives

Students select 6.0 additional credits from any BET, EET, MET, MHT, or INDE courses not already required. See advisor for specific courses.	6.0
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Capstone Course Requirements

MET 421 [WI]	Senior Design Project I	3.0
MET 422	Senior Design Project II	3.0
MET 423 [WI]	Senior Design Project III	3.0
Miscellaneous		
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
UNIV E101	The Drexel Experience	1.0
Free Electives		12.0
Total Credits		187.5

Biomedical Engineering Technology Concentration

Sample Plan of Study

5 YR UG Co-op Concentration

Term 1		Credits
CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
EET 102	Introduction to Engineering Technology	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 110	Precalculus	3.0
PHYS 103	General Physics I	4.0
UNIV E101	The Drexel Experience	1.0
Term Credits		19.5
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
EET 208	Introduction to Programming for Embedded Systems	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 121	Calculus I	4.0
MET 100	Graphical Communication	3.0
PHYS 104	General Physics II	4.0
Term Credits		18.0
Term 3		
COOP 101	Career Management and Professional Development	0.0
EET 201	Circuit Analysis I	4.0
EET 209	Fundamentals of Virtual Instrumentation	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 122	Calculus II	4.0
MET 101	Engineering Materials	3.0
Term Credits		17.0
Term 4		
COM 111	Principles of Communication	3.0
EET 202	Circuit Analysis II	4.0
EET 205	Digital Electronics	4.0
MET 209	Fluid Power	3.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		18.0
Term 5		
EET 204	Introduction to Nanotechnology	3.0
EET 333 [WI]	Non-Destructive Evaluation of Materials	4.0
HIST 285	Technology in Historical Perspective	4.0
MET 205	Robotics and Mechatronics	3.0
MHT 205	Thermodynamics I	3.0
Term Credits		17.0
Term 6		
COM 230	Techniques of Speaking	3.0
EET 311	Modeling of Engineering Systems	4.0
EET 319	PLC Fundamentals	4.0

MET 213	Applied Mechanics	4.0
Term Credits		15.0
Term 7		
EET 401	Applied Microcontrollers	4.0
INDE 240	Technology Economics	3.0
MET 204	Applied Quality Control	3.0
MHT 226	Measurement Techniques and Instrumentation	3.0
PHIL 315	Engineering Ethics	3.0
Term Credits		16.0
Term 8		
BET 301	Healthcare Technology	3.0
BET 302	Biomedical Electronics	4.0
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
BMES 302	Laboratory II: Biomeasurements	2.0
Free Elective		3.0
Term Credits		16.0
Term 9		
BET 303	Medical Imaging Systems	3.0
BMES 335	Biomedical Informatics I	3.0
BMES 391	Biomedical Instrumentation I	3.0
INDE 370	Industrial Project Management	3.0
Free Elective		3.0
Term Credits		15.0
Term 10		
BET 307	Applied Biomedical Instrumentation	3.0
MET 421 [WI]	Senior Design Project I	3.0
Free Elective		3.0
General Educational Elective		3.0
Term Credits		12.0
Term 11		
BMES 488	Medical Device Development	3.0
MET 422	Senior Design Project II	3.0
General Educational Elective		3.0
Technical Elective		3.0
Term Credits		12.0
Term 12		
MET 423 [WI]	Senior Design Project III	3.0
Free elective		3.0
General Educational Elective		3.0
Technical Elective		3.0
Term Credits		12.0

Total Credit: 187.5

Engineering Technology

Electrical Engineering Technology Concentration

The electrical engineering technology concentration provides an extensive background in electric circuit analysis and electronics. Students are required to study digital and analog electronics, digital computer design, analysis of electric power systems, and renewable energy.

During the first three years, students of all concentrations in engineering technology take electrical, mechanical, and industrial courses to get a solid, systematic background in different engineering fields. Students are required to complete general and concentration engineering technology courses, technical electives, and free elective courses that permit

students great latitude in tailoring the program of study to match their career goals.

Electrical Engineering Technology Concentration

Degree Requirements

Humanities and Social Sciences Requirements

COM 111	Principles of Communication	3.0
COM 230	Techniques of Speaking	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 285	Technology in Historical Perspective	4.0
PHIL 315	Engineering Ethics	3.0
General Educational Electives		9.0

Basic Science Requirements

CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
PHYS 103	General Physics I	4.0
PHYS 104	General Physics II	4.0

Mathematics Requirements

MATH 110	Precalculus	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
STAT 201	Introduction to Business Statistics	4.0

Engineering Technology Core

EET 102	Introduction to Engineering Technology	3.0
EET 201	Circuit Analysis I	4.0
EET 202	Circuit Analysis II	4.0
EET 204	Introduction to Nanotechnology	3.0
EET 205	Digital Electronics	4.0
EET 208	Introduction to Programming for Embedded Systems	3.0
EET 209	Fundamentals of Virtual Instrumentation	3.0
EET 311	Modeling of Engineering Systems	4.0
EET 319	PLC Fundamentals	4.0
EET 333 [WI]	Non-Destructive Evaluation of Materials	4.0
EET 401	Applied Microcontrollers	4.0
INDE 240	Technology Economics	3.0
INDE 370	Industrial Project Management	3.0
MET 100	Graphical Communication	3.0
MET 101	Engineering Materials	3.0
MET 204	Applied Quality Control	3.0
MET 205	Robotics and Mechatronics	3.0
MET 209	Fluid Power	3.0
MET 213	Applied Mechanics	4.0
MHT 205	Thermodynamics I	3.0
MHT 226	Measurement Techniques and Instrumentation	3.0

Electrical Engineering Technology Concentration Requirements

EET 206	Analog Electronics I	4.0
EET 313	Signals and Systems I	4.0
EET 317	Analog Electronics II	4.0
EET 322	Energy Conversion	4.0
EET 323	Electrical Systems Design	3.0
EET 324	Power Electronics	4.0
EET 325	Microprocessors	3.0

Electrical Engineering Technology (EET) Electives

Select 6.0 additional credits from any BET, EET, MET, MHT, INDE courses not already required. See advisor for specific courses.

Capstone Course Requirements

MET 421 [WI]	Senior Design Project I	3.0
MET 422	Senior Design Project II	3.0
MET 423 [WI]	Senior Design Project III	3.0
Miscellaneous		
COOP 101	Career Management and Professional Development	0.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV E101	The Drexel Experience	1.0
Free electives		14.0
Total Credits		187.5

Electrical Engineering Technology Concentration

Sample Plan of Study

5 YR UG Co-op

		Credits
Term 1		
CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
EET 102	Introduction to Engineering Technology	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 110	Precalculus	3.0
PHYS 103	General Physics I	4.0
UNIV E101	The Drexel Experience	1.0
	Term Credits	19.5
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
EET 208	Introduction to Programming for Embedded Systems	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 121	Calculus I	4.0
MET 100	Graphical Communication	3.0
PHYS 104	General Physics II	4.0
	Term Credits	18.0
Term 3		
COOP 101	Career Management and Professional Development	0.0
EET 201	Circuit Analysis I	4.0
EET 209	Fundamentals of Virtual Instrumentation	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 122	Calculus II	4.0
MET 101	Engineering Materials	3.0
	Term Credits	17.0
Term 4		
COM 111	Principles of Communication	3.0
EET 202	Circuit Analysis II	4.0
EET 205	Digital Electronics	4.0
MET 209	Fluid Power	3.0
STAT 201	Introduction to Business Statistics	4.0
	Term Credits	18.0
Term 5		
EET 204	Introduction to Nanotechnology	3.0
EET 333 [WI]	Non-Destructive Evaluation of Materials	4.0
HIST 285	Technology in Historical Perspective	4.0
MET 205	Robotics and Mechatronics	3.0
MHT 205	Thermodynamics I	3.0
	Term Credits	17.0
Term 6		
COM 230	Techniques of Speaking	3.0
EET 311	Modeling of Engineering Systems	4.0
EET 319	PLC Fundamentals	4.0

MET 213	Applied Mechanics	4.0
	Term Credits	15.0
Term 7		
EET 401	Applied Microcontrollers	4.0
INDE 240	Technology Economics	3.0
MET 204	Applied Quality Control	3.0
MHT 226	Measurement Techniques and Instrumentation	3.0
PHIL 315	Engineering Ethics	3.0
	Term Credits	16.0
Term 8		
EET 206	Analog Electronics I	4.0
EET 322	Energy Conversion	4.0
EET 325	Microprocessors	3.0
Free elective		3.0
	Term Credits	14.0
Term 9		
EET 313	Signals and Systems I	4.0
EET 317	Analog Electronics II	4.0
EET 323	Electrical Systems Design	3.0
INDE 370	Industrial Project Management	3.0
	Term Credits	14.0
Term 10		
EET 324	Power Electronics	4.0
MET 421 [WI]	Senior Design Project I	3.0
General Educational Elective		3.0
Free elective		4.0
	Term Credits	14.0
Term 11		
MET 422	Senior Design Project II	3.0
Free elective		3.0
General Educational Elective		3.0
Technical Elective		3.0
	Term Credits	12.0
Term 12		
MET 423 [WI]	Senior Design Project III	3.0
Free elective		4.0
General Educational Elective		3.0
Technical Elective		3.0
	Term Credits	13.0
Total Credit:		187.5

Engineering Technology

Industrial Engineering Technology Concentration

The industrial engineering technology concentration provides students with knowledge and skills in management and relevant engineering technology disciplines for manufacturing, service, and healthcare enterprises, including automation, logistics, scheduling, simulation, maintainability, and advanced manufacturing processes. Students learn how to co-ordinate, integrate, and optimize people, machines, materials, and energy to improve efficiency, sustainability, quality, and environment.

During the first three years, students of all concentrations in engineering technology take electrical, mechanical, and industrial courses to get a solid, systematic background in different engineering fields. Students are required to complete general and concentration engineering technology courses, technical electives, and free elective courses that permit

students great latitude in tailoring the program of study to match their career goals.

Industrial Engineering Technology Concentration

Degree Requirements

Humanities and Social Sciences Requirements

COM 111	Principles of Communication	3.0
COM 230	Techniques of Speaking	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 285	Technology in Historical Perspective	4.0
PHIL 315	Engineering Ethics	3.0
General Educational Electives		9.0

Basic Science Requirements

CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
PHYS 103	General Physics I	4.0
PHYS 104	General Physics II	4.0

Mathematics Requirements

MATH 110	Precalculus	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
STAT 201	Introduction to Business Statistics	4.0

Engineering Technology Core

EET 102	Introduction to Engineering Technology	3.0
EET 201	Circuit Analysis I	4.0
EET 202	Circuit Analysis II	4.0
EET 204	Introduction to Nanotechnology	3.0
EET 205	Digital Electronics	4.0
EET 208	Introduction to Programming for Embedded Systems	3.0
EET 209	Fundamentals of Virtual Instrumentation	3.0
EET 311	Modeling of Engineering Systems	4.0
EET 319	PLC Fundamentals	4.0
EET 333 [WI]	Non-Destructive Evaluation of Materials	4.0
EET 401	Applied Microcontrollers	4.0
INDE 240	Technology Economics	3.0
INDE 370	Industrial Project Management	3.0
MET 100	Graphical Communication	3.0
MET 101	Engineering Materials	3.0
MET 204	Applied Quality Control	3.0
MET 205	Robotics and Mechatronics	3.0
MET 209	Fluid Power	3.0
MET 213	Applied Mechanics	4.0
MHT 205	Thermodynamics I	3.0
MHT 226	Measurement Techniques and Instrumentation	3.0

Industrial Engineering Technology Concentration Requirements

ACCT 110	Accounting for Professionals	4.0
FIN 301	Introduction to Finance	4.0
INDE 300	Quality Management	3.0
INDE 331	Lean Manufacturing	3.0
INDE 350	Industrial Engineering Simulation	3.0
INDE 363	Operations Research for Engineering II	3.0
INDE 365	Systems Analysis Methods I	3.0
INDE 366	Systems Analysis Methods II	3.0
INDE 375	Quality Improvement by Experimental Design	4.0

IET Technical Electives

Students select 6.0 additional credits from any BET, EET, MET, MHT, INDE, OPM, or MKT courses not already required. See advisor for specific courses.

Capstone Course Requirements

MET 421 [WI]	Senior Design Project I	3.0
MET 422	Senior Design Project II	3.0
MET 423 [WI]	Senior Design Project III	3.0

Miscellaneous

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
UNIV E101	The Drexel Experience	1.0

Free Electives

Total Credits		187.5
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Industrial Engineering Technology Concentration

Sample Plan of Study

5 YR UG Co-op Concentration

Term 1		Credits
CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
EET 102	Introduction to Engineering Technology	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 110	Precalculus	3.0
PHYS 103	General Physics I	4.0
UNIV E101	The Drexel Experience	1.0
Term Credits		19.5

Term 2		Credits
CIVC 101	Introduction to Civic Engagement	1.0
EET 208	Introduction to Programming for Embedded Systems	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 121	Calculus I	4.0
MET 100	Graphical Communication	3.0
PHYS 104	General Physics II	4.0
Term Credits		18.0

Term 3		Credits
COOP 101	Career Management and Professional Development	0.0
EET 201	Circuit Analysis I	4.0
EET 209	Fundamentals of Virtual Instrumentation	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 122	Calculus II	4.0
MET 101	Engineering Materials	3.0
Term Credits		17.0

Term 4		Credits
COM 111	Principles of Communication	3.0
EET 202	Circuit Analysis II	4.0
EET 205	Digital Electronics	4.0
MET 209	Fluid Power	3.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		18.0

Term 5		Credits
EET 204	Introduction to Nanotechnology	3.0
EET 333 [WI]	Non-Destructive Evaluation of Materials	4.0
HIST 285	Technology in Historical Perspective	4.0
MET 205	Robotics and Mechatronics	3.0
MHT 205	Thermodynamics I	3.0
Term Credits		17.0

Term 6		Credits
COM 230	Techniques of Speaking	3.0

EET 311	Modeling of Engineering Systems	4.0
EET 319	PLC Fundamentals	4.0
MET 213	Applied Mechanics	4.0
Term Credits		15.0
Term 7		
EET 401	Applied Microcontrollers	4.0
INDE 240	Technology Economics	3.0
MET 204	Applied Quality Control	3.0
MHT 226	Measurement Techniques and Instrumentation	3.0
PHIL 315	Engineering Ethics	3.0
Term Credits		16.0
Term 8		
ACCT 110	Accounting for Professionals	4.0
INDE 300	Quality Management	3.0
INDE 331	Lean Manufacturing	3.0
INDE 350	Industrial Engineering Simulation	3.0
Free Elective		3.0
Term Credits		16.0
Term 9		
FIN 301	Introduction to Finance	4.0
INDE 363	Operations Research for Engineering II	3.0
INDE 365	Systems Analysis Methods I	3.0
INDE 370	Industrial Project Management	3.0
Term Credits		13.0
Term 10		
INDE 366	Systems Analysis Methods II	3.0
MET 421 [WI]	Senior Design Project I	3.0
Free electives		3.0
General Educational Elective		3.0
Term Credits		12.0
Term 11		
INDE 375	Quality Improvement by Experimental Design	4.0
MET 422	Senior Design Project II	3.0
General Educational Elective		3.0
Technical elective (See advisor)		3.0
Term Credits		13.0
Term 12		
MET 423 [WI]	Senior Design Project III	3.0
Free elective		4.0
General Educational Elective		3.0
Technical elective (See advisor)		3.0
Term Credits		13.0

Total Credit: 187.5

Engineering Technology

Mechanical Engineering Technology Concentration

The mechanical engineering technology concentration stresses on the design, development, testing, and manufacturing of industrial machinery, consumer and biomedical products, CNC (Computer Numerical Control), prototyping machinery, and similar equipment. The concentration includes study in computer graphics, statics, dynamics, stress analysis, fluid dynamics, and Computer Aided Engineering (CAE) tools, including instrumentation and testing procedures of various industrial systems.

During the first three years, students of all concentrations in engineering technology take electrical, mechanical, and industrial courses to get a solid, systematic background in different engineering fields. Students are required to complete general and concentration engineering

technology courses, technical electives, and free elective courses that permit students great latitude in tailoring the program of study to match their career goals.

Mechanical Engineering Technology Concentration

Degree Requirements

Humanities and Social Sciences Requirements

COM 111	Principles of Communication	3.0
COM 230	Techniques of Speaking	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 285	Technology in Historical Perspective	4.0
PHIL 315	Engineering Ethics	3.0
General Educational Electives		9.0

Basic Science Requirements

CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
PHYS 103	General Physics I	4.0
PHYS 104	General Physics II	4.0

Mathematics Requirements

MATH 110	Precalculus	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
STAT 201	Introduction to Business Statistics	4.0

Engineering Technology Core

EET 102	Introduction to Engineering Technology	3.0
EET 201	Circuit Analysis I	4.0
EET 202	Circuit Analysis II	4.0
EET 204	Introduction to Nanotechnology	3.0
EET 205	Digital Electronics	4.0
EET 208	Introduction to Programming for Embedded Systems	3.0
EET 209	Fundamentals of Virtual Instrumentation	3.0
EET 311	Modeling of Engineering Systems	4.0
EET 319	PLC Fundamentals	4.0
EET 333 [WI]	Non-Destructive Evaluation of Materials	4.0
EET 401	Applied Microcontrollers	4.0
INDE 370	Industrial Project Management	3.0
INDE 240	Technology Economics	3.0
MET 100	Graphical Communication	3.0
MET 101	Engineering Materials	3.0
MET 204	Applied Quality Control	3.0
MET 205	Robotics and Mechatronics	3.0
MET 209	Fluid Power	3.0
MET 213	Applied Mechanics	4.0
MHT 205	Thermodynamics I	3.0
MHT 226	Measurement Techniques and Instrumentation	3.0

Mechanical Engineering Technology Concentration Requirements

MET 316	Computer Numerical Control	3.0
MET 407	Manufacturing Processes	3.0
MET 408	MFG Information Management	3.0
MHT 206	Thermodynamics II	3.0
MHT 222	Applied Dynamics I	4.0
MHT 301	Fluid Mechanics I	3.0
MHT 314	Thermo and Heat Transfer Analysis	3.0
MHT 401	Mechanical Design I	4.0

MHT Technical Electives

Students select 6.0 additional credits from any BET, EET, MET, MHT or INDE courses not already required. See advisor for specific courses.

Capstone Course Requirements

MET 421 [WI]	Senior Design Project I	3.0
MET 422	Senior Design Project II	3.0
MET 423 [WI]	Senior Design Project III	3.0

Miscellaneous

COOP 101	Career Management and Professional Development	0.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV E101	The Drexel Experience	1.0

Free Electives 14.0

Total Credits 187.5

Mechanical Engineering Technology Concentration

Sample Plan of Study

5 YR UG Co-op Concentration

Term		Credits
Term 1		
CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
EET 102	Introduction to Engineering Technology	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 110	Precalculus	3.0
PHYS 103	General Physics I	4.0
UNIV E101	The Drexel Experience	1.0
	Term Credits	19.5
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
EET 208	Introduction to Programming for Embedded Systems	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 121	Calculus I	4.0
MET 100	Graphical Communication	3.0
PHYS 104	General Physics II	4.0
	Term Credits	18.0
Term 3		
COOP 101	Career Management and Professional Development	0.0
EET 201	Circuit Analysis I	4.0
EET 209	Fundamentals of Virtual Instrumentation	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 122	Calculus II	4.0
MET 101	Engineering Materials	3.0
	Term Credits	17.0
Term 4		
COM 111	Principles of Communication	3.0
EET 202	Circuit Analysis II	4.0
EET 205	Digital Electronics	4.0
MET 209	Fluid Power	3.0
STAT 201	Introduction to Business Statistics	4.0
	Term Credits	18.0
Term 5		
EET 204	Introduction to Nanotechnology	3.0
EET 333 [WI]	Non-Destructive Evaluation of Materials	4.0
HIST 285	Technology in Historical Perspective	4.0
MET 205	Robotics and Mechatronics	3.0
MHT 205	Thermodynamics I	3.0
	Term Credits	17.0
Term 6		
COM 230	Techniques of Speaking	3.0

EET 311	Modeling of Engineering Systems	4.0
EET 319	PLC Fundamentals	4.0
MET 213	Applied Mechanics	4.0
	Term Credits	15.0

Term 7

EET 401	Applied Microcontrollers	4.0
INDE 240	Technology Economics	3.0
MET 204	Applied Quality Control	3.0
MHT 226	Measurement Techniques and Instrumentation	3.0
PHIL 315	Engineering Ethics	3.0
	Term Credits	16.0

Term 8

MET 316	Computer Numerical Control	3.0
MET 408	MFG Information Management	3.0
MHT 206	Thermodynamics II	3.0
MHT 222	Applied Dynamics I	4.0
MHT 301	Fluid Mechanics I	3.0
	Term Credits	16.0

Term 9

INDE 370	Industrial Project Management	3.0
MET 407	Manufacturing Processes	3.0
MHT 314	Thermo and Heat Transfer Analysis	3.0
MHT 401	Mechanical Design I	4.0
	Term Credits	13.0

Term 10

MET 421 [WI]	Senior Design Project I	3.0
Free electives		7.0
General Educational Elective		3.0
	Term Credits	13.0

Term 11

MET 422	Senior Design Project II	3.0
Free elective		4.0
General Educational Elective		3.0
Technical elective (See advisor)		3.0
	Term Credits	13.0

Term 12

MET 423 [WI]	Senior Design Project III	3.0
Free elective		3.0
General Educational Elective		3.0
Technical elective (See advisor)		3.0
	Term Credits	12.0

Total Credit: 187.5

Environmental Engineering

Major: Environmental Engineering

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 193.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.1401

Standard Occupational Classification (SOC) code: 17-2081

About the Program

Environmental engineering is concerned with the design of systems, policies and processes to protect human, animal, and plant populations from the effects of adverse environmental factors, including toxic chemicals and wastes, pathogenic bacteria, and global warming, and to design systems that enable a more sustainable society.

Environmental engineers design systems, processes and policies to minimize the effect of human activities on the physical and living environment so that we can all live more healthy and sustainable lives. Environmental engineers work to meet human needs for resources in ways to minimize impact on the ecosystem and adverse effects on health. This field builds on other branches of engineering, especially civil, chemical, and mechanical engineering. It also builds on information from many of the sciences, such as chemistry, physics, hydrology, geology, atmospheric science, and several specializations of biology (ecology, microbiology, and biochemistry). Students who elect to study environmental engineering will become familiar with many of these areas because maintaining and improving the environment requires that problems be evaluated and solutions found using a multidisciplinary approach.

Mission

The mission of the undergraduate environmental engineering program at Drexel University is to graduate outstanding engineers who can identify, evaluate and solve complex environmental problems, and who desire to continue their education on a lifelong basis.

Program Educational Objectives

Environmental engineering graduates will become professionals who analyze, design, construct, manage or operate facilities or systems to protect or enhance the environment of people and other living things, or advance knowledge of the field.

Student Outcomes

The department's student outcomes reflect the skills and abilities that the curriculum is designed to provide to students by the time they graduate. These are:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- d) an ability to function on multidisciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional and ethical responsibility;
- g) an ability to communicate effectively;
- h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i) a recognition of the need for, and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for environmental engineering practice.

Additional Information

The Environmental Engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (<http://www.abet.org>).

For more information about this major, visit the Civil, Architectural and Environmental Engineering Department (<http://www.cae.drexel.edu>) and the BS in Environmental Engineering (<http://www.drexel.edu/cae/academics/bs-environmental-engineering>) page.

Degree Requirements

General Education/Liberal Studies Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 315	Engineering Ethics	3.0
UNIV E101	The Drexel Experience	1.0
General Education Requirements *		15.0

Engineering Core Courses

BIO 141	Essential Biology	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
ENGR 361	Statistical Analysis of Engineering Systems	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0

Environmental Engineering Requirements

CAEE 202	Introduction to Civil, Architectural & Environmental Engineering	3.0
CAEE 203	System Balances and Design in CAEE	3.0
CAEE 212	Geologic Principles for Infrastructure & Environmental Engineering	4.0
CHE 201	Process Material Balances	3.0
CHEM 230	Quantitative Analysis	4.0
CHEM 231 [WI]	Quantitative Analysis Laboratory	2.0
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
CIVE 320	Introduction to Fluid Flow	3.0
CIVE 330	Hydraulics	4.0
CIVE 430	Hydrology	3.0
CIVE 431	Hydrology-Ground Water	3.0
ENVE 300	Introduction to Environmental Engineering	3.0
ENVE 302	Environmental Transport and Kinetics	3.0
ENVE 410	Solid and Hazardous Waste	3.0
ENVE 421	Water and Waste Treatment II	3.0

ENVE 422	Water and Waste Treatment Design	3.0
ENVE 435	Groundwater Remediation	3.0
ENVE 460 or ENVE 465	Fundamentals of Air Pollution Control Indoor Air Quality	3.0
ENVE 485	Professional Environmental Engineering Practice	1.0
ENVE 486	Environmental Engineering Processes Laboratory I	2.0
ENVE 487	Environmental Engineering Processes Laboratory II	2.0
ENVE 491 [WI]	Senior Project Design I	3.0
ENVE 492 [WI]	Senior Design Project II	3.0
ENVE 493 [WI]	Senior Design Project III	3.0
ENVS 401	Chemistry of the Environment	3.0
ENVS 230 or BIO 221	General Ecology Microbiology	3.0
Technical Electives		12.0
Total Credits		193.5

* General Education Requirements (p. 229).

Sample Plan of Study

5 YR UG Co-op Concentration

Term		Credits
Term 1		
CHEM 101	General Chemistry I	3.5
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
	Term Credits	16.5
Term 2		
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
	Term Credits	19.5
Term 3		
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
	Term Credits	17.5
Term 4		
CAEE 202	Introduction to Civil, Architectural & Environmental Engineering	3.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
	Term Credits	17.0
Term 5		
CAEE 203	System Balances and Design in CAEE	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0

ENVS 230 or BIO 221	General Ecology Microbiology	3.0
	Term Credits	15.0
Term 6		
CHE 201	Process Material Balances	3.0
CHEM 230	Quantitative Analysis	4.0
CHEM 231 [WI]	Quantitative Analysis Laboratory	2.0
CIVE 320	Introduction to Fluid Flow	3.0
ENGR 361	Statistical Analysis of Engineering Systems	3.0
ENVE 300	Introduction to Environmental Engineering	3.0
	Term Credits	18.0
Term 7		
CAEE 212	Geologic Principles for Infrastructure & Environmental Engineering	4.0
CIVE 330	Hydraulics	4.0
ENVE 302	Environmental Transport and Kinetics	3.0
PHIL 315	Engineering Ethics	3.0
General Education elective*		3.0
	Term Credits	17.0
Term 8		
CHEM 241	Organic Chemistry I	4.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
CIVE 430	Hydrology	3.0
ENVS 401	Chemistry of the Environment	3.0
General Education elective*		3.0
	Term Credits	16.0
Term 9		
CHEM 242	Organic Chemistry II	4.0
Technical elective		3.0
Free elective		3.0
General Education elective*		3.0
	Term Credits	13.0
Term 10		
ENVE 485	Professional Environmental Engineering Practice	1.0
ENVE 491 [WI]	Senior Project Design I	3.0
ENVE 465 or 460	Indoor Air Quality Fundamentals of Air Pollution Control	3.0
Technical elective		3.0
Technical Elective		3.0
	Term Credits	13.0
Term 11		
CIVE 431	Hydrology-Ground Water	3.0
ENVE 410	Solid and Hazardous Waste	3.0
ENVE 421	Water and Waste Treatment II	3.0
ENVE 486	Environmental Engineering Processes Laboratory I	2.0
ENVE 492 [WI]	Senior Design Project II	3.0
Technical elective		3.0
	Term Credits	17.0
Term 12		
ENVE 422	Water and Waste Treatment Design	3.0
ENVE 435	Groundwater Remediation	3.0
ENVE 487	Environmental Engineering Processes Laboratory II	2.0
ENVE 493 [WI]	Senior Design Project III	3.0
General Education elective*		3.0
	Term Credits	14.0
Total Credit:		193.5

* See degree requirements (p. 272).

Co-op/Career Opportunities

Environmental Engineers pursue careers with many different industries, such as chemical, pharmaceutical and manufacturing, in groundwater

and hazardous waste remediation, in water or wastewater treatment, in air pollution abatement and control, and in mining. Some also join environmental consulting firms which serve several engineering areas. In addition, some students go to graduate school. The breadth of an environmental engineering education prepares the student to follow many career paths.

Co-op Experiences

Past co-op employers of Environmental Engineering majors have included:

- Exelon, Philadelphia, PA
- U.S. Environmental Protection Agency, Philadelphia, PA
- Philadelphia Water Department, Philadelphia, PA
- Sun Co., Philadelphia, PA
- Aqua America, Bryn Mawr, PA
- Fairmount Park Commission, Philadelphia, PA
- Weston Solutions, West Chester, PA
- CDM Consultants, Philadelphia PA and other offices

Dual/Accelerated Degree

The Accelerated Program of the College of Engineering provides opportunities for highly talented and strongly motivated students to progress toward their educational goals essentially at their own pace. Through advanced placement, credit by examination, flexibility of scheduling, and independent study, the program makes it possible to complete the undergraduate curriculum and initiate graduate study in less than the five years required by the standard curriculum.

Bachelor's/Master's Dual Degree Program

Drexel offers a combined BS/MS degree program for our top engineering students who want to obtain both degrees in the same time period as most students obtain a Bachelors degree.

For more information on this program visit the Department's BS/MS Dual Degree Program (<http://www.drexel.edu/cae/academics/bs-environmental-engineering/Accelerated%20and%20Dual%20Degree%20Programs%20CAEE>) page.

Minor in Environmental Engineering

The Environmental Engineering minor focuses on pollution control and is primarily designed to broaden the professional capabilities of engineering students. For example, chemical and mechanical engineers working in process and manufacturing plants will be provided with a better understanding of the natural context of their facilities, better equipped to perform fate and risk analyses, and better able to apply the appropriate technology to control air and water discharges.

While this minor is designed to provide technical knowledge and skills to other engineers, with the appropriate prerequisites students from disciplines other than engineering can also complete this minor.

The minor consists of five required core courses and nine additional credits taken from a list of options.

Prerequisites

The common engineering core curriculum prerequisites are required of all students in the College of Engineering. Students from other colleges

will need the appropriate background in physics, mathematics and thermodynamics.

Required Courses

CAEE 203	System Balances and Design in CAEE	3.0
CIVE 330	Hydraulics	4.0
ENVE 300	Introduction to Environmental Engineering	3.0
ENVE 302	Environmental Transport and Kinetics	3.0
ENVS 401	Chemistry of the Environment	3.0
Select three of the following:		8.0
CIVE 430	Hydrology	
ENVE 410	Solid and Hazardous Waste	
ENVE 460	Fundamentals of Air Pollution Control	
ENVE 486	Environmental Engineering Processes Laboratory I	
ENVE 487	Environmental Engineering Processes Laboratory II	
Total Credits		24.0

Facilities

The Department is well equipped with state-of-the-art facilities:

- The department computer labs are in operation: a computer-assisted design (CAD) and computerized instructional lab; and a graduate-level lab (advanced undergraduates can become involved in graduate-level work)
- External labs are used for surveying, building diagnostics, and surface and ground-water measurements
- Molecular microbiology laboratory to conduct PCR and qPCR analyses, as well as classical measurements
- Analytical equipment for chemical contaminants
- Instrumentation for characterization of indoor and outdoor atmospheric aerosols

Civil, Architectural and Environmental Engineering Faculty

Abieyuwa Aghayere, PhD (*University of Alberta*). Professor. Structural design - concrete, steel and wood; structural failure analysis; retrofitting of existing structures; new structural systems and materials; engineering education.

A. Emin Aktan, PhD (*University of Illinois at Urbana-Champaign*) *John Roebling Professor of Infrastructure Studies*. Professor. Structural engineering; health monitoring of large infrastructure systems; infrastructure evaluation; intelligent systems.

Ivan Bartoli, PhD (*University of California, San Diego*). Associate Professor. Non-destructive evaluation and structural health monitoring; dynamic identification, stress wave propagation modeling.

Robert Brehm, PhD (*Drexel University*). Associate Teaching Professor. International infrastructure delivery; response to natural catastrophes; risk assessment and mitigation strategies; project management techniques.

S.C. Jonathan Cheng, PhD (*West Virginia University*). Associate Professor. Soil mechanics; geosynthetics; probabilistic design; landfill containments; engineering education.

Peter DeCarlo, PhD (*University of Colorado*). Assistant Professor. Outdoor air quality, particulate matter size and composition instrumentation and measurements, source apportionment of ambient particulate matter, climate impacts of particulate matter.

Eugenia Ellis, RA, PhD (*Virginia Polytechnic State University*). Associate Professor. Extended-care facilities design, research on spatial visualization, perception and imagination.

Patricia Gallagher, PhD (*Virginia Polytechnic Institute*). Associate Professor. Soil mechanics; geoenvironmental; ground improvement; sustainability.

Patrick Gurian, PhD (*Carnegie-Mellon University*). Associate Professor. Risk analysis of environmental and infrastructure systems; novel adsorbent materials; environmental standard setting; Bayesian statistical modeling; community outreach and environmental health.

Charles N. Haas, PhD (*University of Illinois-Urbana*) L. D. Betz Professor and Department Head, Civil, Architectural and Environmental Engineering. Professor. Control of human exposures to and risk assessment of pathogenic organisms; water and waste treatment; homeland security.

Ahmad Hamid, PhD (*McMaster University*). Professor. Engineered masonry; seismic behavior, design and retrofit of masonry structures; development of new materials and building systems.

Y. Grace Hsuan, PhD (*Imperial College*). Professor. Durability of polymeric construction materials; advanced construction materials; and performance of geosynthetics.

Joseph B. Hughes, PhD (*University of Iowa*) Dean of the College of Engineering and Distinguished Professor. Biological processes and applications of nanotechnology in environmental systems.

L. James Lo, PhD (*University of Texas at Austin*). Assistant Professor. Computational Fluid Dynamics (CFD) and airflow simulation; Indoor Environmental Quality; Building control integration with building information management systems.

Roger Marino, PhD (*Drexel University*). Associate Teaching Professor. Fluid mechanics; water resources; engineering education; land development.

Joseph P. Martin, PhD (*Colorado State University*). Professor. Geotechnical and geoenvironmental engineering; hydrology; transportation; waste management.

James E. Mitchell, MArch (*University of Pennsylvania*) Associate Dean for Undergraduate Affairs. Professor. Architectural engineering design; building systems; engineering education.

Franco Montalto, PhD (*Cornell University*). Associate Professor. Effects of built infrastructure on societal water needs, ecohydrologic patterns and processes, ecological restoration, green design, water interventions.

Joseph V. Mullin, PhD (*Pennsylvania State University*) Associate Department Head. Teaching Professor. Structural engineering; failure analysis; experimental stress analysis; construction materials; marine structures.

Mira S. Olson, PhD (*University of Virginia*) Graduate Studies Advisor. Associate Professor. Environmental remediation; contaminant and bacterial transport in porous media and bacterial response to dynamic environments.

Michael Ryan, PhD (*Drexel University*). Assistant Teaching Professor. Microbial Source Tracking (MST); Quantitative Microbial Risk Assessment

(QMRA); Dynamic Engineering Systems Modeling; Molecular Microbial Biology; Environmental Statistics; Engineering Economics; Microbiology

Christopher Sales, PhD (*University of California, Berkeley*). Assistant Professor. Environmental microbiology and biotechnology; biodegradation of environmental contaminants; microbial processes for energy and resource recovery from waste.

Yared Shifferaw, PhD (*Johns Hopkins University*). Assistant Professor. Computational and experimental mechanics; structural stability; optimization; health monitoring and hazard mitigation; sustainable structures; emerging materials; thin-walled structures and metallic structures.

Kurt Sjoblom, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Laboratory testing of geomaterials, geotechnical engineering, foundation engineering.

Sabrina Spatari, PhD (*University of Toronto*). Associate Professor. Research in industrial ecology; development and application of life cycle assessment (LCA) and material flow analysis (MFA) methods for guiding engineering and policy decisions; specific interest in biomass and bioenergy, biofuels, and urban infrastructure.

Robert Swan Associate Teaching Professor. Geotechnical and Geosynthetic Engineering; soil/geosynthetic interaction and performance; laboratory and field geotechnical/geosynthetic testing.

Michael Waring, PhD (*University of Texas-Austin*) Associate Department Head for Undergraduate Programs; Director of Architectural Engineering Program. Associate Professor. Indoor air quality and building sustainability; indoor particulate matter fate and transport; indoor chemistry and particle formation; secondary impacts of control technologies and strategies.

Jin Wen, PhD (*University of Iowa*). Associate Professor. Architectural engineering; Building Energy Efficiency; Intelligent Building; Net-zero Building; and Indoor Air Quality.

Aspasia Zerva, PhD (*University of Illinois*). Professor. Earthquake engineering; mechanics; seismology; structural reliability; system identification; advanced computational computational methods in structural analysis.

Emeritus Faculty

Harry G. Harris, PhD (*Cornell University*). Professor Emeritus. Structural models; dynamics of structures, plates and shells; industrialized building construction.

Richard Weggel, PhD (*University of Illinois*) Samuel S. Baxter Professor Emeritus; Civil and Environmental Engineering. Professor Emeritus. Coastal engineering; hydraulics engineering; hydrology.

Richard Woodring, PhD (*University of Illinois*) Dean of Engineering Emeritus. Professor Emeritus. Structural engineering, reinforced concrete.

Materials Science and Engineering

Major: Materials Science and Engineering
Degree Awarded: Bachelor of Science (BS)
Calendar Type: Quarter
Total Credit Hours: 192.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)
Classification of Instructional Programs (CIP) code: 14.1801
Standard Occupational Classification (SOC) code: 17-2131

About the Program

Materials science and engineering (MSE) is concerned with the production, structure, characterization, properties and utilization of metals, ceramics, polymers, composites, electronic, optical, nano- and bio-compatible materials. Materials scientists and engineers play a key role in our increasingly complex technological society by extending the limited supply of materials, improving existing materials, and developing and designing new and superior materials and processes with an awareness of their cost, reliability, safety, and societal/environmental implications.

Students majoring in materials science and engineering (MSE) receive a thorough grounding in the basic sciences and engineering of all materials. All students are required to take course sequences that include materials processing, thermodynamics and kinetics of materials, and their physical and mechanical behavior, plus laboratories designed to familiarize them with the instruments and advanced techniques used to characterize materials and evaluate their structure, properties and performance. A number of custom tracks allow upper level students to focus their technical electives in areas of specialization, including nanoscale materials and nanotechnology, biomaterials, electronic and photonic materials, soft materials and polymers, advanced materials design and processing, or in a custom track. In addition, several required senior level courses emphasize the role of materials selection and specification in design.

Throughout the senior year, students majoring in materials science and engineering work on a capstone senior design project over the course of three terms, with guidance from a faculty advisor and graduate student mentor. Students, working individually or in small groups, synthesize information from their courses to arrive at solutions to real-world engineering problems.

Some recent senior design projects include:

- Analyzing Nonskid Material for Naval Applications
- Core-Cladding Electrospun Nanofibers for Controlled Release Applications
- Adsorption of Antibiotics onto Nanodiamond Platforms
- Effect of Nickel Distribution on Hardenability
- Synthesis and Characterization of Mo_2GaC , Mo_2GaN and Mo_2AlC MAX Phases
- Design and Synthesis of ITO-Free Flexible Organic Solar Cells.

Mission Statement

The Department of Materials Science and Engineering (<http://www.drexel.edu/materials>) will provide our BS, MS and PhD graduates with the technical and theoretical knowledge, design capabilities, professionalism, and communications skills necessary for them to excel in leadership positions in academia, industry, and government at the national and international levels.

Vision

Materials science and engineering is a multi-disciplinary field that is at the forefront of all emerging technologies. Advances in the understanding of the process-structure-property-performance relationships of materials will be critical for future developments in energy storage and power generation, biomaterials and nanomaterials. The Department of Materials

Science and Engineering at Drexel University is recognized as a leader in these areas through its teaching and scholarly research.

Program Educational Objectives

The educational objectives of the Materials Science and Engineering BS degree program are:

- Materials Science and Engineering program graduates possess the core technical competencies in their field necessary to successfully interface with other engineering disciplines in the workplace.
- At least 30% of Materials Science and Engineering program graduates have progressed towards graduate education.
- Materials Science and Engineering program graduates are leaders in their chosen fields.
- Materials Science and Engineering program graduates are engaged in lifelong learning.
- Materials Science and Engineering program graduates possess written and verbal communication skills appropriate for professional materials engineers and/or scientists.

Student Outcomes

The department's student outcomes reflect the skills and abilities that the curriculum is designed to provide to students by the time they graduate. These are:

- a. an ability to apply knowledge of mathematics, science and engineering.
- b. an ability to design and conduct experiments, as well as to analyze and interpret data.
- c. an ability to design a material, system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
- d. an ability to function on multidisciplinary teams.
- e. an ability to identify, formulate and solve *materials* engineering problems.
- f. an understanding of professional and ethical responsibility.
- g. an ability to communicate effectively.
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
- i. a recognition of the need for, and an ability to engage in, life-long learning.
- j. a knowledge of contemporary issues.
- k. an ability to use the techniques, skills and modern engineering tools necessary for materials science and engineering practice.

Additional Information

The Materials Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (<http://www.abet.org>).

For additional information about this major, contact:

Sarit Kunz
Academic Program Coordinator
215.895.2328
skunz@coe.drexel.edu

Degree Requirements

General Education/Liberal Studies Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 315	Engineering Ethics	3.0
UNIV E101	The Drexel Experience	1.0
Technical Electives/Track Courses *		12.0
Non-designated General Education Requirements **		12.0
Free Electives		6.0

Foundation Requirements

CHE 335	Statistics and Design of Experiments	3.0
CHEC 353	Physical Chemistry and Applications III	4.0
CHEM 241	Organic Chemistry I	4.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
BIO 141	Essential Biology	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0

Professional Requirements

MATE 214	Introduction to Polymers	4.0
MATE 221	Introduction to Mechanical Behavior of Materials	3.0
MATE 240	Thermodynamics of Materials	4.0
MATE 245	Kinetics of Materials	4.0
MATE 280	Advanced Materials Laboratory	4.0
MATE 315	Processing Polymers	4.5
MATE 341	Defects in Solids	3.0
MATE 345	Processing of Ceramics	4.5
MATE 351	Electronic and Photonic Properties of Materials	4.0
MATE 355	Structure and Characterization of Crystalline Materials	3.0
MATE 366 [WI]	Processing of Metallic Materials	4.5
MATE 370	Mechanical Behavior of Solids	3.0
MATE 410	Case Studies in Materials	3.0
MATE 455	Biomedical Materials	3.0
MATE 460	Engineering Computational Laboratory	4.0

MATE 491 [WI]	Senior Project Design I	2.0
MATE 492	Senior Project Design II	3.0
MATE 493 [WI]	Senior Project Design III	3.0
Total Credits		192.0

* A "Track" is a sequence of 4-5 technical electives (12.0-18.0 credits) with an underlying connection to a specific area of materials science and engineering. With the rapid expansion of the technical and scientific knowledge in the field of materials science and engineering, organizing technical electives into thematic tracks benefits students. Combined with relevant co-op experiences and senior design, the tracks can provide strong evidence of specialization, which will benefit students in future job searches.

Technical electives can be taken during the junior and (mostly during) the senior year. For planning reasons, better coordination with senior design, and to accommodate students with an out-of-cycle schedule (e.g., transfer students), tracks need to be declared by the beginning of the pre-junior year. Students may change their track selection after consulting with their MSE department advisor.

** Non-designated General Education Requirements (p. 229).

Sample Plan of Study

5 YR UG Co-op Concentration

Term 1		Credits
CHEM 101	General Chemistry I	3.5
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
Term Credits		16.5
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
ENGR 102	Engineering Design Laboratory II	2.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		19.5
Term 3		
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		17.5
Term 4		
CHEM 241	Organic Chemistry I	4.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		18.0
Term 5		
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0

ENGR 232	Dynamic Engineering Systems	3.0
MATE 221	Introduction to Mechanical Behavior of Materials	3.0
Free elective		3.0
Term Credits		15.0
Term 6		
ECON 201	Principles of Microeconomics	4.0
MATE 214	Introduction to Polymers	4.0
MATE 240	Thermodynamics of Materials	4.0
MATE 355	Structure and Characterization of Crystalline Materials	3.0
Term Credits		15.0
Term 7		
ECON 202	Principles of Macroeconomics	4.0
MATE 245	Kinetics of Materials	4.0
MATE 315	Processing Polymers	4.5
MATE 341	Defects in Solids	3.0
Term Credits		15.5
Term 8		
MATE 280	Advanced Materials Laboratory	4.0
MATE 366 [WI]	Processing of Metallic Materials	4.5
MATE 370	Mechanical Behavior of Solids	3.0
Technical elective/Track course		3.0
General education elective *		3.0
Term Credits		17.5
Term 9		
CHEC 353	Physical Chemistry and Applications III	4.0
MATE 345	Processing of Ceramics	4.5
MATE 351	Electronic and Photonic Properties of Materials	4.0
PHIL 315	Engineering Ethics	3.0
Term Credits		15.5
Term 10		
MATE 455	Biomedical Materials	3.0
MATE 460	Engineering Computational Laboratory	4.0
MATE 491 [WI]	Senior Project Design I	2.0
General education elective *		3.0
Technical elective/Track course		3.0
Term Credits		15.0
Term 11		
CHE 335	Statistics and Design of Experiments	3.0
MATE 492	Senior Project Design II	3.0
Free elective		3.0
Technical elective/Track course		3.0
General education elective *		3.0
Term Credits		15.0
Term 12		
MATE 410	Case Studies in Materials	3.0
MATE 493 [WI]	Senior Project Design III	3.0
Technical elective/Track course		3.0
General education elective *		3.0
Term Credits		12.0

Total Credit: 192.0

* See degree requirements (p. 277).

4 YR UG Co-op Concentration

Term 1		Credits
MATH 121	Calculus I	4.0
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 121	Computation Lab I	2.0

UNIV 101	The Drexel Experience	1.0
Term Credits		16.5
Term 2		
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
CIVC 101	Introduction to Civic Engagement	1.0
Term Credits		19.5
Term 3		
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
BIO 141	Essential Biology	4.5
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
Term Credits		17.5
Term 4		
PHYS 201	Fundamentals of Physics III	4.0
CHEM 241	Organic Chemistry I	4.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
Term Credits		18.0
Term 5		
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MATE 221	Introduction to Mechanical Behavior of Materials	3.0
Free Elective		3.0
Term Credits		15.0
Term 6		
ECON 201	Principles of Microeconomics	4.0
Technical Elective/Track Course		3.0
Technical Elective/Track Course		3.0
General Education Elective		6.0
Term Credits		16.0
Term 7		
ECON 202	Principles of Macroeconomics	4.0
PHIL 315	Engineering Ethics	3.0
Free Elective		3.0
General Education Elective		3.0
Technical Elective/Track Course		3.0
Term Credits		16.0
Term 8		
MATE 214	Introduction to Polymers	4.0
MATE 240	Thermodynamics of Materials	4.0
MATE 355	Structure and Characterization of Crystalline Materials	3.0
MATE 280	Advanced Materials Laboratory	4.0
MATE 370	Mechanical Behavior of Solids	3.0
Term Credits		18.0
Term 9		
MATE 245	Kinetics of Materials	4.0
MATE 341	Defects in Solids	3.0
MATE 315	Processing Polymers	4.5
MATE 351	Electronic and Photonic Properties of Materials	4.0
Term Credits		15.5
Term 10		
MATE 366 [WI]	Processing of Metallic Materials	4.5

MATE 455	Biomedical Materials	3.0
MATE 460	Engineering Computational Laboratory	4.0
MATE 491 [WI]	Senior Project Design I	2.0
Term Credits		13.5
Term 11		
MATE 345	Processing of Ceramics	4.5
MATE 492	Senior Project Design II	3.0
CHE 335	Statistics and Design of Experiments	3.0
CHEC 353	Physical Chemistry and Applications III	4.0
Term Credits		14.5
Term 12		
MATE 410	Case Studies in Materials	3.0
MATE 493 [WI]	Senior Project Design III	3.0
Technical Elective/Track Course		3.0
General Education Elective		3.0
Term Credits		12.0
Total Credit: 192.0		

Co-op/Career Opportunities

Examples of industries in which materials science and engineering graduates play major roles include: base metals industries; specialist alloys; advanced ceramics; petrochemical; biomaterials and implants; pharmaceuticals; consumer products; electronics and photonics; nanotechnology; power generation; energy conversion, storage and conservation (fuel cells, advanced batteries, supercapacitors and solar cells); environmental protection and remediation; information and telecommunications; and transportation (aerospace, automotive, bicycles, railways).

Typical job functions include design and development of new materials, materials selection for specific applications, manufacturing, performance and failure analysis, quality control and testing, research and development, technical management, sales and marketing, teaching, technical services, and technical writing.

Please visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) for more detailed information on co-op and post-graduate opportunities.

Dual/Accelerated Degree Accelerated Program

The Accelerated Program of the College of Engineering provides opportunities for highly talented and motivated students to progress toward their educational goals essentially at their own pace. These options include opportunities for accelerated studies, dual degrees, as well as a combined bachelor's/master's (BS/MS) program. Primarily through advanced placement, credit by examination, flexibility of scheduling, and independent study, this "fast-track" makes it possible to complete the undergraduate curriculum and initiate graduate studies in less than the five years required by the standard curriculum.

Dual Degree Bachelor's Programs

With careful planning, students can complete two full degrees in the time usually required to complete one. For detailed information, students should contact their advisors.

Bachelor's/Master's Dual Degree Program

Exceptional students can also pursue a master of science (MS) degree in the same period as the bachelor of science (BS). The combined BS/MS

degree in Materials Science and Engineering differs from the standard BS degree in that there are two Co-op periods instead of three and in the last two years, specific graduate courses are taken.

For more information about this program, please visit the Department's BS/MS Dual Degree Program (<http://www.drexel.edu/materials/academics/undergrad/bs-ms>) page.

Minor in Materials Science and Engineering

In addition to the core engineering curriculum and the courses required for majors in chemical, civil, electrical, or mechanical engineering, engineering students from other majors can obtain a minor in materials engineering by taking 24.0 credits from the courses listed below.

Required Courses

MATE 221	Introduction to Mechanical Behavior of Materials	3.0
Select six (at least 21.0 credits) of the following:		21.0
MATE 214	Introduction to Polymers *	
MATE 240	Thermodynamics of Materials	
MATE 245	Kinetics of Materials	
MATE 280	Advanced Materials Laboratory	
MATE 341	Defects in Solids	
MATE 351	Electronic and Photonic Properties of Materials	
MATE 355	Structure and Characterization of Crystalline Materials	
MATE 370	Mechanical Behavior of Solids **	
MATE 455	Biomedical Materials	
Total Credits		24.0

* MATE 214 requires CHEM 241 as a pre-requisite. If MATE 214 is elected, the credits for CHEM 241 can count toward the 21 credits.

** MATE 370 requires MATH 201 as a pre-requisite. If MATE 370 is elected, the credits for MATH 201 can count toward the 21 credits.

Note: Only one of the prerequisites (either MATH 201 or CHEM 241) can count toward the required 24.0 credits. In other words, both MATE 214 and MATE 370 can be used to fulfill the requirements for the minor, but only the pre-requisite for one of those courses will be calculated into the 24.0 credits. Similarly, MATH 201 or CHEM 241 cannot be counted alone as fulfilling the requirements for this minor. The credits for MATH 201 or CHEM 241 will only count toward the minor when the course(s) is/are taken as a prerequisite for MATE 214 or MATE 370. Substitution for these courses of equivalent courses offered by other departments and/or institutions may be made with the approval of the Department of Materials Science and Engineering on a case-by-case basis.

At least two-thirds of the content of a substitute course must be the same as that of the course in the list above. It is imperative that students check each course carefully with respect to prerequisites since some may be included in the list above and some may be from other departments. Courses taken outside the department as prerequisites do not count towards the 24.0 credits required for the minor. They may, however, be used as technical or free electives in students' home department. Students pursuing the minor in Materials Science and Engineering are also encouraged to select a senior design topic that relates to the field of materials.

Facilities

Biomaterials and Biosurfaces Laboratory

This laboratory contains 10 kN biaxial and 5 kN uniaxial servo-hydraulic mechanical testing machines, a Fluorscan X-ray system, a microscopic

imaging system, a spectra fluorometer, a table autoclave, centrifuge, vacuum oven, CO₂ incubators, biological safety cabinet, thermostatic water baths, precision balance and ultrasonic sterilizer.

Nanobiomaterials and Cell Engineering Laboratory

This laboratory contains fume hood with vacuum/gas dual manifold, vacuum pump and rotary evaporator for general organic/polymer synthesis; gel electrophoresis and electroblotting for protein characterization; bath sonicator, glass homogenizer and mini-extruder for nanoparticle preparation; centrifuge; ultrapure water conditioning system; precision balance; pH meter and shaker.

Ceramics Processing Laboratory

This laboratory contains a photo-resist spinner, impedance analyzer, Zeta potential meter, spectrofluorometer, piezoelectric d33 meter, wire-bonder, and laser displacement meter.

Dynamic Characterization Laboratory

This laboratory contains metallographic sample preparation (sectioning, mounting and polishing) facilities; inverted metallograph; microhardness tester; automated electropolishing for bulk and TEM sample preparation; SEM tensile stage for EBSD; magneto-optical Kerr effect (MOKE) magnetometer.

MAX/MXene Ceramics Laboratory

This laboratory contains a vacuum hot-press; a hot isostatic press (HIP) for materials consolidation and synthesis; laser scattering particle size analyzer; creep testers, and assorted high temperature furnaces; metallographic preparation facilities; high temperature closed-loop servo-hydraulic testing machines.

Mechanical Testing Laboratory

This laboratory contains mechanical and closed-loop servo-hydraulic testing machines, hardness testers, impact testers, equipment for fatigue testing, metallographic preparation facilities and a rolling mill with twin 6" diameter rolls.

Mesoscale Materials Laboratory

This laboratory contains instrumentation for growth, characterization, device fabrication, and design and simulation of electronic, dielectric, ferroelectric and photonic materials. Resources include physical and chemical vapor deposition and thermal and plasma processing of thin films, including oxides and metals, and semiconductor nanowire growth.

Facilities include pulsed laser deposition, atomic layer deposition, chemical vapor deposition, sublimation growth, and resistive thermal evaporation. Variable-temperature high-vacuum probe station and optical cryostats including high magnetic field, fixed and tunable-wavelength laser sources, several monochromators for luminescence and Raman scattering spectroscopies, scanning electron microscopy with electron beam lithography, and a scanning probe microscope.

Nanomaterials Laboratory

This laboratory contains instrumentation for synthesizing, testing and manipulation of nanomaterials carbon and two dimensional carbides under microscope, high-temperature autoclaves, Sievert's apparatus; glove-boxes; high-temperature vacuum and other furnaces for the synthesis of nano-carbon coatings and nanotubes; tube furnaces for synthesis of carbides and nitrides; potentiostat/galvanostat for electrochemical tests; ultraviolet-visible spectrophotometry; zeta potential analyzer; attrition mill, bath and probe sonicators, centrifuges; electro-spinning system for producing nano-fibers.

Oxide Films and Interfaces Laboratory

This laboratory contains an oxide molecular beam epitaxy (MBE) thin film deposition system; physical properties measurement system for electronic transport and magnetometry measurements from 2 – 400K, up to 9 T fields; 2 tube furnaces.

Powder Processing Laboratory

This laboratory contains vee blenders, ball-mills, sieve shaker + sieves for powder classification, several furnaces (including one with controlled atmosphere capability); and a 60-ton Baldwin press for powder compaction.

Soft Matter Research and Polymer Processing Laboratories

These laboratories contain computerized thermal analysis facilities including differential scanning calorimeters (DSC), dynamic mechanical analyzer (DMA) and thermo-gravimetric analyzer (TGA); single-fiber tensile tester; strip biaxial tensile tester; vacuum evaporator; spincoater; centrifuge; optical microscope with hot stage; liquid crystal tester; microbalance; ultrasonic cleaner; laser holographic fabrication system; polymer injection molder and single screw extruder.

Natural Polymers and Photonics Laboratory

This laboratory contains a spectroscopic ellipsometer for film characterization; high purity liquid chromatography (HPLC) system; refractometer; electro-spinning system for producing nano-fibers.

X-ray Tomography Laboratory

This laboratory contains a high resolution X-ray tomography instrument and a cluster of computers for 3D microstructure reconstruction; mechanical stage, a positioning stage and a cryostage for in-situ testing. For more information on departmental facilities, please visit the Department's Facilities web page (<http://www.materials.drexel.edu/research/facilities>).

Centralized Research Facilities

The Department of Materials Science & Engineering relies on Core Facilities within the University for materials characterization and micro- and nano-fabrication. These facilities contain state-of-the-art materials characterization instruments, including environmental and variable pressure field-emission scanning electron microscopes with Energy Dispersive Spectroscopy (EDS) for elemental analysis, and Orientation Image Microscopy (OIM) for texture analysis; a Transmission Electron Microscope (TEM) with STEM capability and TEM sample preparation equipment; a dual beam focused ion beam (FIB) system for nano-characterization and nano fabrication; a femtosecond/ terahertz laser Raman spectrometer; visible and ultraviolet Raman micro spectrometers with a total of 7 excitation wavelengths for non-destructive chemical and structural analysis and Surface Enhanced Raman (SERS); a Fourier Transform Infrared (FTIR) spectrometer with a microscope and full array of accessories; a Nanoindenter; an X-ray Photoelectron Spectrometer (XPS)/Electron Spectroscopy for Chemical Analysis (ESCA) system; and X-Ray Diffractometers (XRD), including small angle/wide angle X-Ray scattering (SAX/WAX).

More details of these instruments, information how to access them and instrument usage rates can be found at Drexel University's Centralized Research Facilities (<http://crf.coe.drexel.edu>) web page.

Materials Science and Engineering Faculty

Michel Barsoum, PhD (*Massachusetts Institute of Technology*). Distinguished Professor. Processing and characterization of novel

ceramics and ternary compounds, especially the MAX and 2-D MXene phases.

Jason Baxter, PhD (*University of California, Santa Barbara*). Associate Professor. Solar cells, semiconductor nanomaterials, ultrafast spectroscopy.

Hao Cheng, PhD (*Northwestern University*). Assistant Professor. Drug delivery, molecular self-assembly, cell-nanomaterial interactions, regenerative medicine and cell membrane engineering.

Adam K. Fontecchio, PhD (*Brown University*) Vice Dean, Graduate College. Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Alexander Fridman, DSc, PhD (*Moscow Institute of Physics and Technology*) Mechanical Engineering and Mechanics, John A. Nyheim Endowed University Chair Professor, Director of the Drexel Plasma Institute. Professor. Plasma science and technology; pollutant mitigation; super-adiabatic combustion; nanotechnology and manufacturing.

Yury Gogotsi, PhD (*Kiev Polytechnic Institute*) Director, A. J. Drexel Nanotechnology Institute. Distinguished University & Trustee Chair Professor. Nanomaterials; carbon nanotubes; nanodiamond; graphene; MXene; materials for energy storage, supercapacitors, and batteries.

Haviva M. Goldman, PhD (*City University of New York*) Neurobiology and Anatomy. Associate Professor. Understanding how the size and shape of whole bones, as well as the distribution quantity and quality of the mineralized tissue that forms the bone, reflect both evolutionary constraints of skeletal growth and development, and responsiveness to mechanical loading during life.

Lin Han, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Nanoscale structure-property relationships of biological materials, genetic and molecular origins soft joint tissue diseases, biomaterials under extreme conditions, coupling between stimulus-responsiveness and geometry.

Maher Harb, PhD (*University of Toronto*). Assistant Professor. Solid state physics, ultrafast electron diffraction, time-resolved X-ray diffraction, ultrafast lasers, nanofabrication, nano/microfluidics, instrument development, vacuum technologies.

Haifeng Frank Ji, PhD (*Chinese Academy of Sciences*). Professor. Chemistry Micromechanical sensors for biological and environmental applications; Nanomechanical drug screening technology.

Vibha Kalra, PhD (*Cornell University*) Chemical and Biological Engineering. Assistant Professor. Electrodes for energy storage and conversion; supercapacitors; Li-S batteries; fuel cells; flow batteries; electrospinning for nanofibers; molecular dynamics simulations; Nanotechnology, polymer nanocomposites.

Richard Knight, PhD (*Loughborough University*) Associate Department Head and Undergraduate Advisor. Teaching Professor. Thermal plasma technology; thermal spray coatings and education; plasma chemistry and synthesis.

E. Caglan Kumbur, PhD (*Pennsylvania State University*). Associate Professor. Mechanical Engineering and Mechanics Next generation energy technologies; fuel cell design and development.

Harry G. Kwatny, PhD (*University of Pennsylvania*) S. Herbert Raynes Professor of Mechanical Engineering. Professor. Dynamic systems

analysis; stochastic optimal control; control of electric power plants and systems.

Leslie Lamberson, PhD (*California Institute of Technology*) P.C. Chou Assistant Professor of Mechanical Engineering. Assistant Professor. Dynamic behavior of materials, dynamic fracture, damage micromechanics, active materials.

Kenneth K.S. Lau, PhD (*Massachusetts Institute of Technology*) Chemical and Biological Engineering. Associate Professor. Surface science; nanotechnology; polymer thin films and coatings; chemical vapor deposition.

Christopher Y. Li, PhD (*University of Akron*). Professor. Soft and hybrid materials for optical, energy, and bio applications; polymeric materials, nanocomposites, structure and properties.

Andrew Magenau, PhD (*University of Southern Mississippi*). Assistant Professor. Structurally complex materials exhibiting unique physical properties designed and fabricated using an assortment of methodologies involving directed self-assembly, externally applied stimuli, structure-function correlation, and applied engineering principles suited for technologies in regenerative medicine, biological interfacing, catalytic, electronic, and optical applications

Michele Marcolongo, PhD, PE (*University of Pennsylvania*) Department Head. Professor. Orthopedic biomaterials; acellular regenerative medicine, biomimetic proteoglycans; hydrogels.

Steven May, PhD (*Northwestern University*). Associate Professor. Synthesis of complex oxide films, superlattices, and devices; materials for energy conversion and storage; magnetic and electronic materials; x-ray and neutron scattering.

Bahram Nabet, PhD (*University of Washington*) Associate Dean for Special Projects, College of Engineering; Electrical and Computer Engineering. Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Giuseppe R. Palmese, PhD (*University of Delaware*) Department Head, Chemical and Biological Engineering. Professor. Reacting polymer systems; nanostructured polymers; radiation processing of materials; composites and interfaces.

Ekaterina Pomerantseva, PhD (*Moscow State University, Russia*). Assistant Professor. Solid state chemistry; electrochemical characterization, lithium-ion batteries, energy generation and storage; development and characterization of novel nanostructured materials, systems and architectures for batteries, supercapacitors and fuel cells.

Caroline L. Schauer, PhD (*SUNY Stony Brook*) Graduate Advisor. Associate Professor. Polysaccharide thin films and nanofibers.

Wan Y. Shih, PhD (*Ohio State University*). Associate Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Wei-Heng Shih, PhD (*Ohio State University*). Professor. Colloidal ceramics and sol-gel processing; piezoelectric biosensors, optoelectronics, and energy harvesting devices; nanocrystalline quantum dots for bioimaging, lighting, and solar cells.

Karl Sohlberg, PhD (*University of Delaware*). Associate Professor. Chemistry Computational and theoretical materials-related

chemistry: (1) complex catalytic materials; (2) mechanical and electrical molecular devices.

Jonathan E. Spanier, PhD (*Columbia University*) Associate Dean, *Strategic Planning, College of Engineering*. Professor. Light-matter interactions in electronic materials, including ferroelectric semiconductors, complex oxide thin film science; laser spectroscopy, including Raman scattering.

Kara Spiller, PhD (*Drexel University*). Assistant Professor. Macrophage-biomaterial interactions, drug delivery systems, and chronic wound healing. Cell-biomaterial interactions, biomaterial design, and international engineering education.

Mitra Taheri, PhD (*Carnegie Mellon University*) *Hoeganaes Associate Professor of Metallurgy*. Associate Professor. Development of the ultrafast Dynamic Transmission Electron Microscope (DTEM) for the study of laser-induced microstructural evolution/phase transformations in nanostructured materials; use of various *in-situ* Transmission Electron Microscopy techniques.

Garritt Tucker, PhD (*Georgial Institute of Technology*). Assistant Professor. Computational materials science and engineering; microstructural evolution and material behavior in extreme environments; interfacial-driven processes for improving material functionality; multi-scale physics modeling.

Christopher Weinberger, PhD (*Stanford University*). Assistant Professor. *Mechanical Engineering and Mechanics* Multiscale materials modeling of mechanical properties including DFT, atomistics, mesoscale and microscale FEM modeling.

Christopher Weyant, PhD (*Northwestern University*). Associate Teaching Professor.

Margaret Wheatley, PhD (*University of Toronto*) *John M. Reid Professor*. Ultrasound contrast agent development (tumor targeting and triggered drug delivery), controlled release technology (bioactive compounds), microencapsulated allografts (*ex vivo* gene therapy) for spinal cord repair.

Antonios Zavaliangos, PhD (*Massachusetts Institute of Technology*) *A.W. Grosvenor Professor*. Professor. Constitutive modeling; powder compaction and sintering; pharmaceutical tableting, X-ray tomography.

Emeritus Faculty

Roger D. Corneliussen, PhD (*University of Chicago*). Professor Emeritus. Fracture, blends and alloys, as well as compounding.

Roger D. Doherty, PhD (*Oxford University*). Professor Emeritus. Metallurgical processing; thermo-mechanical treatment.

Ihab L. Kamel, PhD (*University of Maryland*). Professor Emeritus. Nanotechnology, polymers, composites, biomedical applications, and materials-induced changes through plasma and high energy radiation.

Jack Keverian, PhD (*Massachusetts Institute of Technology*). Professor Emeritus. Rapid parts manufacturing, computer integrated manufacturing systems, strip production systems, technical and/or economic modeling, melting and casting systems, recycling systems.

Alan Lawley, PhD (*University of Birmingham, England*). Professor Emeritus. Mechanical and physical metallurgy, powder metallurgy, materials engineering design, engineering education.

Mechanical Engineering

Major: Mechanical Engineering

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 192.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.1901

Standard Occupational Classification (SOC) code: 17-2141

About the Program

The role of the mechanical engineer in today's society is rapidly changing. Advances in manufacturing, transportation, infrastructure systems, materials, communications, and high-performance computing have introduced new demands, opportunities, and challenges for mechanical engineers. What was once an individual endeavor has now become a team activity. Today's industries require that mechanical engineers possess diverse interdisciplinary skills, a global viewpoint, entrepreneurial and managerial abilities, and an understanding of the forces governing the marketplace.

Traditionally, mechanical engineers have been associated with industries like automotive, transportation, and power generation, and with activities involving the design, analysis, and manufacturing of products useful to society. While today such activities are still dominated by mechanical engineers, the spectrum of opportunities for these professionals has expanded tremendously. For example, mechanical engineers are involved in the design and analysis of biomedical instrumentation, electronic components, smart structures, and advanced materials; they are involved in sophisticated studies of human motion, control of satellites, and the development of more efficient energy-transfer techniques.

Drexel's Department of Mechanical Engineering and Mechanics (http://www.drexel.edu/coe/departments/mech_eng) prides itself on providing its students with a comprehensive program of courses, laboratories, design projects, and co-op experiences. The MEM curriculum is designed to balance technical breadth (provided by a set of fundamental required core courses) with technical depth (provided by optional concentrations that emphasize particular fields within the profession). Thus, the MEM program not only prepares its graduates to become successful mechanical engineers needed in industry and government, but also provides an excellent springboard to pursue graduate studies in medical sciences, law, business, information technology, and any other disciplines where technological and analytical skills play an important role.

Mission Statement

The mission of the Department of Mechanical Engineering and Mechanics of Drexel University is to transfer and acquire knowledge through: (a) the education of engineers for leadership in industry, business, academia, and government; and (b) the establishment of internationally recognized research programs. This mission is accomplished by the delivery of an outstanding curriculum, by the participation of our students in one of the nation's most prestigious co-operative educational programs, and by the scholarly activities of the faculty.

Program Educational Objectives

- Graduates will be successful in careers that deal with the design, simulation and analysis of engineering systems, experimentation and testing, manufacturing, technical services, and research.

- Graduates will enter and complete academic and professional programs in engineering, business, management, law and medicine.
- Graduates will communicate effectively with peers and be successful working with and leading multi-disciplinary and multi-cultural teams.
- Graduates will recognize the global, legal, societal, and ethical contexts of their work.
- Graduates will advance in their careers; for example, assuming increasing levels of responsibility and acquiring professional licensure.

Student Outcomes

The department's student outcomes reflect the skills and abilities that the curriculum is designed to provide to students by the time they graduate.

These are:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- d) an ability to function on multidisciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional and ethical responsibility;
- g) an ability to communicate effectively;
- h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i) a recognition of the need for, and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for mechanical engineering and mechanics practice.

Additional Information

The Mechanical Engineering and Mechanics program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

For additional information about this major, contact:

Dane Zdunowski
dzdunowski@coe.drexel.edu
215.895.2336
Randell 115

Sheena Butler
sbutler@coe.drexel.edu
215.895.1474
Randell 115

Degree Requirements

The mechanical engineering and mechanics curriculum is designed to balance technical breadth (provided by a set of fundamental required core

courses) with technical depth (provided by optional concentrations that emphasize particular fields within the profession).

General Education/Liberal Studies Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 285	Technology in Historical Perspective	4.0
PHIL 315	Engineering Ethics	3.0
UNIV E101	The Drexel Experience	1.0
General Education Requirements *		12.0

Mathematics Requirements

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0

Physics Requirements

PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0

Chemistry/Biology Requirements

CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
BIO 141	Essential Biology	4.5

Design/Laboratory Requirements

ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0

Engineering Requirements

ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0

Engineering Economics Requirements

CIVE 240 [WI]	Engineering Economic Analysis	3.0
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Materials Requirements

ENGR 220	Fundamentals of Materials	4.0
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Mechanical Requirements

MEM 201	Foundations of Computer Aided Design	3.0
MEM 202	Statics	3.0
MEM 220	Basic Fluid Mechanics	4.0
MEM 230	Mechanics of Materials I	4.0
MEM 238	Dynamics	4.0
MEM 255	Introduction to Controls	4.0
MEM 310	Thermodynamic Analysis I	4.0
MEM 311	Thermal Fluid Science Laboratory	2.0
MEM 331	Experimental Mechanics I	2.0
MEM 351	Dynamic Systems Laboratory I	2.0
MEM 333	Mechanical Behavior of Materials	3.0
MEM 345	Heat Transfer	4.0
MEM 355	Performance Enhancement of Dynamic Systems	4.0
MEM 361	Engineering Reliability	3.0
MEM 391	Introduction to Engineering Design Methods	1.0
MEM 435	Introduction to Computer-Aided Design and Manufacturing	4.0
MEM 491 [WI]	Senior Design Project I	2.0
MEM 492 [WI]	Senior Design Project II	3.0
MEM 493 [WI]	Senior Design Project III	3.0

Elective Courses

MEM Fundamental Courses **	12.0
MEM Open Electives (Any two MEM courses 300 level or higher.)	6.0-8.0
COE Electives (Any 2 College of Engineering courses, including MEM courses, 300 level or higher.)	6.0-8.0
Math/Science Electives (300+ level MATH, PHYS, BIO, CHEM, CHEC, and ENVS.)	6.0-8.0
Free Electives	6.0-8.0
Total Credits	193.5-201.5

* General Education Requirements (p. 229).

** All MEM students must complete a minimum of four of the MEM Fundamentals courses. (See List Below)

MEM Fundamental Courses

Select four of the following:

MEM 320	Fluid Dynamics I
MEM 330	Mechanics of Materials II
MEM 410	Thermodynamic Analysis II
MEM 417	Introduction to Microfabrication
MEM 423	Mechanics of Vibration
MEM 431	Machine Design I
MEM 437	Manufacturing Process I
MEM 440	Thermal Systems Design
MEM 458	Micro-Based Control Systems I
MEM 459	Control Applications of DSP Microprocessors

Sample Plan of Study

5 YR UG Co-op Concentration

Term		Credits	
Term 1	CHEM 101	General Chemistry I	3.5
	ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
	ENGR 100	Beginning Computer Aided Drafting for Design	1.0
	ENGR 101	Engineering Design Laboratory I	2.0
	ENGR 121	Computation Lab I	2.0
	MATH 121	Calculus I	4.0
	UNIV E101	The Drexel Experience	1.0
		Term Credits	16.5
Term 2	CHEM 102	General Chemistry II	4.5
	CIVC 101	Introduction to Civic Engagement	1.0
	COOP 001	Co-op Essentials	0.0
	ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
	ENGR 102	Engineering Design Laboratory II	2.0
	ENGR 122	Computation Lab II	1.0
	MATH 122	Calculus II	4.0
	PHYS 101	Fundamentals of Physics I	4.0
	Term Credits	19.5	
Term 3	BIO 141	Essential Biology	4.5
	ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
	ENGR 103	Engineering Design Laboratory III	2.0
	MATH 200	Multivariate Calculus	4.0
	PHYS 102	Fundamentals of Physics II	4.0
		Term Credits	17.5
		Term 4	
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0	
ENGR 220	Fundamentals of Materials	4.0	
ENGR 231	Linear Engineering Systems	3.0	

MEM 202	Statics	3.0
PHYS 201	Fundamentals of Physics III	4.0
	Term Credits	17.0
Term 5		
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 201	Foundations of Computer Aided Design	3.0
MEM 238	Dynamics	4.0
	Term Credits	16.0
Term 6		
CIVE 240 [WI]	Engineering Economic Analysis	3.0
HIST 285	Technology in Historical Perspective	4.0
MEM 230	Mechanics of Materials I	4.0
MEM 310	Thermodynamic Analysis I	4.0
Free Elective		3.0
	Term Credits	18.0
Term 7		
MEM 220	Basic Fluid Mechanics	4.0
MEM 255	Introduction to Controls	4.0
MEM 331	Experimental Mechanics I	2.0
MEM 333	Mechanical Behavior of Materials	3.0
PHIL 315	Engineering Ethics	3.0
	Term Credits	16.0
Term 8		
MEM 311	Thermal Fluid Science Laboratory	2.0
MEM 355	Performance Enhancement of Dynamic Systems	4.0
MEM 435	Introduction to Computer-Aided Design and Manufacturing	4.0
MEM 345	Heat Transfer	4.0
MEM Fundamentals Course *		3.0
	Term Credits	17.0
Term 9		
MEM 351	Dynamic Systems Laboratory I	2.0
MEM 361	Engineering Reliability	3.0
MEM 391	Introduction to Engineering Design Methods	1.0
Two MEM Fundamentals Courses *		6.0
General Education Elective *		3.0
	Term Credits	15.0
Term 10		
MEM 491 [WI]	Senior Design Project I	2.0
General Education Elective *		3.0
A MEM or College of Engineering Elective (300+)		3.0
MEM Fundamentals Course *		3.0
Math/Science Course *		3.0
	Term Credits	14.0
Term 11		
MEM 492 [WI]	Senior Design Project II	3.0
General Education Elective *		3.0
Any 300-level or Higher MEM Elective		3.0
A MEM or College of Engineering Elective (300+)		3.0
Math/Science Course *		3.0
	Term Credits	15.0
Term 12		
MEM 493 [WI]	Senior Design Project III	3.0
Free Electives		3.0
Any 300-level or Higher MEM Elective		3.0
General Education Elective *		3.0
	Term Credits	12.0
Total Credit: 193.5		

* See degree requirements (p. 283).

Co-op/Career Opportunities

Mechanical engineers are employed in a growing number of areas, including aerospace, automotive, biomechanics, computer systems, electronic entertainment, energy, environmental, health care, manufacturing, nuclear technology, and utilities.

Most mechanical engineering graduates begin full-time employment immediately upon graduation. However, there are a number of graduates who go on to pursue master's and/or doctoral degrees in mechanical engineering. The graduate schools that Drexel's mechanical engineers have attended include Harvard, UC Berkeley, and the University of Pennsylvania.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) for more detailed information on co-op and post-graduate opportunities.

Dual/Accelerated Degree

Accelerated Program

The Accelerated Program of the College of Engineering provides opportunities for highly talented and strongly motivated students to progress toward their educational goals essentially at their own pace. These options include opportunities for accelerated studies, dual degrees, a combined bachelor's/master's program as well as participation in the University Honors Program (<http://www.drexel.edu/honors>).

Primarily through advanced placement, credit by examination, flexibility of scheduling, and independent study, the "fast track" makes it possible to complete the undergraduate curriculum and initiate graduate study in less than the five years required by the standard curriculum.

Dual Degree Bachelor's Programs

With careful planning, you can complete two full degrees in the time usually required to complete one. The double major option works best in closely related areas. For detailed information please contact your advisor.

Bachelor's/Master's (BS/MS) Dual Degree Program

Exceptional students can also pursue a master of science degree in the same period as the bachelor of science. For MEM undergraduate students, the following are the possible graduate programs for the Master's degree in the BS/MS dual degree program:

- Electrical Engineering
- Computer Engineering
- Material Science Engineering
- Mechanical Engineering and Mechanics
- Biomedical Engineering
- Chemical Engineering

BS/MS students must be in the 5-year co-op option, must have a 3.2 GPA to gain admission, and must maintain a 3.0 GPA while in the program. For more information about this program, visit the College of Engineering BS/MS Dual Degree Program page.

Minor in Mechanical Engineering and Mechanics

Any undergraduate student in good standing who has completed more than 30.0 credits at Drexel may apply for the minor in mechanical engineering.

The minor must contain a minimum of 24.0 MEM credits according to the following distribution: (a) 16.0 credits from any four of the 4-credit required course options; (b) at least eight credits from additional required courses or from the laboratory components and recommended electives.

Required Course Options

Select four of the following:	16.0
MEM 220	Basic Fluid Mechanics
MEM 230	Mechanics of Materials I
MEM 238	Dynamics
MEM 255	Introduction to Controls
MEM 310	Thermodynamic Analysis I
MEM 345	Heat Transfer
MEM 355	Performance Enhancement of Dynamic Systems
MEM 361	Engineering Reliability
MEM 435	Introduction to Computer-Aided Design and Manufacturing
Select three of the following:	8.0

Laboratories

MEM 311	Thermal Fluid Science Laboratory
MEM 331	Experimental Mechanics I
MEM 351	Dynamic Systems Laboratory I

Recommended Electives

MEM 320	Fluid Dynamics I
MEM 330	Mechanics of Materials II
MEM 361	Engineering Reliability
MEM 410	Thermodynamic Analysis II
MEM 420	Aerodynamics
MEM 423	Mechanics of Vibration
MEM 425	Aircraft Design & Performance
MEM 430	Advanced Stress Analysis
MEM 437	Manufacturing Process I
MEM 438	Manufacturing Process II
MEM 440	Thermal Systems Design
MEM 453	Aircraft Flight Dynamics & Control I
MEM 455	Introduction to Robotics
MEM 458	Micro-Based Control Systems I
MEM 459	Control Applications of DSP Microprocessors
MEM 462 [WI]	Introduction to Engineering Management

Total Credits	24.0
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Facilities

Advanced Design and Manufacturing Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=6) This laboratory provides research opportunities in design methodology, computer-aided design, analysis and manufacturing, and materials processing and manufacturing. Facilities include various computers and software, I-DEAS, Pro/E, ANSYS, MasterCAM, Mechanical DeskTop, SurfCAM, Euclid, Strim, ABQUS, and more. The machines include two Sanders Model Maker rapid prototyping machines, a BridgePort CNC Machining Center, a BOY 220 injection molding machine, an Electra high-temperature furnace for metal sintering, infiltration, and other heat treatment.

Biofluid Mechanics Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=5)

The biofluid mechanics laboratory conducts computational and experimental research on the dynamics of flow in the cardiovascular and respiratory system, and the effects of flow on biological processes, particularly hemostasis and thrombosis. Lab resources include high-performance engineering workstations, commercial computational fluid dynamics (CFD) software, and basic experimental facilities including Laser Doppler Velocimetry (LDV), pressure and flow transducers, pumps, and microscopes.

Biomechanics Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=2)

Emphasis in this laboratory is placed on understanding the mechanical properties of human joints, characterization of the mechanical properties of biological materials, studies of human movements, and design and development of artificial limbs. Facilities include a 3-D kinematic measuring system, Instron testing machine, and microcomputers for data acquisition and processing. Additional biomechanical laboratory facilities are available at Moss Rehab.

Combustion and Fuels Chemistry Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)

Emphasis in this laboratory is placed on developing an understanding of both the chemical and physical factors that control and, hence, can be used to tailor combustion processes for engineering applications. Facilities include continuous spectroscopic reaction monitoring systems, static reactors, combustion bombs, flat flame burner systems, flow reactors, and complete analytical and monitoring instrumentation.

Combustion and Thermal-Science Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=9)

Research is conducted in the areas of (1) low temperature hydrocarbon oxidation, (2) cool flames, (3) auto-ignition, (4) flame instabilities, (5) flame structure, (6) flame ignition, and (7) flame extinction (quenching). New ways to improve fuel efficiency in practical combustors and recover waste energy in the transportation sector are also being explored.

Combustion Emissions/Engine Laboratory

In this laboratory the effects of engine operating variables, fuel type, ambient conditions, and control devices on engine performance and emissions are studied. The laboratory contains both diesel and spark ignition engines, as well as extensive engine and emissions monitoring instrumentation, including dynamometers and continuous gaseous emission analyzers. The laboratory has a high-pressure flow reactor for detailed kinetic studies of hydrocarbon oxidation processes in engines.

Composite Mechanics Laboratory

Emphasis in this laboratory is placed on the characterization of performance of composite materials. Current interest includes damage mechanisms, failure processes, and time-dependent behavior in resin-, metal-, and ceramic-matrix composites. Major equipment includes servo-hydraulic and electromechanical Instron testing machines, strain/displacement monitoring systems, environmental chambers, microcomputers for data acquisition and processing, composites fabrication facility, interferometric displacement gauge, X-radiography, and acoustic emission systems.

Drexel Plasma Institute (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=11)

The Drexel Plasma Institute (DPI) was formed in 2002 to stimulate and coordinate research projects related to plasma and other modern high energy engineering techniques. Today the DPI is an active multidisciplinary organization involving 23 faculty members from 6 engineering departments working in close collaboration with School of

Biomedical Engineering, College of Arts and Sciences and College of Nursing and Health Professions.

Heat Transfer Laboratory

The heat transfer laboratory is outfitted with an array of instrumentation and equipment for conducting single- and multiphase heat transfer experiments in controlled environments. Facilities include computer-controlled data acquisition (LabVIEW and MacAdios) systems, a Newport holographic interferometric system with associated lasers and optics, image enlargers, power amplifiers, precision voltmeters, slip-ring assemblies, and an IBM RISC/6000 workstation for large-scale computing and simulation. A draft-free room is available with independent temperature control for carrying out natural convection experiments. An experimental test-rig is available for studying heat transfer from rotating surfaces. A bubble column has been recently built to study multiphase flow and heat transfer problems. Facilities are also available for measuring thermal conductivities of thin films using a thermal comparator.

Industrial Robot Performance Laboratory

Emphasis in this laboratory is placed on determining the relationship between robot design parameters and performance criteria.

Microcomputer Controls Laboratory

This laboratory provides an environment conducive to appreciating aspects of systems and control through hands-on experiments. They range from data acquisition and processing to modeling of dynamical systems and implementing a variety of controllers to control systems, such as DC motors and the inverted pendulum. Active research is being conducted on control reconfiguration in the event of actuator failures in aircrafts.

Non-Newtonian Fluid and Heat Transfer Laboratory

Emphasis in this laboratory is placed on the study of hydrodynamic and thermal performance of various non-Newtonian viscoelastic fluids in complex flow geometries. Facilities and equipment include a 20-foot-long recirculating flow loop with a 500-gallon reservoir tank and a thermal conductivity measurement cell. A complete data acquisition system provides fully automated experimental operation and data reduction. State-of-the-art finite element codes provide three-dimensional flow and heat transfer simulations of flows in complex geometrics, with a complete post-processing graphic capability backed by template.

Polymer Processing Laboratory

This laboratory is devoted to understanding the basic controlling parameters in polymer processing and the procedures for communicating between the automated processing machine and the rest of the manufacturing facilities, such as the material handling system and the intelligent monitoring system. Facilities include a BOY 55-ton injection molding machine with necessary equipment for processing fiber-reinforced polymers, an IBM microcomputer for data acquisition and control, a Macintosh II microcomputer with software for mold design and process simulation, a Brookfield digital viscometer, and a Tinius Olsen tensile strength tester for material property evaluation.

Precision Instrumentation and Metrology Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=7)

This laboratory is focused on activities related to precision measurement, computer-aided inspection, and precision instrument design. Facilities include 3D Coordinate Measuring Machine (Brown & Sharpe) with Micro Measurement and Reverse engineering software, Surface Profilometer, and Laser Displacement Measuring System.

Program for Robotics, Intelligent Sensing, and Mechatronics (PRISM) Laboratory

The PRISM Laboratory is a state-of-the-art laboratory for pursuing research in the areas of medical robotics, haptic (sense of touch) and vision feedback through a user interface for augmenting a surgeon's capability in performing surgery, and visual servoing. The laboratory is equipped with a robotic arm, haptic interface devices, head-mounted display for immersion in the surgical environment, and dedicated hardware and software for the above research areas.

Rheology Laboratory

Emphasis in this laboratory is placed on developing tools for rheological property measurement of various non-Newtonian fluids, including friction-reducing viscoelastic fluids, molten polymers, coal-water slurries, ceramic slurries, and bonding cements for biomedical applications. A capillary tube viscometer, falling ball and needle viscometers, and Brookfield rotating viscometer are available. In particular, the capillary tube viscometer is designed to allow fully automated operation, thus avoiding time-consuming data collection procedures. A high-temperature and high-pressure capillary tube viscometer is under development, so that viscosities of advanced polymer materials can be measured at relatively high temperatures and shear rates.

Stress Wave and Ballistics Laboratory

Emphasis in this laboratory is placed on studying the effects of stress waves in structures. Equipment and facilities include a pendulum impact system, small air gun, high-air-pressure mass accelerator, drop impact system, exploding wire, explosion chamber, and instrumented Charpy impact system.

Rapid Product Development Center (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=4)

This center provides fundamental research, educational instruction, and engineering services in product design and manufacturing, solid freeform fabrication, and computer-aided tissue engineering. The center is equipped with state-of-the-art CAD/CAE/CAM, medical imaging processing, and 3D reconstruction software, and a rapid prototyping system.

Mechanical Engineering Faculty

Hisham Abdel-Aal, PhD (*University of North Carolina*). Associate Teaching Professor. Bio-tribology; biomimetics and bio-inspired design; high-speed machining; metrology of biological surfaces; mechano-biology thermodynamics

Jonathan Awerbuch, DSc (*Technion, Israel Institute of Technology*). Professor. Mechanics of composites; fracture and fatigue; impact and wave propagation; structural dynamics.

Nicholas P. Cernansky, PhD (*University of California-Berkeley*) *Hess Chair Professor of Combustion*. Professor. Combustion chemistry and kinetics; combustion generated pollution; utilization of alternative and synthetic fuels.

Bor-Chin Chang, PhD (*Rice University*). Professor. Computer-aided design of multivariable control systems; robust and optimal control systems.

Richard Chiou, PhD (*Georgia Institute of Technology*). Associate Professor. Green manufacturing, mechatronics, Internet-based robotics and automation, and remote sensors and monitoring.

Young I. Cho, PhD (*University of Illinois-Chicago*). Professor. Heat transfer; fluid mechanics; non-Newtonian flows; biofluid mechanics; rheology.

Alisa Clyne, PhD (*Harvard-Massachusetts Institute of Technology*). Associate Professor. Cardiovascular biomechanics.

Bakhtier Farouk, PhD (*University of Delaware*) *Billings Professor of Mechanical Engineering*. Professor. Heat transfer; combustion; numerical methods; turbulence modeling; materials processing.

Alexander Fridman, DSc, PhD (*Moscow Institute of Physics and Technology*) *Mechanical Engineering and Mechanics, John A. Nyheim Endowed University Chair Professor, Director of the Drexel Plasma Institute*. Professor. Plasma science and technology; pollutant mitigation; super-adiabatic combustion; nanotechnology and manufacturing.

Michael Glaser, MFA (*Ohio State University*) *Program Director for Product Design*. Associate Professor. Quantifying the designer's intuition; the interplay between digital and physical forms; human desire to shape our surroundings.

Li-Hsin Han, PhD (*University of Texas at Austin*). Assistant Professor. Polymeric, micro/nano-fabrication, biomaterial design, tissue engineering, rapid prototyping, free-form fabrication, polymer micro actuators, photonics

Ani Hsieh, PhD (*University of Pennsylvania*). Associate Professor. Multi-robot systems, decentralized and distributed control, bio-inspired control, swarm robotics.

Y. Grace Hsuan, PhD (*Imperial College*). Professor. Durability of polymeric construction materials; advanced construction materials; and performance of geosynthetics.

Andrei Jablolkow, PhD (*University of Wisconsin, Madison*) *Associate Department Head for Undergraduate Affairs, Mechanical Engineering and Mechanics*. Associate Teaching Professor. Kinematics; geometric modeling.

Antonios Kotsos, PhD (*Rice University*). Associate Professor. Applied mechanics; probabilistic engineering mechanics; modeling of smart multifunctional materials.

E. Caglan Kumbur, PhD (*Pennsylvania State University*). Associate Professor. Mechanical Engineering and Mechanics Next generation energy technologies; fuel cell design and development.

John Lacontora, PhD (*New Jersey Institute of Technology*). Associate Research Professor. Service engineering; industrial engineering.

Leslie Lamberson, PhD (*California Institute of Technology*) *P.C. Chou Assistant Professor of Mechanical Engineering*. Assistant Professor. Dynamic behavior of materials, dynamic fracture, damage micromechanics, active materials.

Alan Lau, PhD (*Massachusetts Institute of Technology*) *Associate Department Head for Graduate Affairs, Mechanical Engineering and Mechanics*. Professor. Deformation and fracture of nano-devices and macroscopic structures; damage-tolerant structures and microstructures.

Michele Marcolongo, PhD, PE (*University of Pennsylvania*) *Department Head*. Professor. Orthopedic biomaterials; acellular regenerative medicine, biomimetic proteoglycans; hydrogels.

Matthew McCarthy, PhD (*Columbia University*). Assistant Professor. Micro- and nanoscale thermofluidic systems, bio-inspired cooling, smart materials and structures for self-regulated two-phase cooling, novel architectures for integrated energy conversion and storage.

David L. Miller, PhD (*Louisiana State University*) *Department Head, Mechanical Engineering and Mechanics*. Professor. Gas-phase reaction kinetics; thermodynamics; biofuels.

Hongseok (Moses) Noh, PhD (*Georgia Institute of Technology*). Associate Professor. MEMS; BioMEMS; lab-on-a-chip; microfabrication; microfluidics.

Mira S. Olson, PhD (*University of Virginia*) *Graduate Studies Advisor*. Associate Professor. Environmental remediation; contaminant and bacterial transport in porous media and bacterial response to dynamic environments.

William C. Regli, PhD (*University of Maryland-College Park*). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Sorin Siegler, PhD (*Drexel University*). Professor. Orthopedic biomechanics; robotics; dynamics and control of human motion; applied mechanics.

Jonathan E. Spanier, PhD (*Columbia University*) *Associate Dean, Strategic Planning, College of Engineering*. Professor. Light-matter interactions in electronic materials, including ferroelectric semiconductors, complex oxide thin film science; laser spectroscopy, including Raman scattering.

Wei Sun, PhD (*Drexel University*) *Albert Soffa Chair Professor of Mechanical Engineering*. Professor. Computer-aided tissue engineering; solid freeform fabrication; CAD/CAM; design and modeling of nanodevices.

Ying Sun, PhD (*University of Iowa*). Associate Professor. Transport processes in multi-component systems with fluid flow; heat and mass transfer; phase change; pattern formation.

Tein-Min Tan, PhD (*Purdue University*). Associate Professor. Mechanics of composites; computational mechanics and finite-elements methods; structural dynamics.

James Tangorra, PhD (*Massachusetts Institute of Technology*). Associate Professor. Analysis of human and (other) animal physiological systems; head-neck dynamics and control; balance, vision, and the vestibular system; animal swimming and flight; robotics; system identification; bio-inspired design.

Christopher Weinberger, PhD (*Stanford University*). Assistant Professor. Mechanical Engineering and Mechanics Multiscale materials modeling of mechanical properties including DFT, atomistics, mesoscale and microscale FEM modeling.

Ajmal Yousuff, PhD (*Purdue University*). Associate Professor. Optimal control; flexible structures; model and control simplifications.

Jack G. Zhou, PhD (*New Jersey Institute of Technology*). Professor. CAD/CAM; computer integrated manufacturing systems; rapid prototyping; system dynamics and automatic control.

Emeritus Faculty

Leon Y. Bahar, PhD (*Lehigh University*). Professor Emeritus. Analytical methods in engineering, coupled thermoelasticity, interaction between analytical dynamics and control systems.

Gordon D. Moskowitz, PhD (*Princeton University*). Professor Emeritus. Biomechanics, dynamics, design, applied mathematics.

Donald H. Thomas, PhD (*Case Institute of Technology*). Professor Emeritus. Biocontrol theory, biomechanics, fluidics and fluid control, vehicle dynamics, engineering design.

Albert S. Wang, PhD (*University of Delaware*) *Albert and Harriet Soffa Professor*. Professor Emeritus. Treatment of damage evolution processes in multi-phased high-temperature materials, including ceramics and ceramic-matrix composites.

Property Management

Major: Property Management

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.1501

Standard Occupational Classification (SOC) code: 11-9141

About the Program

Drexel's Bachelor of Science in Property Management provides an interdisciplinary education necessary for success in the ever-expanding and complex field of real estate management. This full-time, face-to-face bachelor's degree program incorporates Philadelphia's amazing real estate market as its outdoor classroom. The curriculum consists of courses that will equip students with a foundation in real estate operations and management, along with specialized courses in asset management, sustainability, urban economics, business law, accounting, finance, and construction management. In addition, students complete courses that will lead to a minor in Business Administration. The curriculum also includes a six-month co-op experience that partners classroom knowledge with experiential learning to further develop the requisite skills students need to succeed as professionals.

For additional information, visit the Property Management site.

Degree Requirements

General Education Requirements

COM 230	Techniques of Speaking	3.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101 & MATH 102	Introduction to Analysis I and Introduction to Analysis II	8.0
PHYS 103	General Physics I	4.0
PHYS 104	General Physics II	4.0
CIVC 100	Foundations of Civic Engagement	3.0
UNIV E101	The Drexel Experience	2.0
ANTH 101	Introduction to Cultural Diversity	3.0
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0

Humanities and Social Science Controlled Electives (Select 6 Courses) * 18.0-20.0

ANTH 360	Culture and the Environment	
COM 317 [WI]	Environmental Communication	
ENTP 101	Life Strategies I	
ENTP 270	Social Entrepreneurship	
ENTP 275	Women and Minority Entrepreneurship	
ENTP 385	Innovation in Established Companies	
PBHL 101	Public Health 101	
PHIL 323	Organizational Ethics	
SOC 210	Race, Ethnicity and Social Inequality	
SOC 345	Sociology of the Environment	

Property Management Core Requirements (76 Credits)

ARCH 261	Environmental Systems I	3.0
ARCH 262	Environmental Systems II	3.0
ARCH 263	Environmental Systems III	3.0
ARCH 432	The Development Process	3.0
CAT 360	Applied Organizational Research	3.0
ENSS 325	Introduction to Urban and Environmental Planning	4.0
ENTP 250	Ideation	3.0
ENVS 260	Environmental Science and Society	3.0
MKTG 301	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
PRMT 110	Introduction to Property Management	3.0
PRMT 310	Property Financing & Valuation	3.0
PRMT 315	Property Risk Management	3.0
PRMT 320	Sustainable Property Management	3.0
PRMT 330	Property Management Technology	3.0
PRMT 333	Social Responsibility and Ethics in Real Estate Management	3.0
PRMT 335	Marketing and Operations: Multifamily Properties	3.0
PRMT 360	Marketing and Operations: Commercial Properties	3.0
PRMT 363	Commercial Property Financial Reports	3.0
PRMT 491	Senior Project in Property Management	3.0
REAL 310	Introduction to Real Estate	3.0
REAL 330	Facilities Management	3.0
REAL 474	Real Estate Economics in Urban Markets	3.0
STAT 201	Introduction to Business Statistics	4.0

Free Electives 17.0**Minor in Business Administration ****

ACCT 110	Accounting for Professionals	4.0
BLAW 201	Business Law I	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
MIS 200	Management Information Systems	4.0

Total Credits 180.0-182.0

* Select Six (6) Courses from the list of the Humanities and Social Sciences Controlled Electives. Controlled Elective credits will vary from 18.0 - 20.0.

** No more than 2 transferred courses may be used to complete the Minor in Business Administration. A grade of C (2.0) or better must be earned in each course in the Minor in Business.

Sample Plan of Study

Term 1		Credits
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
SOC 101	Introduction to Sociology	3.0
UNIV E101	The Drexel Experience	1.0
	Term Credits	15.0

Term 2

ANTH 101	Introduction to Cultural Diversity	3.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
	Term Credits	14.0

Term 3

ACCT 110	Accounting for Professionals	4.0
CIVC 100	Foundations of Civic Engagement	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHYS 103	General Physics I	4.0
	Humanities & Social Science controlled elective	3.0
	Term Credits	17.0

Term 4

BLAW 201	Business Law I	4.0
COM 230	Techniques of Speaking	3.0
PHYS 104	General Physics II	4.0
PSY 101	General Psychology I	3.0
	Term Credits	14.0

Term 5

ARCH 261	Environmental Systems I	3.0
COM 270 [WI]	Business Communication	3.0
ENTP 250	Ideation	3.0
PRMT 110	Introduction to Property Management	3.0
	Humanities & Social Science controlled elective	3.0
	Term Credits	15.0

Term 6

ARCH 262	Environmental Systems II	3.0
MIS 200	Management Information Systems	4.0
PRMT 335	Marketing and Operations: Multifamily Properties	3.0
REAL 310	Introduction to Real Estate	3.0
	Humanities & Social Science controlled elective	3.0
	Term Credits	16.0

Term 7

CAT 360	Applied Organizational Research	3.0
ARCH 263	Environmental Systems III	3.0
ENVS 260	Environmental Science and Society	3.0
STAT 201	Introduction to Business Statistics	4.0
	Humanities & Social Science controlled elective	3.0
	Term Credits	16.0

Term 8

ARCH 432	The Development Process	3.0
ENSS 325	Introduction to Urban and Environmental Planning	4.0
PRMT 330	Property Management Technology	3.0
PRMT 360	Marketing and Operations: Commercial Properties	3.0
	Term Credits	13.0

Term 9

FIN 301	Introduction to Finance	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
MKTG 201	Introduction to Marketing Management	4.0
PRMT 320	Sustainable Property Management	3.0
	Term Credits	15.0

Term 10

PRMT 310	Property Financing & Valuation	3.0
PRMT 315	Property Risk Management	3.0
REAL 330	Facilities Management	3.0
	Humanities & Social Science controlled elective	4.0
	Free elective	3.0
	Term Credits	16.0

Term 11

PRMT 333	Social Responsibility and Ethics in Real Estate Management	3.0
PRMT 363	Commercial Property Financial Reports	3.0
REAL 474	Real Estate Economics in Urban Markets	3.0
Humanities & Social Science controlled elective		4.0
Free elective		3.0
Term Credits		16.0
Term 12		
PRMT 491	Senior Project in Property Management	3.0
Free electives		10.0
Term Credits		13.0

Total Credit: 180.0

Minor in Property Management

A minor in property management is designed to prepare students to engage, analyze, and synthesize investment real estate portfolios from a comprehensive operational perspective. Students completing the transdisciplinary curriculum will be able to approach management of the built environment with a holistic view of the multifaceted real estate industry.

The property management minor is open to all undergraduate students across the University.

Program Requirements

- Completion of a minimum of 24 credits.
- A grade of "C" (2.0) or better must be earned for every courses in the curriculum or the minor will not be conferred.
- Students should verify prerequisites when selecting courses. It is the student's responsibility to ensure all course prerequisites are completely timely and satisfactorily.
- An academic major and minor within the same curriculum cannot be completed.

Required Courses

PRMT 110	Introduction to Property Management	3.0
PRMT 320	Sustainable Property Management	3.0
PRMT 330	Property Management Technology	3.0
PRMT 333	Social Responsibility and Ethics in Real Estate Management	3.0
ARCH 432	The Development Process	3.0
REAL 320	Real Estate Law - Principle & Practice	3.0
REAL 474	Real Estate Economics in Urban Markets	3.0
Select one of the following:		3.0
PRMT 335	Marketing and Operations: Multifamily Properties	
PRMT 360	Marketing and Operations: Commercial Properties	
Total Credits		24.0

Property Management Faculty

Kimberly Mitchell, PhD (*Virginia Polytechnic Institute and State University*) *Property Management Program Director*. Associate Teaching Professor. Multi-family real estate operations, sustainability, affordability, and policy; asset management; real estate development.

Systems Engineering BS/MS

Major: Systems Engineering

Degree Awarded: Bachelor of Science (BS) AND Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 228.0

Classification of Instructional Programs (CIP) code: 14.2701

Standard Occupational Classification (SOC) code: 17-2199

About the Program

The Master of Science in Systems Engineering is an online curriculum integrating systems and financial management and planning. The degree enables engineering leaders to perform, lead, and manage systems development throughout the life cycle, from conceptual development and engineering design through the operation and sustainment phases.

Program Outcomes

Graduates of the Drexel University Master of Science in Systems Engineering will be competent in their ability to:

- develop and implement models and tools to enhance and optimize complex systems;
- develop and manage processes relevant to complex systems development;
- architect, design, implement, integrate, verify, validate, support and decommission complex systems;
- use systems engineering tools and practices to identify and execute effective technical solutions;
- manage system-intensive projects within cost and schedule constraints;
- consider financial elements in all complex systems solutions.

Degree Requirements

General Education/Liberal Studies Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 315	Engineering Ethics	3.0
UNIV E101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
General Education Courses		15.0

Foundation Requirements

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
BIO 141	Essential Biology	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ECE 200	Digital Logic Design	4.0
ECE 201	Foundations of Electric Circuits	4.0
ECE 203	Programming for Engineers	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0

Sophomore Engineering Elective Options

Select one of the following:	3.0-4.0
ENGR 210 Introduction to Thermodynamics	
MATH 221 Discrete Mathematics	
PHYS 202 Fundamentals of Physics IV	
Professional Requirements	
ECEL 301 [WI] Electrical Engineering Laboratory	2.0
ECEL 302 ECE Laboratory II	2.0
ECEL 303 ECE Laboratory III	2.0
ECEL 304 ECE Laboratory IV	2.0
ECE 361 Probability for Engineers	3.0-4.0
or ECE 362 Engineering Statistics	
ECES 301 Transform Methods and Filtering	4.0
ECES 303 Transform Methods II	3.0
ECE 391 Introduction to Engineering Design Methods	1.0
ECE 491 [WI] Senior Design Project I	2.0
ECE 492 [WI] Senior Design Project II	2.0
ECE 493 Senior Design Project III	4.0
ECE Electives	33.0
Math Elective	3.0
Free Electives	13.5
Required Graduate Courses	
EGMT 531 Engineering Economic Evaluation & Analysis	3.0
EGMT 571 Managerial Statistics	3.0
EGMT 572 Statistical Data Analysis	3.0
EGMT 573 Operations Research	3.0
SYSE 510 Systems Engineering Process	3.0
SYSE 520 Sustainment and Integrated Logistics	3.0
SYSE 521 Integrated Risk Management	3.0
SYSE 533 Systems Integration and Test	3.0
SYSE 598 Capstone in Systems Engineering	3.0
SYSE 685 Systems Engineering Management	3.0
SYSE 688 Systems Engineering Analysis I	3.0
SYSE 690 Systems Engineering Analysis II	3.0
Elective Graduate Courses (Choose 4)	12.0
SYSE 511 Systems Engineering Tools	
SYSE 522 Supply Chain Systems Engineering	
SYSE 523 Systems Reliability Engineering	
SYSE 524 Systems Reliability, Availability & Maintainability Analysis	
SYSE 525 Statistical Modeling & Experimental Design	
SYSE 530 Systems Engineering Design	
SYSE 531 Systems Architecture Development	
SYSE 532 Software Systems Engineering	
Total Credits	230.0-232.0

Sample Plan of Study

First Year

Fall		Credits
CHEM 101	General Chemistry I	3.5
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	0.5
Term Credits		16.0
Winter		
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0

MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
Term Credits		19.5

Spring

MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
BIO 141	Essential Biology	4.5
ENGR 103	Engineering Design Laboratory III	2.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV 101	The Drexel Experience	0.5
Term Credits		18.0

Second Year

Fall

ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
ENGR 220	Fundamentals of Materials	4.0
ECE 200	Digital Logic Design	4.0
ENGR 201	Evaluation & Presentation of Experimental Data I	3.0
Term Credits		18.0

Winter

ENGR 232	Dynamic Engineering Systems	3.0
ECE 203	Programming for Engineers	3.0
ECE 201	Foundations of Electric Circuits	4.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
Free elective		3.0
General Ed elective		3.0
Term Credits		19.0

Third Year

Fall

ECE 361	Probability for Engineers	4.0
ECES 301	Transform Methods and Filtering	4.0
ECEL 301 [WI]	Electrical Engineering Laboratory	2.0
General Ed elective		6.0
Term Credits		16.0

Winter

ECEL 302	ECE Laboratory II	2.0
ECES 303	Transform Methods II	3.0
EGMT 571	Managerial Statistics	3.0
MATH 291	Complex and Vector Analysis for Engineers	4.0
PHIL 315	Engineering Ethics	3.0
ECE elective		4.0
Term Credits		19.0

Fourth Year

Fall

ECEL 303	ECE Laboratory III	2.0
EGMT 572	Statistical Data Analysis	3.0
EGMT 685	Systems Engineering Management	3.0
ECE Electives		7.0
Term Credits		15.0

Winter

ECE 391	Introduction to Engineering Design Methods	1.0
ECEL 304	ECE Laboratory IV	2.0
EGMT 573	Operations Research	3.0
EGMT 688	Systems Engineering Analysis I	3.0
ECE Electives		7.0
Term Credits		16.0

Spring

EGMT 531	Engineering Economic Evaluation & Analysis	3.0
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EGMT 690	Systems Engineering Analysis II	3.0
SYSE 521	Integrated Risk Management	3.0
Gen Ed electives		6.0
Term Credits		15.0
Summer		
SYSE 533	Systems Integration and Test	3.0
ECE Elective		4.0
Free Elective		6.0
Term Credits		13.0
Fifth Year		
Fall		
ECE 491 [WI]	Senior Design Project I	2.0
SYSE 510	Systems Engineering Process	3.0
Free elective		3.0
ECE elective		3.0
Grad elective		3.0
Term Credits		14.0
Winter		
ECE 492 [WI]	Senior Design Project II	2.0
SYSE 520	Sustainment and Integrated Logistics	3.0
ECE elective		4.0
Free elective		3.0
Grad electives		6.0
Term Credits		18.0
Spring		
ECE 493	Senior Design Project III	4.0
SYSE 598	Capstone in Systems Engineering	3.0
ECE elective		4.5
Grad elective		3.0
Term Credits		14.5

Total Credit: 231.0

Minor in Engineering Management

This minor focuses on the management of technical organizations. The required courses enhance an engineer's resume to show understanding of management and leadership behaviors, economics, and systems engineering and thinking.

While this minor is primarily designed to provide engineering management knowledge and skills to other engineers, with the equivalent science background students from other majors (biomedical engineering science, for example) can also complete this minor.

Prerequisites

The common engineering core curriculum prerequisites are required of all students in the college of engineering. Students from other colleges will need the appropriate background prerequisite courses.

Required Courses

BLAW 201	Business Law I	4.0
CIVE 240 [WI]	Engineering Economic Analysis	3.0
PROJ 401	Introduction to Project Management	3.0
EGMT 404 [WI]	Introduction to Engineering Management Communications	3.0
EGMT 462	Introduction to Engineering Management	3.0
or MEM 462	Introduction to Engineering Management	
EGMT 465	Introduction to Systems Engineering	3.0
Complete 2 classes from the list below		7.0
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	
ENTP 329	Entrepreneurship & New Technologies	

Other courses accepted with Director approval

Total Credits 26.0

Additional Information

More information is available on the Engineering Management Minor (<http://www.drexel.edu/egmt/programs/minor>) web page.

Engineering Policy Analysis Minor

An increasingly complex, interrelated, and technological society has come to rely on quantitative models of engineering systems to make decisions. While these models are used to make decisions in domains as varied as telecommunications, energy, and environmental quality, a common set of tools for the use of such models in decision making has been developed and forms the basis of an emerging discipline in engineering policy analysis. The practitioners of this discipline need training in mathematical and social science analytic approaches, as well as an understanding of the human factors that inevitably influence real-world policy choices. The minor in engineering policy analysis is designed to introduce students to these topics.

This minor broadens the exposure of engineering students to societal issues and provides an initial introduction to analytic skills which they may use both in engineering practice and as managers (given that many engineers become managers both in the private and public sector). Graduates will have additional training and credentials relevant not only to engineering careers, but also to other fields, including urban planning, management consulting, and public administration.

The program provides a basis for students to evaluate their interest and aptitude for graduate studies in fields such as business administration, public administration, and public policy. For pre-law students, the minor introduces them to analytic methods that inform the establishment and interpretation of laws as a mechanism of public policy implementation.

Students are required to complete a total of 24.0 credits. At least 12.0 of these credits may not be counted as part of their major.

Applied Quantitative Methods (6.0 credits)

Students select one sequence in probability and statistics consisting of one introductory course and one advanced course. Any introductory course may be combined with advanced course provided that the prerequisites of the advanced course are met.

Introductory Course Options

Select one of the following:	3.0-4.0
CHE 335	Statistics and Design of Experiments
ENGR 361	Statistical Analysis of Engineering Systems
MATH 311	Probability and Statistics I
MEM 361	Engineering Reliability
STAT 205	Statistical Inference I

Advanced Course Options

Select one of the following:	3.0-4.0
MATH 312	Probability and Statistics II
STAT 206	Statistical Inference II
ENVE 750	Data-based Engineering Modeling

Additional Quantitative Method Electives

MATH 300	Numerical Analysis I
MATH 305	Introduction to Optimization Theory
MATH 318 [WI]	Mathematical Applications of Statistical Software
STAT 321	Statistical Decision Methods
OPR 320	Linear Models for Decision Making

OPR 330	Advanced Decision Making and Simulation	
Policy Analytic Methods (11.0)		
Students are required to take at least 11.0 credits, including a course on capital investment decision making and a two-course sequence in economics.		
CIVE 240 [WI]	Engineering Economic Analysis	3.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
Additional Policy Analytic Methods Electives		
ECON 250	Game Theory and Applications	
ECON 301	Microeconomics	
ECON 330	Managerial Economics	
ECON 334	Public Finance	
ECON 351	Resource and Environmental Economics	
ENVS 370	Practice of Environmental Economics	
ENVE 727	Risk Assessment	
Human Factors (6.0)		
Select two of the following:		6.0
PSCI 110	American Government I	
PSCI 211	American Government II	
PSCI 220	Constitutional Law I	
PSCI 329	Theories of Justice	
PSCI 331	Environmental Politics	
PSCI 372	City in United States Political Development	
SOC 215	Sociology of Work	
SOC 240	Urban Sociology	
SOC 347	Introduction to Environmental Policy Analysis	
Elective		
One additional credit of coursework is required for the minor. This credit may be any of the three areas above. It is permissible to count 3.0 of the credits from a 4.0 credit class towards fulfilling one of the other areas, thereby using the 4th credit to meet the elective credit requirement.		1.0
Total Credits		24.0

Minor in Entertainment Engineering

Digital technologies have revolutionized the world of entertainment and created a new field combining the foundations of electrical engineering with entertainment media. This minor is designed for students with the technical literacy to effectively use, as well as develop, new tools for digital content creation and manipulation for entertainment applications.

The entertainment engineering minor consists of a minimum of six (6) required courses and an additional two (2) elective courses.

Entertainment Engineering Option for Non-Engineering Majors

The minor assumes students have a background in mathematics (equivalent to Calculus II). Courses taken to meet these pre-requisite requirements will not count toward the minor.

Required Courses		
DIGM 105	Overview of Digital Media	3.0
ECE 101	Electrical and Computer Engineering in the Real World	1.0
ECE 121	Introduction to Entertainment Engineering	3.0
ECES 201	Introduction to Audio-Visual Signals	4.0
ECES 352	Introduction to Digital Signal Process	4.0
PSY 101	General Psychology I	3.0
Electives		
Select one of the following:		3.0

PSY 213	Sensation and Perception	
INFO 310	Human-Computer Interaction II	
Select one of the following:		3.0
FMVD 110	Basic Shooting and Lighting	
FMVD 115	Basic Editing	
FMVD 120	Basic Sound	
MIP 133	Digital Audio Workstations I	
Total Credits		24.0

Additional Information

Additional information about this minor is available on the ECE Department (<http://www.ece.drexel.edu>) website.

For advising questions, please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu).

To make an appointment, please call 215.895.2837.

Drop-in hours: Please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu) for up-to-date drop-in availability.

Advising

Jeffrey Birou

Associate Director of Undergraduate Advising

Bossone Research Center, Room 313

E-mail: jbirou@coe.drexel.edu (jbirou@coe.drexel.edu)

Dr. Jaudelice de Oliveira

Associate Department Head for Undergraduate Affairs

Bossone Research Center, Room 313

E-mail: jau@coe.drexel.edu (jau@coe.drexel.edu)

Minor in Global Engineering

The Minor in Global Engineering is designed to train engineering students to become global citizens, skilled in meeting the challenges of a global work environment. Coursework in this minor aims at developing students' international historical, political, and cultural awareness as well as their knowledge of international business in order to succeed in the global economy. In addition to the required coursework, students must successfully complete an experience abroad prior to graduation. Experiences other than approved Study Abroad (<http://www.drexel.edu/studyabroad>) or Co-op Abroad programs must receive prior approval from the College of Engineering Associate Dean for Undergraduate Affairs.

Foreign language

Foreign language is not required for the Minor in Global Engineering, but it may be required as a prerequisite to a student's experience abroad. In addition, a student can choose to apply as many as eight (8) credits of 200-level or higher foreign language toward the credit requirements for the minor.

Restrictions

Currently, only students enrolled in either the the College of Engineering or the School of Biomedical Engineering, Science and Health Systems can enroll in this minor.

Required Courses

ENGR 280	Introduction to Global Engineering	2.0
EGMT 350	Conflict Management for Engineers	3.0
EGMT 465	Introduction to Systems Engineering	3.0
PROJ 401	Introduction to Project Management	3.0
PROJ 435	Essentials of International Project Management	3.0

Select three of the following (a minimum of one course from each of the three categories): 10.0

International Business

BLAW 340	International Business Law	*
ECON 342	Economic Development	*
EGMT T380	Special Topics in EGMT	
INTB 200	International Business	
INTB 332	Multinational Corporations	*
INTB 334	International Trade	*
INTB 336	International Money and Finance	*

Political Science/History

HIST 220	History of American Business	
HIST 259	History of Europe in the 20th Century	
PSCI 140	Introduction to Comparative Political Analysis	
PSCI 150	International Politics	
PSCI 351	International Organizations: The United Nations	
PSCI 352	Ethics and International Relations	
PSCI 353	International Human Rights	
PSCI 354	United States & the Third World	
PSCI 357	The European Union in World Politics	

Culture and Communications

COM 360	International Communication	
SOC 330	Development and Underdevelopment in the Global South	
PHIL 335	Global Ethical Issues	**
WGST 240	Women and Society in a Global Context	

Total Credits 24.0

* Require ECON 201 and ECON 202 as pre-requisites.

** Requires PHIL 105 as a prerequisite.

Note: Students may petition the Engineering Management Department Head for permission to apply other courses they believe relevant to the Minor in Global Engineering toward their credit requirements. Such requests will be handled on a case-by-case basis.

Minor in Nuclear Engineering

The minor assumes that students will have a background in mathematics and physics equivalent to that covered in the first two years of the engineering curriculum. Specifically, students are required to complete the following pre-requisites: PHYS 101 Fundamentals of Physics I ; PHYS 102 Fundamentals of Physics II; PHYS 201 Fundamentals of Physics III; ENGR 210 Introduction to Thermodynamics and ENGR 220 Fundamentals of Materials. Courses taken to meet these prerequisite requirements will not count toward the minor.

Required Courses

ECEP 371	Introduction to Nuclear Engineering	2.0
or MEM 371	Introduction to Nuclear Engineering I	
ECEP 402	Theory of Nuclear Reactors	4.0
ECEP 372	Radiation Detection and Measurement	3.0
ECEP 406	Introduction to Radiation Health Principles	3.0
MATE 450	The Nuclear Fuel Cycle & Materials	3.0
PHYS 330	Introduction to Nuclear Physics	2.0

Select 9.0 credits from at least two of the following principal areas 9.0

Industrial Applications Electives

ECEP 403	Nuclear Power Plant Design & Operation
MEM 402	Power Plant Design
MEM 448	Applications of Thermal Plasmas
MEM 449	Applications of Non-Thermal Plasmas

Power Engineering Electives

ECEP 352	Electric Motor Control Principles
ECEP 354	Energy Management Principles
ECEP 411	Power Systems I
ECEP 412	Power Systems II

Nuclear & Thermal Engineering & Science Electives

MEM 446	Fundamentals of Plasmas I
MEM 447	Fundamentals of Plasmas II

Materials Electives

MATE 221	Introduction to Mechanical Behavior of Materials
MATE 341	Defects in Solids
MATE 355	Structure and Characterization of Crystalline Materials
MATE 370	Mechanical Behavior of Solids

Transport Phenomena Electives

CHE 302	Process Fluid Mechanics
CHE 303	Process Heat Transfer
CHE 310	Transport Phenomena
CHE 311	Fluid Flow and Transport
CIVE 320	Introduction to Fluid Flow
MEM 220	Basic Fluid Mechanics
MEM 345	Heat Transfer

Simulation Electives

PHYS 105	Computational Physics I
PHYS 305	Computational Physics II
PHYS 405	Advanced Computational Physics

Total Credits 26.0

The Nuclear Engineering minor is open to all engineering majors. The minor consists of a minimum of six required courses for 17.0 credits and an additional 9.0 credits of elective courses.

Additional Information

Additional information about the minor is available on the ECE Department website (http://www.ece.drexel.edu/Undergraduate_Programs2.html).

For advising questions, please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu).

To make an appointment, please call 215.895.2241
Drop-in hours: Please e-mail advising@ece.drexel.edu (advising@ece.drexel.edu) for up-to-date drop-in availability.

Minor in Project Management

Project management focuses on the management of teams of people and other resources in the planning, design, execution, and implementation of various aspects of projects in practically every industry. The minor in Project Management provides students with the skills necessary to perform successfully as members of project management teams.

The minor in Project Management will provide a foundation for graduate education in project management and prepare interested students to pursue the Certified Associate in Project Management (CAPM)[®] or

Project Management Professional (PMP)[®] credentials from the Project Management Institute (PMI)[®].

Requirements

- Open to Drexel undergraduate students in any discipline.
- Must have sophomore, pre-junior, junior, or senior standing.
- Must have a cumulative GPA of at least 3.0.
- A minimum grade of "C" (2.0) must be earned in each course in this minor for the course to be counted.

Required Courses

PROJ 401	Introduction to Project Management	3.0
PROJ 402	Essentials of Project Planning & Scheduling	3.0
PROJ 403	Essentials of Project Leadership and Teamwork	3.0
PROJ 415	Essentials of Project Estimation & Cost Management	3.0
PROJ 430	Essentials of Managing Multiple Projects	3.0
Select 3 additional courses:		9.0
PROJ 410	Essentials of Project Quality Management	
PROJ 420	Essentials of Project Risk Assessment & Management	
PROJ 435	Essentials of International Project Management	
Project Management Elective (4XX or higher)		
Other courses, with prior written approval of student's Academic Advisor and the Project Management program (must be 4XX or higher and be relevant to Project Management)		
Total Credits		24.0

For additional information or questions about the minor in Project Management contact:

Mercedes Moultrie

Program Manager

Project Management Program

Tel: 215.571.3939

E-mail: mm342@drexel.edu

CAPM, PMP, and PMBOK are registered marks of the Project Management Institute, Inc.

Minor in Real Estate

Designed for students in various disciplines (such as architecture, business, civil engineering, architectural engineering, fashion merchandising and interior design) the minor in real estate provides the necessary knowledge, skills, and perspective to be successful in the real estate development process. Students will explore the knowledge and skill sets required to create and maintain built environments for living, working and entertainment purposes.

Required Courses

ARCH 432	The Development Process	3.0
CMGT 468	Real Estate	3.0
REAL 310	Introduction to Real Estate	3.0
REAL 320	Real Estate Law - Principle & Practice	3.0
REAL 330	Facilities Management	3.0
REAL 470	Real Estate Investments - Market & Feasibility Analysis	3.0
Select two of the following:		6.0
REAL 471	Advanced Real Estate in Investment & Analysis	
REAL 472	Advanced Market Research & Analysis	
REAL 473	Sales & Marketing of Real Estate	
REAL 474	Real Estate Economics in Urban Markets	
REAL 475	Real Estate Finance	

REAL 476	Real Estate Valuation & Analysis	
Total Credits		24.0

Minor in Systems Engineering

About the Program

Systems engineering is a set of processes and tools used to guide the engineering of large scale systems. Unlike traditional engineering which may focus on very specific technical components, systems engineers focus on the entirety of a system to ensure it is run efficiently and effectively. The Minor will prepare undergraduate students for the current demands of industry and provide them with the opportunity to achieve a formal education in systems engineering.

The Minor in Systems Engineering is designed for students in the College of Engineering and School of Biomedical Engineering who are interested in the management of large, complex systems. It leads to careers in a wide range of industries, such as aerospace, communications, healthcare, manufacturing, and transportation.

The opportunity to pursue a minor in systems engineering will be offered to students who meet the following conditions:

- Minimum 3.0 Cumulative GPA
- Upper Class students (sophomores, juniors, pre-juniors and seniors)
- Student in the College of Engineering or the School of Biomedical Engineering

Core Requirements

CIVE 240 [WI]	Engineering Economic Analysis	3.0
PROJ 401	Introduction to Project Management	3.0
EGMT 462	Introduction to Engineering Management	3.0
or MEM 462	Introduction to Engineering Management	
EGMT 465	Introduction to Systems Engineering	3.0
SYSE 488	Systems Engineering Analysis	3.0
Complete 3 courses in one track		9.0

Systems Analysis and Modeling Track

INDE 350	Industrial Engineering Simulation	
INDE 365	Systems Analysis Methods I	
INDE 366	Systems Analysis Methods II	

Decision Analysis Track

INDE 362	Operations Research for Engineering I	
INDE 363	Operations Research for Engineering II	
INDE 467	Decision Processes	

Industrial Engineering Track

INDE 400	Designs of Program Evaluation Systems	
INDE 462	Industrial Plant Design	
INDE 364	Special Topics in Industrial Engineering	

Logistics Systems Engineering Track

MEM 361	Engineering Reliability	
OPM 341	Supply Chain Management	
SYSE 520	Sustainment and Integrated Logistics	

Total Credits		24.0
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Certificate in Construction Management

Certificate Level: Undergraduate

Admission Requirements: High school diploma or GED

Certificate Type: Certificate

Number of Credits to Completion: 18.0 - 19.0

Instructional Delivery: Campus, Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 52.2001

Standard Occupational Classification (SOC) Code: 11-9021

Construction Management I - Fundamentals

18.0 quarter credits

The Construction Management I - Fundamentals Certificate introduces students to the basic concepts of the construction industry.

Students interested in continuing their education after certification are able to apply their coursework and credits directly to the Bachelor of Science in Construction Management (p. 251).

Requirements

CMGT 101	Introduction to Construction Management	3.0
CMGT 161	Building Materials and Construction Methods I	3.0
CMGT 162	Building Materials and Construction Methods II	3.0
CMGT 163	Building Materials and Construction Methods III	3.0
CMGT 261	Construction Safety	3.0
CMGT 263	Understanding Construction Drawings	3.0
Total Credits		18.0

Construction Management II - Construction Science

18.0 quarter credits

The Construction Management II - Construction Science Certificate focuses on introducing students to design concepts relating to heating, ventilation, and air conditioning systems and the integration of these systems into the construction process. In addition, the certificate also covers the process of estimating as well as building codes involved in construction projects.

Students interested in continuing their education after certification are able to apply their coursework and credits directly to the Bachelor of Science in Construction Management (p. 251).

Requirements

CMGT 266	Building Systems I	3.0
CMGT 267	Building Systems II	3.0
CMGT 363	Estimating I	3.0
CMGT 364	Estimating II	3.0
Select two of the following:		6.0
CMGT 262	Building Codes	
CMGT 265	Information Technologies in Construction	
CMGT 450	Management of Field Operations	
Total Credits		18.0

Construction Management III - Management Concepts

19.0 quarter credits

The Construction Management III - Management Concepts Certificate focuses on construction contracts, specifications, and practices with regard to business law and liability. The certificate also covers value engineering and construction planning, scheduling, network systems,

as well as the communications required for project control and claims prevention.

Students interested in continuing their education after certification are able to apply their coursework and credits directly to the Bachelor of Science in Construction Management (p. 251).

Requirements

CMGT 361	Contracts And Specifications I	3.0
CMGT 362	Contracts and Specifications II	3.0
CMGT 461	Construction Project & Company Management	3.0
CMGT 463	Value Engineering	3.0
CMGT 465	Marketing Construction Services	3.0
CMGT 467	Techniques of Project Control	4.0
Total Credits		19.0

Construction Management IV - Customized Independent

18.0 quarter credits

The Construction Management IV - Customized Independent Certificate is designed to allow students to choose the higher-level courses that best suit their special needs and interests. Students must select all six of their courses at the start of the Certificate program.

Students interested in continuing their education after certification are able to apply their coursework and credits directly to the Bachelor of Science in Construction Management (p. 251).

Requirements

A minimum of six (6) 300-level or higher approved CMGT courses *	18.0
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* CIVE and CAEE majors may not include CMGT 371 or CMGT 372.

The College of Nursing and Health Professions

By anticipating and meeting the challenges presented by the nation's health care system, Drexel's College of Nursing and Health Professions is doing its part to guarantee a lasting legacy for current and future health professionals.

The College of Nursing and Health Professions offers a wide range of undergraduate programs. Many offer flexible scheduling, making it possible for students to continue their education through part-time, online, night, or weekend study.

Majors

- Behavioral Health Counseling (BS) (p. 298)
- Health Sciences (BS) (p. 300)
 - Accelerated BS/DPT (p. 305)
 - Accelerated BS/MHS (p. 305)
- Health Services Administration (BS) (p. 307)
- Nursing (BSN) (p. 311)
 - Accelerated Career Entry (ACE) (p. 313)
 - RN/BSN Completion Program (p. 313)
 - Dual/Accelerated Degree (p. 314)
- Nutrition and Foods (BS) (p. 316)

Minors

- Addictions Counseling (p. 320)
- Health Services Administration (p. 310)
- Nutrition (p. 318)
- Psychiatric Rehabilitation (p. 320)

Certificates

- Human Lactation (p. 321)
- Medical Billing and Coding (p. 321)

About the College

According to the US Bureau of Labor Statistics' employment projections, the health care sector accounts for nearly 40% of the net increase in employment over the next 10 years, adding 3.8 million jobs by 2024. The national movement to improve health and care delivery is rising in tandem with these numbers.

The College of Nursing and Health Professions has more than a century-long history of educating nurses and health professionals, uniquely preparing clinicians to practice and lead in a rapidly changing healthcare system. Since 2002, the College has embraced the practical ingenuity of Drexel through the refinement and development of more than 25 undergraduate and graduate nursing and health professions programs characterized by the integration of learning and work through cooperative education, a culture of excellence, innovation and technology infusion, research and deep civic engagement. The College has grown to include more than 5,000 students, 200 full-time faculty and 104 staff.

Mission and Approach

The College of Nursing and Health Professions prepares competent and compassionate health professionals through technology-infused and evidence-based programs. The College is committed to leading the way in improving health, reducing health disparities through innovative education, interdisciplinary research, and community-based practice initiatives.

The College has established an interdisciplinary practice in primary care, physical therapy, nutrition sciences and mental health care, including couple and family therapy, behavioral health counseling and creative arts therapies, where students learn and work with faculty in honing their clinical skills. In addition, Drexel's partnerships with employers of health professionals through its co-operative education program affords the opportunity for its undergraduate nursing and health professions students to work in the best healthcare institutions, regionally and nationally, as part of their program of study. This approach challenges the notion of "best practice" with "real practice" and helps our students to achieve the highest learning and clinical outcomes, while gaining a competitive edge in the job market.

Every program in the College has integrated into its curriculum cutting edge technology, including the use of high fidelity manikins and simulation, to build knowledge and skills in both safe and experimental learning situations before practice in actual clinical settings. All courses are web-enhanced with learning tools and information that support knowledge mastery.

The College's researchers in nutrition and rehabilitation sciences, couple and family therapy, and nursing and creative arts therapies have garnered on average \$2.9 million in external funding annually. Undergraduate and graduate students work with cutting-edge researchers building knowledge in clinical disciplines with the ultimate goal of improving the quality and outcomes of care.

Accreditation

The College has 12 nationally accredited or approved clinical programs. Pass rates for professional licensing and board certifications are well above the national mean, with nine programs boasting a 100% pass rate and nursing first-time pass rates consistently above 95%.

- The Baccalaureate Degree in Nursing (BSN) and the Master's Degree in Nursing (MSN) programs are accredited by the Commission on Collegiate Nursing Education (CCNE), One DuPont Circle, NW, Suite 530, Washington, DC, 20036, 202-887-6791. These programs and the post-graduate APRN certificates are also approved by the Pennsylvania State Board of Nursing.
- The Couple and Family Therapy MFT degree and Post-Master's Certificate programs are accredited by COAMFTE (Commission on Accreditation of Marriage and Family Therapy Education).
- The Creative Arts Therapies MA degree programs in Dance/ Movement Therapy and Counseling, Music Therapy and Counseling, and Art Therapy and Counseling are approved by the ADTA (American Dance Therapy Association), the AMTA (American Music Therapy Association), and the AATA (American Art Therapy Association), respectively.
- The Didactic Program in Nutrition is accredited by ACEND (Accreditation Council for Education in Nutrition and Dietetics).
- The Nurse Anesthesia program is accredited by COA (Council on Accreditation of Nurse Anesthesia Educational Programs).

- The Doctor of Physical Therapy Program (DPT) program is accredited by CAPTE (Commission on Accreditation in Physical Therapy Education).
- The Physician Assistant program is accredited by ARC-PA (Accreditation Review Commission on Education for the Physician Assistant).

Behavioral Health Counseling

Major: Behavioral Health Counseling
 Degree Awarded: Bachelor of Science (BS)
 Calendar Type: Quarter
 Total Credit Hours: 180.0

Co-op Options: One Co-op (Four years); No Co-op (Four years)
 Classification of Instructional Programs (CIP) code: 51.1501; 51.1508
 Standard Occupational Classification (SOC) code: 21-1011

About the Program

The Behavioral Health Counseling program develops clinical competencies needed to counsel and support people experiencing mental illnesses and substance use disorders. Our students go on to graduate school or begin work in areas such as psychiatric rehabilitation, prevention and treatment of substance use disorders, child and adolescent services, and case management. Students create a plan of study and select courses based on their career interests.

During the freshman and sophomore years, students develop a foundation for clinical practice by studying humanities, social sciences, writing, biological sciences, math, and research methods. Behavioral Health Counseling (BHC) courses build on this foundation by demonstrating that biological, psychological, and social perspectives are needed to deliver today's evidence-based practices and develop tomorrow's innovative interventions. BHC courses offer a comprehensive selection of topics that focus on aspects of therapeutic rapport building, assessment, planning, and intervening with people from diverse backgrounds and needs.

The major also offers a co-op experience in a clinical setting that greatly enhances the student's preparation for employment after graduation and for graduate study in professional counseling, social work, or psychology. For students interested in certification as addictions counselors, all program courses are accredited by the Pennsylvania Certification Board. Students may also pursue certification in psychiatric rehabilitation.

For additional information about this major, visit the Behavioral Health Counseling (<https://www.drexel.edu/cnhp/academics/departments/Behavioral-Health>) Department on the College of Nursing and Health Profession's site.

Degree Requirements

General Education Requirements		
UNIV NH101	The Drexel Experience	1.0
CIVC 101	Introduction to Civic Engagement	1.0
Computing/Communication Requirement		3.0
CS 161	Introduction to Computing	
	or COM 230 Techniques of Speaking	
English		9.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	

ENGL 103	Composition and Rhetoric III: Themes and Genres	
Life Science		3.0
BIO 100	Applied Cells, Genetics & Physiology	
	or BIO 107 Cells, Genetics & Physiology	
Mathematics		3.0
MATH 107	Probability and Statistics for Liberal Arts	
Humanities and Social Sciences - Required		13.0
ANTH 101	Introduction to Cultural Diversity	
PSY 240 [WI]	Abnormal Psychology	
SOC 101	Introduction to Sociology	
Any (1) Four Credit History Course		
Humanities and Social Sciences Electives		24.0
Free Electives		54.0
Behavioral Health Counseling Courses Required		30.0
BACS 100	Life Span Human Development	
BACS 200	Foundation of Behavioral Health Care	
BACS 220	Counseling Theory and Practice	
BACS 232	Ethics and Professional Responsibility	
BACS 234	Introduction to Addictive Disorders	
BACS 236	Psychiatric Rehabilitation Principles and Practices	
BACS 255	Multicultural Counseling	
BACS 301	Group Counseling I	
BACS 304	Cognitive and Behavioral Counseling I	
BACS 401	Assessment and Treatment Planning	
Behavioral Health Counseling Electives		39.0
Select 13 From the Following Course List:		
BACS 230	Genetics and Mental Health	
BACS 310	Recovery and Relapse Prevention	
BACS 312	Case Management Methods	
BACS 320	Crisis and Brief Intervention	
BACS 325	Psychopharmacology for Counselors	
BACS 345	Careers in Behavioral Health	
BACS 350	Child Psychopathology	
BACS 360	Preventing Substance Abuse	
BACS 367	Advanced Counseling Intervention	
BACS 368	Addictions Counseling with Special Populations	
BACS 370	Problem Gambling Interventions	
BACS 380	Trauma-Informed Care	
BACS 390	Special Topics in Mental Health	
BACS 404	Cognitive and Behavioral Counseling II	
BACS 405	Family-Focused Interventions	
BACS 410	Child and Adolescent Support	
BACS 411	Forensic Behavior Health Service	
BACS 412	Group Counseling II	
BACS 414	Co-Occurring Disorders	
BACS 420	Psychiatric Rehabilitation Competencies	
BACS 430	Behavioral Health and Aging	
BACS 490	Senior Research Project	
Total Credits		180.0

Sample Plans of Study

BS Behavioral Health Counseling: 4-Year Co-op Option

Term 1		Credits
ANTH 101	Introduction to Cultural Diversity	3.0
BACS 100	Life Span Human Development	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 107	Probability and Statistics for Liberal Arts	3.0
UNIV NH101	The Drexel Experience	1.0

Humanities/Social Science elective	3.0
Term Credits	16.0
Term 2	
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
SOC 101 Introduction to Sociology	3.0
BACS elective	3.0
Humanities/Social Science elective	3.0
Free elective	3.0
Term Credits	16.0
Term 3	
BACS 200 Foundation of Behavioral Health Care	3.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
PSY 240 [WI] Abnormal Psychology	3.0
Humanities/Social Science electives	6.0
Term Credits	15.0
Term 4	
BACS 220 Counseling Theory and Practice	3.0
BACS 236 Psychiatric Rehabilitation Principles and Practices	3.0
BIO 100 Applied Cells, Genetics & Physiology or 107 Cells, Genetics & Physiology	3.0
Humanities/Social Science elective	3.0
Free elective	3.0
Term Credits	15.0
Term 5	
BACS 232 Ethics and Professional Responsibility	3.0
CS 161 Introduction to Computing or COM 230 Techniques of Speaking	3.0
BACS elective	3.0
History (HIST) elective	4.0
Free elective	3.0
Term Credits	16.0
Term 6	
BACS 234 Introduction to Addictive Disorders	3.0
BACS 401 Assessment and Treatment Planning	3.0
BACS elective	3.0
Humanities/Social Science elective	3.0
Free elective	3.0
Term Credits	15.0
Term 7	
Humanities/Social Science elective	3.0
Free electives	12.0
Term Credits	15.0
Term 8	
BACS 301 Group Counseling I	3.0
BACS 304 Cognitive and Behavioral Counseling I	3.0
BACS elective	3.0
Humanities/Social Science elective	3.0
Free elective	3.0
Term Credits	15.0
Term 9	
BACS 255 Multicultural Counseling	3.0
BACS electives	6.0
Free electives	6.0
Term Credits	15.0
Term 10	
BACS electives	9.0
Free electives	6.0
Term Credits	15.0
Term 11	
BACS electives	9.0

Free electives	6.0
Term Credits	15.0
Term 12	
BACS elective	3.0
Free electives	9.0
Term Credits	12.0
Total Credit: 180.0	

BS Behavioral Health Counseling: 4-Year Non-Co-op Option

	Credits
Term 1	
ANTH 101 Introduction to Cultural Diversity	3.0
BACS 100 Life Span Human Development	3.0
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 107 Probability and Statistics for Liberal Arts	3.0
UNIV NH101 The Drexel Experience	1.0
Humanities/Social Science elective	3.0
Term Credits	16.0
Term 2	
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
SOC 101 Introduction to Sociology	3.0
BACS elective	3.0
Humanities/Social Science elective	3.0
Free elective	3.0
Term Credits	16.0
Term 3	
BACS 200 Foundation of Behavioral Health Care	3.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
PSY 240 [WI] Abnormal Psychology	3.0
Humanities/Social Science electives	6.0
Term Credits	15.0
Term 4	
BACS 220 Counseling Theory and Practice	3.0
BACS 236 Psychiatric Rehabilitation Principles and Practices	3.0
BIO 100 Applied Cells, Genetics & Physiology or 107 Cells, Genetics & Physiology	3.0
Humanities/Social Science elective	3.0
Free elective	3.0
Term Credits	15.0
Term 5	
BACS 232 Ethics and Professional Responsibility	3.0
CS 161 Introduction to Computing or COM 230 Techniques of Speaking	3.0
BACS elective	3.0
History (HIST) elective	4.0
Free elective	3.0
Term Credits	16.0
Term 6	
BACS 234 Introduction to Addictive Disorders	3.0
BACS 401 Assessment and Treatment Planning	3.0
BACS elective	3.0
Humanities/Social Science elective	3.0
Free elective	3.0
Term Credits	15.0
Term 7	
BACS 301 Group Counseling I	3.0
BACS 304 Cognitive and Behavioral Counseling I	3.0
BACS elective	3.0
Humanities/Social Science elective	3.0
Free elective	3.0
Term Credits	15.0

Free elective		3.0
Term Credits		15.0
Term 8		
BACS 255	Multicultural Counseling	3.0
BACS elective		3.0
Free electives		9.0
Term Credits		15.0
Term 9		
BACS elective		3.0
Humanities/Social Science elective		3.0
Free electives		9.0
Term Credits		15.0
Term 10		
BACS electives		9.0
Free electives		6.0
Term Credits		15.0
Term 11		
BACS electives		9.0
Free electives		6.0
Term Credits		15.0
Term 12		
BACS elective		3.0
Free electives		9.0
Term Credits		12.0

Total Credit: 180.0

Co-op/Career Opportunities

Drexel University has long been known for its cooperative education program, through which students mix periods of full-time, career-related employment with their studies. The Behavioral Health Counseling curriculum includes one co-op option that exposes students to the varied work environments of behavioral health professionals. Co-op provides students with an opportunity to assess their personal strengths and interests for a career in behavioral health by observing successful mental health and addictions professionals in action. Co-op students work for six months in paid or unpaid positions consistent with their interests, abilities, and aptitudes.

After Graduation

Graduates of the Behavioral Health Counseling program are widely acknowledged by regional employers as being among their best prepared new employees. This reputation helps graduates easily find preferred employment in a variety of behavioral health care settings. Many graduates elect to continue their education in graduate and doctoral programs at Drexel or leading universities across the nation. Within Drexel, students may select excellent graduate programs preparing them for licensure as behavioral health clinicians and/or administrative, research, and behavioral health policy-making positions.

Career Opportunities

Behavioral health counseling professionals are employed in a wide range of venues. Counselors are needed in social service agencies, schools, health care facilities, and inpatient and residential treatment settings. Counselors work with children, adolescents, adults, and elderly individuals who experience disability due to mental illnesses or substance use disorders. Graduates who choose to enter the behavioral health workforce find immediate employment in areas such as psychiatric rehabilitation; family and child support services; addictions counseling; case management and services coordination; forensic mental health services; individual and group counseling; and crisis intervention.

The behavioral health care field is tremendously diverse and encompasses far more career opportunities than are listed here. There are career choices to be made at all levels of service — from direct care to administration and policy making. In this regard, students will find tremendous benefit both in the listings and outreach offered by Drexel's Steinbright Career Development Center and in the diverse professional career experience our faculty bring to our students.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) web page for more detailed information on post-graduate opportunities.

Facilities

The College of Nursing and Health Professions is located at Drexel University's Health Sciences Campus in Center City. A Clinical Learning Resource Center (<http://www.drexel.edu/cnhp/about/CELR>) offers a simulation lab where students practice skills needed in their chosen behavioral health career. Sessions are video captured to allow students the opportunity to observe and critique their performance.

Behavioral Health Counseling Faculty

Veronica Carey, PhD (*Capella University*) Associate Director of the *Saturday Scholars Program*. Assistant Clinical Professor. Evidence-based best practices in recovery-oriented services, treatment planning, behavioral health care system practices, program planning, and implementation of psychiatric rehabilitation services.

Angela L. Colistra, PhD, CAADC, CCS (*University of North Carolina at Charlotte*). Clinical Assistant Professor. Best practices in substance use disorder treatment, opioid prevention and epidemic intervention, addiction related cognitive impairment, multicultural competence in clinical supervision, the intersect between loss and grief and addiction, the relationship between spiritual well-being and burnout.

Ronald C. Comer, DSW (*University of Pennsylvania, School of Social Work*) Chair, *Behavioral Health Counseling Program*. Clinical Associate Professor. Pre-professional and professional workforce development, and behavioral health care policy -- particularly at the service delivery level.

Lisa T. Schmidt, PhD (*University of Medicine and Dentistry of New Jersey*). Associate Clinical Professor. The identification of best practices in psychiatric rehabilitation, illness management and recovery, and psycho-education.

Health Sciences

Major: Health Sciences

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 181.0

Co-op Options: One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 51.1199

Standard Occupational Classification (SOC) code: 11-9111

About the Program

The Bachelor's degree program in Health Sciences at Drexel University exposes students to a wide variety of careers in health care and related professions. Our emphasis on interdisciplinary study, coupled with expert faculty, gives students the opportunity to explore different facets of health-related professions before matriculating to specialized graduate programs

or entering the workplace. Whether you are on the fast track to a career in health professions or still finding your path, our Health Sciences Program offers a multitude of options for completing your degree.

What you will learn

The Health Sciences Program offers a rigorous four-year curriculum for students interested in pursuing careers in health-related professions. Courses in health and clinical sciences, research methods, statistics, and healthcare ethics are combined with a core curriculum of mathematics, humanities, and social sciences to provide a fully integrated and comprehensive curriculum.

Career Opportunities

Health care professions are one of the fastest growing job sectors in the United States. There is tremendous demand for trained health care providers at all levels. In the Health Sciences Program, our multidisciplinary approach, flexible curriculum, and co-op experience provide students with a highly competitive edge in the market place and in the pursuit of graduate program admission. Some of the fields Health Sciences graduates can expect to pursue post-graduation include:

- Rehabilitation Professions
 - Physical therapy
 - Occupational therapy
 - Speech and language pathology
 - Cardiac rehabilitation
- Physician Assistant Studies
- Medicine and Dentistry
- Optometry
- Audiology
- Clinical Research
- Public Health and Health Advocacy
- Nursing
- Exercise Physiology
- Nutrition Sciences
- Bioethics
- Health Psychology

Co-op Experience

Drexel University has long been known for its cooperative education programs. As part of the Health Sciences curriculum, students incorporate a six-month co-op experience into their plan of study. This allows students to learn from healthcare leaders at renowned facilities nationwide. By building career-related employment into undergraduate study, students gain work experience, network with healthcare professionals, and hone their clinical and research skills. Some local co-op employers of Health Sciences students include Children's Hospital of Philadelphia, Magee Rehabilitation Hospital, Bryn Mawr Rehabilitation Hospital, Hahnemann University Hospital, Good Shepherd Penn Partners, NovaCare, and many other health care facilities in the region.

Accelerated Options

The Health Sciences program offers accelerated academic tracks for high achieving students to pursue degrees in the Physician Assistant Studies program and the Doctor of Physical Therapy program within the College of Nursing and Health Professions.

Articulation Agreement Options

Drexel's Health Sciences Department and Salus University's Occupational Therapy Department have partnered to offer a BS/MSOT sequential degree program. In the BS/MSOT Option, students first complete a Bachelor of Science (BS) degree in Health Sciences at Drexel University, then enroll into the 2-year Master of Science in Occupational Therapy (MSOT) program at Salus University.

Drexel Graduate Options in Biomedical Sciences

Graduates of the Health Sciences program may also continue their education in the Graduate School of Biomedical Sciences and Professional Studies which offers over 40 doctoral, master's and professional development programs. These academic programs emphasize real-world experience and help guide students to make career decisions that best fit their abilities and evolving needs.

For more information, visit the Health Sciences Program (<http://www.drexel.edu/cnhp/academics/departments/Health-Sciences>) page at the College of Nursing and Health Professions web site.

Degree Requirements

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
UNIV NH101	The Drexel Experience	1.0

English Sequence

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Biology Sequence

BIO 122	Cells and Genetics	4.5
BIO 124	Evolution & Organismal Diversity	4.5
BIO 126	Physiology and Ecology	4.5
BIO 226	Microbiology for Health Professionals	5.0

Chemistry Sequence

CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0

Mathematics Sequence

MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0

Communications

COM 320 [WI]	Science Writing	3.0
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Health Systems

ECON 240	Economics of Health Care Systems	4.0
HSAD 210	Health-Care Ethics I	3.0

Complete 1 of the following courses:

HSAD 309	Advanced Health-Care Ethics	
HSAD 310	Introduction to Health-Systems Administration	
HSAD 345	Ethics in Health Care Management	

Psychology

PSY 101	General Psychology I	3.0
Two Psychology (PSY) courses (minimum 6.0 credits)		6.0

Sociology

SOC 101	Introduction to Sociology	3.0
Two Sociology (SOC) courses (minimum 6.0 credits)		8.0

Humanities

Three Humanities (HUM, HIST, ANTH, PHIL or language electives) (minimum 9.0 credits)	9.0
Public Health	
PBHL 101 Public Health 101	3.0
One Public Health (PBHL) course (minimum 3.0 credits)	3.0
Anatomy & Physiology Courses	
ANAT 101 Anatomy & Physiology I	5.0
ANAT 102 Anatomy & Physiology II	5.0
ANAT 103 Anatomy & Physiology III	5.0
Clinical Research Courses	
HSCI 310 Introduction to Clinical Research	4.0
HSCI 313 Clinical Trials Protocols	4.0
Statistics and Assessment	
HSCI 201 Health Assessment through the Lifespan	4.0
STS 345 Statistics for the Health Sciences	4.0
STS 350 Advanced Statistics for Clinical Science	4.0
Health Sciences electives (HSCI, PHGY, ANAT, NEUR, NFS) *	28.0
Free electives	19.0
Total Credits	180.5

* Health Sciences electives include any HSCI, ANAT, PHGY, NEUR or NFS course. Certain Health Services Administration (HSAD) and Behavioral & Addictions Counseling (BACS) courses may also be taken as Health Sciences electives; see your advisor for more information.

Optional Concentration in Exercise Science

The concentration in Exercise Science helps prepare students for graduate studies in Exercise Physiology. In addition, the concentration provides foundational knowledge and skills for a variety of fitness certifications from the American College of Sports Medicine, National Strength and Conditioning Association, and others. These certifications are often required of graduates interested in seeking employment in the fitness industry.

Students wishing to complete the concentration in Exercise Science must complete the courses listed below as 17.0 of their elective credits.

Required courses:

HSCI 325 Exercise Physiology	4.0
HSCI 326 Applied Anatomy and Kinesiology	4.0

Complete 9.0 credits from the following list:

HSCI 415 Musculoskeletal Pathophysiology	
HSCI 490 Senior Research Project	
HSCI T480 Special Topics in Health Sciences	
NFS 100 Nutrition, Foods, and Health	
& NFS 101 and Introduction to Nutrition & Food	
NFS 325 Nutrition & Exercise Physiology	

Sample Plans of Study

For accelerated **clinical track** sample plans, students should visit the *Health Sciences Professions Program page*.

BACHELOR OF SCIENCE IN HEALTH SCIENCES - 12 TERMS

2 terms of COOP occur after Term 7.

Term 1		Credits
BIO 122	Cells and Genetics	4.5
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV NH101	The Drexel Experience	1.0

Free elective		3.0
Term Credits		15.0
Term 2		
BIO 124	Evolution & Organismal Diversity	4.5
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 101	Introduction to Analysis I	4.0
Term Credits		17.0
Term 3		
BIO 126	Physiology and Ecology	4.5
CHEM 103	General Chemistry III	5.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 102	Introduction to Analysis II	4.0
Term Credits		16.5
Term 4		
ANAT 101	Anatomy & Physiology I	5.0
BIO 226	Microbiology for Health Professionals	5.0
STS 345	Statistics for the Health Sciences	4.0
Free elective		3.0
Term Credits		17.0
Term 5		
ANAT 102	Anatomy & Physiology II	5.0
COOP 101	Career Management and Professional Development	0.0
PSY 101	General Psychology I	3.0
STS 350	Advanced Statistics for Clinical Science	4.0
Free elective		3.0
Term Credits		15.0
Term 6		
ANAT 103	Anatomy & Physiology III	5.0
COM 320 [WI]	Science Writing	3.0
HSAD 210	Health-Care Ethics I	3.0
HSCI 310	Introduction to Clinical Research	4.0
Term Credits		15.0
Term 7		
SOC 101	Introduction to Sociology	3.0
One of the following:		3.0
HSAD 309	Advanced Health-Care Ethics	
HSAD 310	Introduction to Health-Systems Administration	
HSAD 345	Ethics in Health Care Management	
PSY elective		3.0
Free elective		3.0
Term Credits		12.0
Term 8		
HSCI 313	Clinical Trials Protocols	4.0
PBHL 101	Public Health 101	3.0
Health Sciences electives *		6.0
Term Credits		13.0
Term 9		
HSCI 201	Health Assessment through the Lifespan	4.0
Health Sciences electives *		4.0
Sociology elective		4.0
Free elective		3.0
Term Credits		15.0
Term 10		
ECON 240	Economics of Health Care Systems	4.0
Health Sciences electives *		7.0
Free elective		3.0
Term Credits		14.0
Term 11		

Health Sciences elective*	3.0
Humanities/Social Science electives	6.0
Sociology elective	4.0
Free elective*	3.0
Term Credits	16.0

Term 12	
Health Sciences electives*	6.0
Humanities/Social Science elective	3.0
PBHL elective	3.0
PSY elective	3.0
Term Credits	15.0

Total Credit: 180.5

* See degree requirements (p. 301).

Accelerated BS in Health Sciences - 10 terms

Term 1	Credits
BIO 122 Cells and Genetics	4.5
CHEM 101 General Chemistry I	3.5
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV NH101 The Drexel Experience	1.0
Humanities elective	3.0
Free elective	3.0
Term Credits	18.0

Term 2	
BIO 124 Evolution & Organismal Diversity	4.5
CHEM 102 General Chemistry II	4.5
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 101 Introduction to Analysis I	4.0
Term Credits	17.0

Term 3	
BIO 126 Physiology and Ecology	4.5
CHEM 103 General Chemistry III	5.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
MATH 102 Introduction to Analysis II	4.0
Free elective	3.0
Term Credits	19.5

Term 4	
PSY 101 General Psychology I	3.0
SOC 101 Introduction to Sociology	3.0
Health Science electives	6.0
Humanities elective	3.0
Free elective	3.0
Term Credits	18.0

Term 5	
ANAT 101 Anatomy & Physiology I	5.0
BIO 226 Microbiology for Health Professionals	5.0
STS 345 Statistics for the Health Sciences	4.0
Humanities elective	3.0
Free elective	3.0
Term Credits	20.0

Term 6	
ANAT 102 Anatomy & Physiology II	5.0
HSCI 310 Introduction to Clinical Research	4.0
STS 350 Advanced Statistics for Clinical Science	4.0
Psychology elective	3.0
Health Sciences elective	3.0
Term Credits	19.0

Term 7

ANAT 103 Anatomy & Physiology III	5.0
COM 320 [WI] Science Writing	3.0
HSAD 210 Health-Care Ethics I	3.0
Health Sciences elective	4.0
Free elective	3.0
Term Credits	18.0

Term 8	
One of the following:	3.0
HSAD 309 Advanced Health-Care Ethics	
HSAD 310 Introduction to Health-Systems Administration	
HSAD 345 Ethics in Health Care Management	
PBHL 101 Public Health 101	3.0
Health Sciences elective	3.0
Psychology elective	3.0
Sociology elective	4.0
Free elective	3.0
Term Credits	19.0

Term 9	
ECON 240 Economics of Health Care Systems	4.0
HSCI 313 Clinical Trials Protocols	4.0
Health Sciences elective	4.0
Public Health elective	3.0
Term Credits	15.0

Term 10	
HSCI 201 Health Assessment through the Lifespan	4.0
Health Sciences electives	6.0
Sociology elective	4.0
Free elective	3.0
Term Credits	17.0

Total Credit: 180.5

Term 1	Credits
BIO 122 Cells and Genetics	4.5
CHEM 101 General Chemistry I	3.5
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV NH101 The Drexel Experience	1.0
Free elective	3.0
Term Credits	15.0

Term 2	
BIO 124 Evolution & Organismal Diversity	4.5
CHEM 102 General Chemistry II	4.5
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 101 Introduction to Analysis I	4.0
Term Credits	17.0

Term 3	
BIO 126 Physiology and Ecology	4.5
CHEM 103 General Chemistry III	5.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
MATH 102 Introduction to Analysis II	4.0
Term Credits	16.5

Term 4	
ANAT 101 Anatomy & Physiology I	5.0
BIO 226 Microbiology for Health Professionals	5.0
STS 345 Statistics for the Health Sciences	4.0
Free elective	3.0
Term Credits	17.0

Term 5	
ANAT 102 Anatomy & Physiology II	5.0
COOP 101 Career Management and Professional Development	0.0

PSY 101	General Psychology I	3.0
STS 350	Advanced Statistics for Clinical Science	4.0
Free elective		3.0
Term Credits		15.0
Term 6		
ANAT 103	Anatomy & Physiology III	5.0
COM 320 [WI]	Science Writing	3.0
HSAD 210	Health-Care Ethics I	3.0
HSCI 310	Introduction to Clinical Research	4.0
Term Credits		15.0
Term 7		
SOC 101	Introduction to Sociology	3.0
One of the following:		3.0
HSAD 309	Advanced Health-Care Ethics	
HSAD 310	Introduction to Health-Systems Administration	
HSAD 345	Ethics in Health Care Management	
PSY elective		3.0
Free elective		3.0
Term Credits		12.0
Term 8		
HSCI 313	Clinical Trials Protocols	4.0
PBHL 101	Public Health 101	3.0
Health Sciences electives*		6.0
Term Credits		13.0
Term 9		
HSCI 201	Health Assessment through the Lifespan	4.0
Health Sciences electives*		4.0
Sociology elective		4.0
Free elective		3.0
Term Credits		15.0
Term 10		
ECON 240	Economics of Health Care Systems	4.0
Health Sciences electives*		7.0
Free elective		3.0
Term Credits		14.0
Term 11		
Health Sciences elective*		3.0
Humanities/Social Science electives		6.0
Sociology elective		4.0
Free elective*		3.0
Term Credits		16.0
Term 12		
Health Sciences electives*		6.0
Humanities/Social Science elective		3.0
PBHL elective		3.0
PSY elective		3.0
Term Credits		15.0

Total Credit: 180.5

* See degree requirements (p. 301).

Accelerated BS in Health Sciences - 10 terms

		Credits
Term 1		
BIO 122	Cells and Genetics	4.5
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV NH101	The Drexel Experience	1.0
Humanities elective		3.0
Free elective		3.0
Term Credits		18.0

Term 2

BIO 124	Evolution & Organismal Diversity	4.5
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 101	Introduction to Analysis I	4.0
Term Credits		17.0

Term 3

BIO 126	Physiology and Ecology	4.5
CHEM 103	General Chemistry III	5.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 102	Introduction to Analysis II	4.0
Free elective		3.0
Term Credits		19.5

Term 4

PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
Health Science electives		6.0
Humanities elective		3.0
Free elective		3.0
Term Credits		18.0

Term 5

ANAT 101	Anatomy & Physiology I	5.0
BIO 226	Microbiology for Health Professionals	5.0
STS 345	Statistics for the Health Sciences	4.0
Humanities elective		3.0
Free elective		3.0
Term Credits		20.0

Term 6

ANAT 102	Anatomy & Physiology II	5.0
HSCI 310	Introduction to Clinical Research	4.0
STS 350	Advanced Statistics for Clinical Science	4.0
Psychology elective		3.0
Health Sciences elective		3.0
Term Credits		19.0

Term 7

ANAT 103	Anatomy & Physiology III	5.0
COM 320 [WI]	Science Writing	3.0
HSAD 210	Health-Care Ethics I	3.0
Health Sciences elective		4.0
Free elective		3.0
Term Credits		18.0

Term 8

One of the following:		
HSAD 309	Advanced Health-Care Ethics	
HSAD 310	Introduction to Health-Systems Administration	
HSAD 345	Ethics in Health Care Management	
PBHL 101	Public Health 101	3.0
Health Sciences elective		3.0
Psychology elective		3.0
Sociology elective		4.0
Free elective		3.0
Term Credits		19.0

Term 9

ECON 240	Economics of Health Care Systems	4.0
HSCI 313	Clinical Trials Protocols	4.0
Health Sciences elective		4.0
Public Health elective		3.0
Term Credits		15.0

Term 10

HSCI 201	Health Assessment through the Lifespan	4.0
Health Sciences electives		6.0

Sociology elective	4.0
Free elective	3.0
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Term Credits	17.0

Total Credit: 180.5

Accelerated BS/DPT: Physical Therapy Option

About the Accelerated BS/DPT Option

Drexel's undergraduate Health Sciences Program and graduate Physical Therapy (PT) Program have partnered to offer an Accelerated dual-degree BS/DPT option available to high-achieving students enrolled in the Health Sciences Program. The *Accelerated BS/DPT Option* is an accelerated academic track that enables students to complete their Bachelor of Sciences and Doctor of Physical Therapy degrees in 5.5 years as opposed to the traditional 6.5 years. Students pursue a BS degree in Health Sciences during their first three years of study, and a DPT degree during their final 2.5 years of study. The bachelor's degree in Health Sciences is awarded following completion of year four (first year of graduate study), and the doctoral degree is awarded following completion of the Physical Therapy program.

For additional information visit the Accelerated BS/DPT Option (<http://www.drexel.edu/cnhp/academics/departments/Health-Sciences>) on Health Sciences page.

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
UNIV NH101	The Drexel Experience	1.0

English Sequence

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Biology Sequence

BIO 122	Cells and Genetics	4.5
BIO 124	Evolution & Organismal Diversity	4.5
BIO 126	Physiology and Ecology	4.5
BIO 226	Microbiology for Health Professionals	5.0

Chemistry Sequence

CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0

Mathematics Sequence

MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0

Physics for Life Sciences

PHYS 152	Introductory Physics I	4.0
PHYS 153	Introductory Physics II	4.0

Communications

COM 320 [WI]	Science Writing	3.0
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Health Systems

HSAD 210	Health-Care Ethics I	3.0
Select one of the following:		
HSAD 309	Advanced Health-Care Ethics	
HSAD 310	Introduction to Health-Systems Administration	
HSAD 345	Ethics in Health Care Management	

Psychology

PSY 101	General Psychology I	3.0
One Psychology (PSY) course (minimum 3 credits)		3.0

Sociology

SOC 101	Introduction to Sociology	3.0
One Sociology (SOC) course (minimum 3 credits)		4.0
Public Health		
PBHL 101	Public Health 101	3.0
One Public Health (PBHL) course (minimum 3 credits)		3.0
Anatomy & Physiology Courses		
ANAT 101	Anatomy & Physiology I	5.0
ANAT 102	Anatomy & Physiology II	5.0
ANAT 103	Anatomy & Physiology III	5.0
Clinical Research Courses		
HSCI 310	Introduction to Clinical Research	4.0
HSCI 313	Clinical Trials Protocols	4.0
Statistics and Assessment		
HSCI 201	Health Assessment through the Lifespan	4.0
STS 345	Statistics for the Health Sciences	4.0
STS 350	Advanced Statistics for Clinical Science	4.0
Free Electives		
Health Sciences electives (HSCI, PHGY, ANAT, NEUR, NFS) *		15.0
1st-Year DPT Courses - see DPT curriculum **		49.0
Total Credits		189.5

* Health Sciences electives include any HSCI, ANAT, PHGY, NEUR or NFS course. Certain Health Services Administration (HSAD) and Behavioral Health Counseling (BHC) courses may also be taken as Health Sciences electives; see your advisor for more information.

** Students receive their BS degree in Health Sciences after successful completion of the Fall, Winter, and Spring term courses in the first year of the DPT curriculum.

Accelerated BS/MHS: Physician Assistant Option

About the Accelerated BS/MHS Option

Drexel's undergraduate Health Sciences Program and graduate Physician Assistant (PA) Program have partnered to offer an accelerated dual-degree BS/MHS option available to high achieving students enrolled in the Health Sciences Program. The *Accelerated BS/MHS PA Option* is an accelerated academic track that enables students to complete their bachelor's and master's degrees in Health Sciences, including sitting for the Physician Assistant National Certifying Exam (PANCE), in 5.25 years as opposed to the traditional 6.25 years. Students pursue a Bachelor of Science degree in Health Sciences during their first three years of study, and a Master of Health Science degree during the final 2.25 years of study. The bachelor's degree in Health Sciences is awarded following completion of year four (first year of graduate study), and the master's degree is awarded following completion of the Physician Assistant Program.

For additional information visit the Accelerated BS/MHS Option (<http://www.drexel.edu/cnhp/academics/departments/Health-Sciences>) on Health Sciences page.

General Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
UNIV NH101	The Drexel Experience	1.0

English Sequence

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Biology Sequence

BIO 122	Cells and Genetics	4.5
BIO 124	Evolution & Organismal Diversity	4.5
BIO 126	Physiology and Ecology	4.5
BIO 226	Microbiology for Health Professionals	5.0
Chemistry Sequence		
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
Mathematics Sequence		
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
Communications		
COM 320 [WI]	Science Writing	3.0
Health Systems		
HSCI 125	Medical Terminology	3.0
HSAD 210	Health-Care Ethics I	3.0
Select one of the following:		3.0
HSAD 309	Advanced Health-Care Ethics	
HSAD 310	Introduction to Health-Systems Administration	
HSAD 345	Ethics in Health Care Management	
Psychology		
PSY 101	General Psychology I	3.0
One Psychology (PSY) course (minimum 3.0 credits)		3.0
Sociology		
SOC 101	Introduction to Sociology	3.0
One Sociology (SOC) course (minimum 3.0 credits)		4.0
Public Health		
PBHL 101	Public Health 101	3.0
One Public Health (PBHL) course (minimum 3.0 credits)		3.0
Anatomy & Physiology Courses		
ANAT 101	Anatomy & Physiology I	5.0
ANAT 102	Anatomy & Physiology II	5.0
ANAT 103	Anatomy & Physiology III	5.0
Genetics		
HSCI 337	Genetics and Health	3.0
Clinical Research Courses		
HSCI 310	Introduction to Clinical Research	4.0
HSCI 313	Clinical Trials Protocols	4.0
Statistics and Assessment		
HSCI 201	Health Assessment through the Lifespan	4.0
STS 345	Statistics for the Health Sciences	4.0
STS 350	Advanced Statistics for Clinical Science	4.0
Health Sciences electives (HSCI, PHGY, ANAT, NEUR, NFS) *		15.0
Free electives		6.0
1st Year PA Courses: see PA-MHS curriculum		46.0
Total Credits		186.5

* Health Sciences electives include any HSCI, ANAT, PHGY, NEUR or NFS course. Certain Health Services Administration (HSAD) and Behavioral Health Counseling (BHC) courses may also be taken as Health Sciences electives; see your advisor for more information.

** Students receive their BS degree in Health Sciences after successful completion of the Fall, Winter, and Spring term courses in the first year of the PA-MHS curriculum.

Facilities

The College of Nursing and Health Professions is located on Drexel University's Center City Campus, adjacent to Hahnemann University Hospital. The proximity of this major medical center provides a rich environment for students to study and experience the health sciences. Students have access to the *Center for Interdisciplinary Clinical*

Simulation and Practice (CICSP) which utilizes patient actors and automated simulation manikins to mimic real-life human physiology. The CICSP provides undergraduate Health Sciences students the opportunity to learn assessment and communication skills in a controlled setting. The College of Nursing and Health Professions also maintains the *Stephen and Sandra Sheller 11th Street Family Health Services of Drexel University*, a comprehensive, community-based health center, where students have unique opportunities to observe and participate in health care delivery.

Health Sciences Faculty

William D'Andrea, MS, BS Pharm, CCP (*MCP Hahnemann University*). Assistant Clinical Professor. Pharmacology, anatomy & physiology, advanced pharmacology.

David Ebaugh, PT, PhD (*Drexel University*) *Director, Human Anatomy Lab*. Clinical Professor. Physical Therapy, identification and treatment of underlying neuromusculoskeletal factors associated with rotator cuff disease.

Mary Elizabeth Flynn, PhD (*Temple University*). Assistant Teaching Professor. Anatomy and physiology, developmental biology, genetics

Alan Haroian, PhD (*St. Louis University*). Associate Teaching Professor. Examination of the normal afferent and efferent connections of the mouse cerebella nuclei.

Michael L. Kirifides, PhD (*Hahnemann University*). Assistant Teaching Professor. Intracellular electrophysiology, ratiometric calcium imaging, fluorescence microscopy and flow cytometry.

Margery A. Lockard, PT, PhD (*Hahnemann University*). Clinical Professor. Orthopedic/musculoskeletal physical therapy; management of patients using prosthetic and orthotic devices; and anatomy and physiology.

Robert J. Mele, DPM (*Pennsylvania College of Podiatric Medicine*). Assistant Teaching Professor. Physiology, pathophysiology.

Janell L. Mensinger, PhD (*City University of New York*). Associate Teaching Professor. Behavioral health promotion strategies, treating obesity, clinical research methods, statistics. Body perception, obesity and eating disorders.

R. Peter Meyer, PhD (*Temple University*). Associate Professor. Quantitative microscopy studies.

Krista L. Rompolski, PhD (*University of Pittsburgh*). Assistant Teaching Professor. Interventions to prevent and treat diabetes mellitus, obesity, cardiovascular disease, and complications during pregnancy.

Joseph A. Rubertone, MPT, PhD (*West Virginia University*). Associate Clinical Professor. Connectivity of vestibular nuclear complex, brain tumor imaging, and clinical studies pertaining to the effectiveness of stroke rehabilitation.

Sinclair A. Smith, MS, DSc (*Boston University*) *Chair, Health Sciences*. Professor. The use of magnetic resonance spectroscopy and near infrared spectroscopy to non-invasively study neuromuscular metabolism in humans; creatine supplementation on mitochondrial respiration; weight training studies.

Vincent J. Zarro, MD, PhD (*Hahnemann Medical College*). Clinical Associate Professor. Community and preventative medicine.

Health Services Administration

Major: Health Services Administration

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 51.0701

Standard Occupational Classification (SOC) code: 11-9111

About the Program

The Health Services Administration program provides students with a foundation in management and economic principles related to health care, as well as an understanding of the administrative structure, operations, and policies of the health care industry.

Additional options are available for students wishing to complete an accelerated BS degree immediately prior to pursuing graduate study.

The Health Services Administration (HSA) curriculum is a four-year full-time course of study consisting of 180.0 quarter credits and including one cooperative (co-op) experience comprised of two consecutive quarter terms during the first half or the second half of the junior year. (A non-co-op full-time time option is also available). Transfer students are eligible for the full-time curriculum with or without co-op depending on the number of approved transfer credits.) The curriculum is designed to give students a foundation in general management and economic principles and policies related to health care, as well as to expose students to the quantitative and qualitative aspects of the health care industry by means of courses in health care related to policy, law, economics, management, marketing, and health information systems. At the same time, the curriculum provides interdisciplinary courses dealing with religious, ethical, psychosocial, political, legal, literary, and historical perspectives regarding health care practices and populations in need of health care. Courses in disability and aging expand students' understanding of the role of society and health care in the lives of individuals not always well understood. In addition, the curriculum can prepare students wishing to pursue graduate studies in health services administration, business administration, public health, law, and health communication.

The program also provides a concentration and a minor in HSA and an online certificate in Medical Billing and Coding (p. 321) for Drexel University bachelor's degree-seeking students.

Courses are available online (<http://online.drexel.edu/online-degrees/healthcare-degrees/bs-hsa>). A maximum of 90.0 semester credits can be transferred.

Additional Information

The contact for this program is:

Susan Feinstein, BS
Program Coordinator, Health Services Administration
1601 Cherry Street, 7th floor, Room 773
Philadelphia PA, 19102
267-359-5543
slf52@drexel.edu

For more information, visit the Health Services Administration (<https://www.drexel.edu/cnhp/academics/undergraduate/BS-MPH-Dual-Degree-Program>) page on the College's website.

Degree Requirements

English Sequence		
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Natural Sciences		8.0-10.0
Students may select from Biology (BIO), Chemistry (CHEM) or Anatomy (ANAT) courses. However, any course selected must include a laboratory component. Additional natural science subject options may be considered with the approval of the student's advisor.		
Mathematics		
MATH 101	Introduction to Analysis I	3.0-4.0
	or MATH 181 Mathematical Analysis I	
MATH 102	Introduction to Analysis II	3.0-4.0
	or MATH 182 Mathematical Analysis II	
Computing Course		
CS 161	Introduction to Computing	3.0
Drexel Experience		
CIVC 101	Introduction to Civic Engagement	1.0
UNIV NH101	The Drexel Experience	1.0
Health Services Administration Core Requirements		
HSAD 210	Health-Care Ethics I	3.0
HSAD 310	Introduction to Health-Systems Administration	3.0
HSAD 321	Health-Care Human Resources	3.0
HSAD 322	Health-Care Law	3.0
HSAD 330	Financial Management in Health Care	3.0
HSAD 331 [WI]	Non-profits and Health Care	3.0
HSAD 332 [WI]	Health-Care Marketing	3.0
HSAD 334	Management of Health Services	3.0
HSAD 335 [WI]	Health-Care Policy	3.0
HSAD 340	Leadership in Health Services Administration	3.0
HSAD 345	Ethics in Health Care Management	3.0
9 Health Services Administration (HSAD) electives *		27.0
Business Courses		
ACCT 110	Accounting for Professionals	4.0
Complete 1 of the following ECON courses:		
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	
ECON 240	Economics of Health Care Systems	
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0
	or STS 345 Statistics for the Health Sciences	
Humanities and Social Sciences		
PSCI 110	American Government I	4.0
SOC 101	Introduction to Sociology	3.0
Humanities and Social Sciences electives		29.0
Free Electives		40.0
Total Credits		180.0-184.0

* HSAD 316 Health Care across Cultures, HSAD 325 Issues in the Health Care System, and HSAD 320 Managed Health Care are recommended electives.

Sample Plan of Study

Four Year Year Co-op and Spring/Summer Cycle

Term 1		Credits
CS 161	Introduction to Computing	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0

SOC 101	Introduction to Sociology	3.0
UNIV NH101	The Drexel Experience	1.0
Natural Science course with laboratory *		4.0-5.0
Term Credits		14.0-15.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
HSAD 310	Introduction to Health-Systems Administration	3.0
HSAD 210	Health-Care Ethics I	3.0
MATH 101 or 181	Introduction to Analysis I Mathematical Analysis I	3.0-4.0
Natural Science courses with laboratory *		4.0-5.0
Term Credits		16.0-18.0
Term 3		
ACCT 110	Accounting for Professionals	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HSAD 334	Management of Health Services	3.0
MATH 102 or 182	Introduction to Analysis II Mathematical Analysis II	3.0-4.0
Term Credits		14.0-15.0
Term 4		
HSAD 322	Health-Care Law	3.0
PSCI 110	American Government I	4.0
Humanities/Social Science elective		3.0
Free elective		3.0
Health Services Administration (HSAD) elective		3.0
Term Credits		16.0
Term 5		
ECON 201, 202, or 240	Principles of Microeconomics Principles of Macroeconomics Economics of Health Care Systems	4.0
HSAD 332 [WI]	Health-Care Marketing	3.0
HSAD 340	Leadership in Health Services Administration	3.0
Health Services Administration (HSAD) elective		3.0
Humanities/Social Science elective		3.0
Term Credits		16.0
Term 6		
HSAD 330	Financial Management in Health Care	3.0
HSAD 335 [WI]	Health-Care Policy	3.0
Humanities/Social Science elective		3.0
Free electives		6.0
Term Credits		15.0
Term 7		
Health Services Administration (HSAD) elective		3.0
Humanities/Social Science electives		6.0
Free electives		6.0
Term Credits		15.0
Term 8		
ORGB 300 [WI]	Organizational Behavior	4.0
Humanities/Social Science elective		3.0
Health Services Administration (HSAD) elective		3.0
Free electives		6.0
Term Credits		16.0
Term 9		
HSAD 321	Health-Care Human Resources	3.0
Health Services Administration (HSAD) elective		3.0
Humanities/Social Science elective		3.0
Free electives		6.0
Term Credits		15.0
Term 10		
HSAD 331 [WI]	Non-profits and Health Care	3.0

STS 345 or STAT 201	Statistics for the Health Sciences Introduction to Business Statistics	4.0
Humanities/Social Science electives		6.0
Term Credits		13.0
Term 11		
Health Services Administration (HSAD) electives		6.0
Humanities/Social Science elective		3.0
Free elective		6.0
Term Credits		15.0
Term 12		
HSAD 345	Ethics in Health Care Management	3.0
Health Services Administration (HSAD) electives		6.0
Free electives		6.0
Term Credits		15.0

Total Credit: 180.0-184.0

* Students may select from Biology (BIO), Chemistry (CHEM) or Anatomy (ANAT) courses. However, any course selected must include a laboratory component. Additional natural science subject options may be considered with the approval of the student's advisor.

Dual/Accelerated Degree

Accelerated Dual Degree BS/MPH in Health Services Administration/Masters of Public Health

The Health Services Administration program and the Master of Public Health program in the School of Public Health offer an accelerated dual degree option. Participants can earn both a BS degree in Health Services Administration and a Master of Public Health (MPH) degree in five years.

In this accelerated dual degree program, students participate in the Health Services Administration program for three years (nine academic quarters and one co-operative experience). After three years of undergraduate study students begin their graduate studies in the Master of Public Health program. Nineteen (19.0) quarter credits from the first year of graduate study will be credited toward completion of the students' Bachelor of Science degrees. After the successful completion of the first year of graduate study, students receive their BS. When students successfully complete the remainder of their graduate studies (typically one additional year), they will receive the MPH degree.

Students in this accelerated, dual degree program apply to the graduate Masters of Public Health Program (<http://catalog.drexel.edu/graduate/schoolofpublichealth/publichealth>) during the fall quarter of their junior year. They then follow the same application procedures as other applicants, including being interviewed by the graduate faculty. (Any student who does not meet the entrance requirements of the graduate program will be able to complete the fourth year of the Health Services Administration program and receive a BS degree.)

Students in the Master of Public Health program complete 64.0 graduate quarter credits to meet the requirements of the master's program. The accelerated, dual degree program represents an acceleration of only the undergraduate portion of the student's curriculum.

For additional information, visit the College of Nursing and Health Professions Accelerated Dual Degree Programs (<https://www.drexel.edu/cnhp/academics/undergraduate/BS-MPH-Dual-Degree-Program>) page.

HSAD BS/MPH 3 + 2 Program

Degree Requirements

(Sample plan of study is listed below requirements)

English Sequence

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Biology Courses

BIO 107 & BIO 108	Cells, Genetics & Physiology and Cells, Genetics and Physiology Laboratory	4.0
BIO 109 & BIO 110	Biological Diversity, Ecology & Evolution and Biological Diversity, Ecology and Evolution Laboratory	4.0

Computing Course

MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0

Mathematics Sequence

CS 161	Introduction to Computing	3.0
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Informatics Course

HSCI 204	Clinical Health Informatics	3.0
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Drexel Experience

UNIV NH101	The Drexel Experience	2.0
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Core Health Services Administration (HSAD) Courses

HSAD 210	Health-Care Ethics I	3.0
HSAD 309	Advanced Health-Care Ethics	3.0
HSAD 310	Introduction to Health-Systems Administration	3.0
HSAD 321	Health-Care Human Resources	3.0
HSAD 322	Health-Care Law	3.0
HSAD 330	Financial Management in Health Care	3.0
HSAD 331 [WI]	Non-profits and Health Care	3.0
HSAD 332 [WI]	Health-Care Marketing	3.0
HSAD 334	Management of Health Services	3.0
HSAD 335 [WI]	Health-Care Policy	3.0
HSAD 340	Leadership in Health Services Administration	3.0

Nine Health Services Administration (HSAD) Electives 27.0

Business Courses

ACCT 115	Financial Accounting Foundations	4.0
ECON 240	Economics of Health Care Systems	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0

Humanities and Social Sciences Courses

ANTH 101	Introduction to Cultural Diversity	3.0
COM 111	Principles of Communication	3.0
COM 230	Techniques of Speaking	3.0
COM 280	Public Relations Principles and Theory	3.0
PHIL 105	Critical Reasoning	3.0
PSCI 110	American Government I	4.0
PSY 101	General Psychology I	3.0
PSY 120	Developmental Psychology	3.0
PSY 240 [WI]	Abnormal Psychology	3.0
PSY 250 [WI]	Industrial Psychology	3.0
SOC 101	Introduction to Sociology	3.0
SOC 115	Social Problems	3.0
SOC 125	Sociology of Aging	3.0
SOC 215	Sociology of Work	3.0
SOC 235	Sociology of Health and Illness	3.0

Free Electives

Two Free electives		6.0
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Credits from the Graduate MPH Program

PBHL 530	Principles of Epidemiology	4.0
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PBHL 540	Prevention Principles and Practices	4.0
PBHL 550	Community Based Prevention Practices	4.0
PBHL 640	Environmental Health	4.0
PBHL 650	Public Policy and Advocacy	3.0

Total Credits		180.0
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Sample BS/MPH Plan of Study

"A" Track, one Fall/Winter Co-Op

(The "B" track follows the same sequence, with the exception of having the Co-Op in Spring/Summer of Junior year.)

First Year

Fall		Credits
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
CS 161	Introduction to Computing	3.0
SOC 101	Introduction to Sociology	3.0
UNIV 101	The Drexel Experience	1.0
Term Credits		14.0

Winter

BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
HSAD 310	Introduction to Health-Systems Administration	3.0
MATH 101	Introduction to Analysis I	4.0
PSY 101	General Psychology I	3.0
UNIV 101	The Drexel Experience	1.0
Term Credits		18.0

Spring

ACCT 115	Financial Accounting Foundations	4.0
HSAD 334	Management of Health Services	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 102	Introduction to Analysis II	4.0
PSY 120	Developmental Psychology	3.0
Term Credits		17.0

Summer

Vacation		
Term Credits		0.0

Second Year

Fall

COM 111	Principles of Communication	3.0
ECON 240	Economics of Health Care Systems	4.0
PSCI 110	American Government I	4.0
SOC 125	Sociology of Aging	3.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		18.0

Winter

ANTH 101	Introduction to Cultural Diversity	3.0
HSCI 204	Clinical Health Informatics	3.0
PSY 240 [WI]	Abnormal Psychology	3.0
SOC 215	Sociology of Work	3.0
Health Services Administration (HSAD) Electives*		6.0
Term Credits		18.0

Spring

COM 280	Public Relations Principles and Theory	3.0
HSAD 210	Health-Care Ethics I	3.0
HSAD 330	Financial Management in Health Care	3.0
PHIL 105	Critical Reasoning	3.0
SOC 235	Sociology of Health and Illness	3.0

Free Elective		3.0
Term Credits		18.0
Summer		
COM 230	Techniques of Speaking	3.0
HSAD 321	Health-Care Human Resources	3.0
HSAD 322	Health-Care Law	3.0
HSAD 335 [WI]	Health-Care Policy	3.0
PSY 250 [WI]	Industrial Psychology	3.0
Free Elective		3.0
Term Credits		18.0
Third Year		
Fall		
Co-Op		
Health Services Administration (HSAD) Elective		3.0
Term Credits		3.0
Winter		
Co-Op		
Health Services Administration (HSAD) Elective		3.0
Term Credits		3.0
Spring		
HSAD 331 [WI]	Non-profits and Health Care	3.0
HSAD 332 [WI]	Health-Care Marketing	3.0
ORGB 300 [WI]	Organizational Behavior	4.0
Health Services Administration (HSAD) Electives **		6.0
Term Credits		16.0
Summer		
HSAD 309	Advanced Health-Care Ethics	3.0
HSAD 340	Leadership in Health Services Administration	3.0
SOC 115	Social Problems	3.0
Health Services Administration (HSAD) Electives ***		6.0
Free Elective		3.0
Term Credits		18.0
Fourth Year		
Fall		
19.0 Credits from the Master of Public Health Program		19.0
Term Credits		19.0

Total Credit: 180.0

- * HSAD 316 Health Care across Cultures is a recommended elective.
- ** HSAD 325 Issues in the Health Care System is a recommended elective.
- *** HSAD 320 Managed Health Care Managed Health Care is a recommended elective.

Minor in Health Services Administration

The minor in health services administration is designed for students interested in preparing for careers in health services administration while pursuing a major in another area. In addition, the curriculum can prepare students wishing to pursue graduate studies in health-services administration, business administration, public health, and law.

Required Courses

HSAD 210	Health-Care Ethics I	3.0
HSAD 310	Introduction to Health-Systems Administration	3.0
HSAD 334	Management of Health Services	3.0
Complete 1 of the following courses:		3.0
HSAD 330	Financial Management in Health Care *	
HSAD 340	Leadership in Health Services Administration	
HSAD 345	Ethics in Health Care Management	

Complete 4 of the following courses:		12.0
HSAD 309	Advanced Health-Care Ethics	
HSAD 312	Development of World Health Care	
HSAD 313	Evolution of Health Care in the United States	
HSAD 315	Interdisciplinary Health Services	
HSAD 316	Health Care across Cultures	
HSAD 317	Religious Views on Health Care	
HSAD 318	Health and Vulnerable Populations	
HSAD 319	Women and the Health Professions	
HSAD 320	Managed Health Care	
HSAD 323	Health Services and the Elderly	
HSAD 324	Health Technology and Ethical Responsibility	
HSAD 325	Issues in the Health Care System	
HSAD 326	Holism and Health Care	
HSAD 328	Health Care for Diverse Groups	
HSAD 329	Health Care and the Media	
HSAD 336	Urban Health Care	
HSAD 337	Health Care/Quality Improvement	
HSAD 341	Risk Management in Healthcare Organizations	
HSAD 342	Children and Health Care	
HSAD 343	Health and Illness in Film	
HSAD 346	Mental Illness in the Media and Arts	
HSAD 351	Ethical Issues in Reproduction	
HSAD 353	Public Health Ethics	
Total Credits		24.0

* Requires ACCT 115 (p. 550) as a prerequisite.

Health Services Administration Faculty

Jesse Ballenger, PhD (*Case Western Reserve University*). Associate Teaching Professor. Healthcare, medicine and ethics; aging and neurodegenerative diseases; Science and Technology Studies.

Fred DiCostanzo, EdD (*Rutgers University*). Assistant Professor. Organizational leadership, Healthcare Management, Human resources and team effectiveness

David Flood, PhD (*University of Pennsylvania*). Professor. Medical humanities: an examination of topics in medicine and health care from the perspectives of literature, the arts, and medical ethics.

Stephen F. Gambescia, PhD, MEd, MBA (*Temple University*). Professor. Health care policy, nonprofits and health care, and health care management and leadership.

Kristine A. Mulhorn, PhD (*University of Delaware*) *Chair, Department of Health Administration*. Professor. Disability and aging; cross-national methods of functioning.

Constance Karin Perry, PhD, EMT (*University of Buffalo*). Associate Professor. Biomedical ethics and ethical theory. Research interests include autonomy, personhood, feminist ethics, the ethics of animal experimentation, and ethical issues in reproduction and pregnancy.

Michelle Sahl, PhD, MEd, MBA, MBE (*The University of the Sciences in Philadelphia*). Associate Teaching Professor. Health management and policy: management and leadership of health services organizations, urban health, and the history of health care systems.

Spencer R. Ward, PhD (*University of Nebraska*). Assistant Professor. The use of behavioral techniques to reduce performance anxiety, improve the knowledge acquisition process and promote distance-learning models.

Nursing

Major: Nursing

Degree Awarded: Bachelor of Science Degree in Nursing (BSN)

Calendar Type: Quarter

Total Credit Hours: 185.0; Accelerated Career Entry: 220.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 51.3801

Standard Occupational Classification (SOC) code: 29-1141

About the Program

The BS in Nursing (BSN) is a full-time, five year program. This program offers three paid, six-month cooperative education experiences. There is also a full-time, four-year option with one, 6 month co-op experience in the 3rd year of study. Students graduate with a bachelor of science in nursing and eligibility to sit for the RN licensure examination.

The BS in nursing degree is approved by the Pennsylvania State Board of Nursing, the National League for Nursing Accreditation Commission, and the American Association of Colleges of Nursing.

Drexel's nursing curriculum is built to respond to the rapidly changing health care system, as well as to student's needs. Graduates of the baccalaureate program will be prepared to:

- Utilize the growing compendium of knowledge and information sources from nursing and other disciplines to learn, teach, heal the sick, and conserve health.
- Contribute to the profession by sharing knowledge and skills with clients, peers, and other professionals in a variety of methods.
- Utilize multiple technologies that access and manage information to guide professional practice.
- Participate in culturally sensitive health promotion activities that contribute to the community's health and wellness.
- Participate in ongoing educational activities related to personal growth, professional practice, and community service.
- Apply knowledge and skills appropriate to their selected areas of career clinical practice.
- Develop personal potential for leadership in a changing health care environment.
- Integrate ethical concepts and principles, The Code of Ethics for Nurses, and professional standards into practice within professional, academic, and community settings.
- Utilize critical-thinking skills to improve the health outcomes of patients, families, and communities across the continuum of care.

A BSN is awarded at the completion of the program.

For more information about the BSN with Co-Op option at Drexel, visit the Nursing Co-Op Program (<https://www.drexel.edu/cnhp/academics/undergraduate/BSN-Nursing-CO-OP>) page.

Degree Requirements

Students should contact their Academic Advisor for any changes to their plans of study prior to registration due to ongoing curriculum updates.

General requirements

CIVC 101	Introduction to Civic Engagement	1.0
UNIV NH101	The Drexel Experience	2.0

English Sequence

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Biology/Nutrition courses

BIO 226	Microbiology for Health Professionals	5.0
NFS 220	Normal & Lifespan Nutrition	4.0
NFS 315	Nutrition in Chronic Disease	4.0

Chemistry courses

CHEM 103	General Chemistry III	5.0
CHEM 108	Health Chemistry I	3.0

Humanities and Social Science courses

ECON 240	Economics of Health Care Systems	4.0
HSAD 210	Health-Care Ethics I	3.0
PSY 101	General Psychology I	3.0
PSY 120	Developmental Psychology	3.0
SOC 101	Introduction to Sociology	3.0

Language Requirement (Choose 1 of the following courses) *

ARBC 101	Arabic I	
CHIN 101	Chinese I	
FREN 101	French I	
GER 101	German I	
GREC 101	Modern Elementary Greek I	
HBRW 101	Introduction to Hebrew I	
ITAL 101	Italian I	
JAPN 101	Japanese I	
KOR 101	Korean I	
PORT 101	Introduction to Portuguese I	
RUSS 101	Russian I	
SPAN 101	Spanish I	

Mathematics/Data Analysis courses

MATH 101	Introduction to Analysis I **	4.0
STS 345	Statistics for the Health Sciences	4.0

Anatomy courses

ANAT 101	Anatomy & Physiology I	5.0
ANAT 102	Anatomy & Physiology II	5.0
ANAT 103	Anatomy & Physiology III	5.0

Nursing courses

NURS 120	Contemporary Health Care	3.0
NURS 121	Relationship-Based Nursing Care	3.0
NURS 220	Foundations of Nursing Practice	8.0
NURS 221	Concepts of Pathophysiology in Nursing	3.0
NURS 222	Medication Principles	3.0
NURS 223	Clinical Concepts	2.0
NURS 320	Health and Illness Concepts I	6.0
NURS 321	Health and Illness Concepts II	6.0
NURS 322	Concepts of Mental Health Nursing	6.0
NURS 323	Nursing Pharmacology Concepts I	3.0
NURS 326	Reproductive Health Across the Lifespan	6.0
NURS 327	Population Health Concepts	6.0
NURS 328	Pediatric Health Concepts	6.0
NURS 329	Nursing Pharmacology Concepts II	3.0

NURS 420	Health and Illness Concepts III	6.0
NURS 421	Holistic Gerontological Nursing	6.0
NURS 422	Leadership Concepts in Nursing	3.0
NURS 423	Research Basis of Nursing Practice	4.0
NURS 495	Comprehensive Nursing Concepts	3.0
Electives		
Humanities electives		3.0
Social Science electives		3.0
Nursing electives		9.0
Free electives		6.0
Total Credits		183.0

* Or approved language course, as determined by student's Academic Advisor

** Or other mathematics equivalent by placement exam.

Sample Plans of Study

Students should contact their Academic Advisor for any changes to their plans of study prior to registration due to ongoing curriculum updates.

Term 1		Credits
ANAT 101	Anatomy & Physiology I	5.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101*	Introduction to Analysis I	4.0
NURS 121	Relationship-Based Nursing Care	3.0
PSY 101	General Psychology I	3.0
UNIV NH101	The Drexel Experience	2.0
Term Credits		20.0
Term 2		
ANAT 102	Anatomy & Physiology II	5.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PSY 120	Developmental Psychology	3.0
SOC 101	Introduction to Sociology	3.0
Language Requirement		4.0
Term Credits		19.0
Term 3		
ANAT 103	Anatomy & Physiology III	5.0
BIO 226	Microbiology for Health Professionals	5.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
NURS 120	Contemporary Health Care	3.0
Term Credits		16.0
Term 4		
NURS 220	Foundations of Nursing Practice	8.0
NURS 221	Concepts of Pathophysiology in Nursing	3.0
NURS 222	Medication Principles	3.0
NURS 223	Clinical Concepts	2.0
Term Credits		16.0
Term 5		
CHEM 108	Health Chemistry I	3.0
NFS 220	Normal & Lifespan Nutrition	4.0
NURS 320	Health and Illness Concepts I	6.0
NURS 323	Nursing Pharmacology Concepts I	3.0
Term Credits		16.0
Term 6		
CHEM 103	General Chemistry III	5.0
NURS 321	Health and Illness Concepts II	6.0
NURS 329	Nursing Pharmacology Concepts II	3.0
Term Credits		14.0

Term 7		
ECON 240	Economics of Health Care Systems	4.0
NFS 315	Nutrition in Chronic Disease	4.0
NURS 322	Concepts of Mental Health Nursing	6.0
Term Credits		14.0

Term 8		
HSAD 210	Health-Care Ethics I	3.0
NURS 326	Reproductive Health Across the Lifespan	6.0
STS 345	Statistics for the Health Sciences	4.0
Social Science elective		3.0
Term Credits		16.0

Term 9		
NURS 327	Population Health Concepts	6.0
NURS 423	Research Basis of Nursing Practice	4.0
Humanities elective		3.0
Nursing elective		3.0
Term Credits		16.0

Term 10		
NURS 328	Pediatric Health Concepts	6.0
NURS 422	Leadership Concepts in Nursing	3.0
Nursing elective		3.0
Term Credits		12.0

Term 11		
NURS 421	Holistic Gerontological Nursing	6.0
Nursing elective		3.0
Free elective		3.0
Term Credits		12.0

Term 12		
NURS 420	Health and Illness Concepts III	6.0
NURS 495	Comprehensive Nursing Concepts	3.0
Free elective		3.0
Term Credits		12.0
Total Credit: 183.0		

* Or other mathematics equivalent by placement exam.

About the Co-op

Cooperative education was designed to provide students with real-world experience in a variety of professional settings before graduation. Co-op integrates full-time work experience in the student's field of study throughout the academic program. The College of Nursing and Health Professions co-op program is one of only two of its kind in the nation.

The nursing co-op provides students with 18 months of cooperative education in addition to the traditional clinical educational experiences.

Through co-op, students will have the opportunity to learn the role of the nurse and unlicensed assistive personnel as well as other daily professional, political, and social issues in a work environment. Both before and during co-op, students will receive instruction on career management and professional development skills, such as résumé writing, job searches, interviewing skills, maintaining a career portfolio, negotiating salary, and professional behavior in the workplace. The clinical background students gain from co-op, coupled with a knowledge of career management, makes the Drexel option a value-added model of nursing education.

Co-op Descriptions

First Experience

Co-op I: Nursing in Contemporary Health Networks

Students will have cooperative education experiences in managed care settings, pharmaceutical companies, and other non-traditional healthcare work environments where nurses and nursing can effect change. Students will either work under the direction of a professional nurse or another health care professional with a minimum of a baccalaureate degree. Students will not perform any basic nursing skills in this role.

Second Experience

Co-op II: Acute and Chronic Health and Illness

Students on the 4-year track participate in Co-Op II, an education experience in the traditional health care environment that emphasize the delivery of nursing care to adults and adolescents with acute and chronic illnesses. The majority of placements will be in general and specialty medical-surgical units. Students will function in the role as an unlicensed assistive person and their job description will be modeled similarly to unlicensed assistive personnel or nursing externs.

Third Experience

Co-op III: Specialty Nursing Concentration

Students will have cooperative education experiences in a specialty area of their choice which will build upon their previous clinical courses and work experiences. For example, students may elect to specialize in labor and delivery, critical care, or return to work for a pharmaceutical or managed care company. Selection of content area for the Co-op III site will be made by each student in consultation with the student's faculty advisor. Students will be given a suggested reading list and texts to be used for supplemental reading and learning for the specialty co-op area. Students will function in the role as an unlicensed assistive person and their job description will be modeled similarly to the role of unlicensed assistive personnel or nursing externs.

Accelerated Career Entry (ACE) BSN

About the Program

Drexel University offers the Accelerated Career Entry Option (<https://www.drexel.edu/cnhp/academics/undergraduate/Accelerated-Career-Entry-to-Nursing-Program>), a one-year intensive nursing program for students who already have bachelor's or graduate degrees. The program is ideal for working adults or college graduates who want to change careers and earn a new degree in one year. This innovative program is geared to students who will benefit from intense education in nursing science rather than the traditional program, which takes three or four years.

Like their counterparts in the traditional baccalaureate nursing program, graduates of the accelerated program emerge with a set of skills that will serve them well in their chosen profession. Our graduates:

- Utilize the growing compendium of knowledge and information sources from nursing and other disciplines to learn, teach, heal the sick, and conserve health.
- Contribute to the profession by sharing knowledge and skills with clients, peers, and other professionals in a variety of methods.
- Utilize multiple technologies that access and manage information to guide professional practice.
- Participate in culturally sensitive health promotion activities that contribute to the community's health and wellness.
- Participate in ongoing educational activities related to personal growth, professional practice, and community service.
- Apply knowledge and skills appropriate to their selected areas of career clinical practice.

- Develop personal potential for leadership in a changing health care environment.
- Integrate ethical concepts and principles, The Code of Ethics for Nurses, and professional standards into practice within professional, academic, and community settings.
- Utilize critical-thinking skills to improve the health outcomes of patients, families, and communities across the continuum of care.

Admission requirements/Prerequisites

Candidates for admission must be college graduates with a 3.0 overall GPA or a 3.0 GPA in their most-recent 60 semester hours of coursework completed. Admitted students must complete all prerequisites before continuing with the program. Applicants whose native language is not English and/or were born outside of the United States are required to take both the TOEFL (Test of English as a Foreign Language) and the TSE (Test of Spoken English) and achieve a passing score in each.

Prerequisites

Effective for spring quarter 2013-14 (201335) and beyond, the following 8 courses, in semester terms, are prerequisites for the ACE program:

Chemistry with lab	4.0
Developmental Psychology	3.0
Anatomy with lab *	4.0
Physiology with lab *	4.0
Microbiology with lab *	4.0
Human Nutrition	3.0
Statistics	3.0
English	3.0

* The anatomy, physiology, and microbiology courses must have been taken within five years of beginning the program.

Degree Requirements

Students should contact their Academic Advisor for any changes to their plans of study prior to registration due to ongoing curriculum updates.

Required Courses

INFO 204	Nursing Informatics	3.0
NURS 110	Essentials of Relationship-Based Professional Nursing Practice	4.0
NURS 112	Relationship-Based Health Assessment & Promotion	5.0
NURS 200	Principles of Nursing Practice	6.0
NURS 300	Comprehensive Adult Nursing I	6.0
NURS 301	Pharmacology for Nursing I	3.0
NURS 303	Women's Health Nursing	6.0
NURS 304	Nursing of Children	6.0
NURS 305	Comprehensive Adult Nursing II	6.0
NURS 306	Pharmacology for Nursing II	3.0
NURS 308	Mental Health Nursing	6.0
NURS 330 [WI]	Research Basis of Nursing	4.0
NURS 337 [WI]	Genetics in Nursing and Health	3.0
NURS 339	Pathophysiology	3.0
NURS 400 [WI]	Leadership, Management, and Entrepreneurship in Nursing	3.0
NURS 401	Comprehensive Adult Nursing III	6.0
NURS 403	Community Public Health Nursing	6.0
NURS 450	Contemporary Gerontological Nursing	6.0
NURS 492	Senior Seminar in Nursing	3.0
Total Credits		88.0

RN/BSN Completion Program

Bachelor of Science Degree in Nursing (BSN): 180.0 quarter credits (for Registered Nurses)

The RN/BSN Completion program is an option for nurses from associate degree and diploma nursing programs looking to complete the bachelor of science degree in nursing.

About the Program

The Bachelor of Science in Nursing program continues the education of registered nurses to prepare them for the rapidly changing health care environment. Core courses prepare the graduate for population-based cases and the managed care environment. Support courses, electives, and study in an area of the student's choosing build on foundational educational experiences to facilitate the examination of critical issues from a variety of perspectives.

A BSN is awarded at the completion of the program. Qualified students are encouraged to submatriculate in the MSN program (RN/BSN/MSN pathway) while enrolled in the BSN program.

For more information about this completion program at Drexel, visit the RN/BSN Completion Program (<https://www.drexel.edu/cnhp/academics/undergraduate/RN-to-BSN-Completion-Program>) page.

Admission Requirements/Prerequisites

Admission Requirements

- RN licensure (provisional acceptance will generally be offered pending successful completion of the NCLEX-RN examination)
- Official college transcripts
- College grade point average of 2.0 or better
- High school degree or equivalent

To be eligible for admission to the Bachelor of Science in nursing program, students must have completed 60.0 semester hours (90.0 quarter credits) of college prerequisites, as follows, with a grade of C or better. Students may transfer in up to 135.0 quarter credits. Remaining credits will be evaluated on an individual basis. To graduate, students must have completed 180.0 quarter credits.

The required 60.0 semester hours include:

English (includes one semester of composition)	6.0
Humanities (studio courses not acceptable)	3.0
Anatomy and Physiology	8.0
Microbiology	4.0
Sociology	3.0
Growth and Development	3.0
Psychology	3.0
Nursing	30.0
Total Credits	60.0

Students must be graduates of nursing programs that are both regionally accredited and accredited by the Accreditation Commission for Education for Nursing (ACEN). Students who meet the criteria of the Pennsylvania Nursing Articulation Model will receive credit for 30.0 semester hours (45.0 quarter credits) of nursing, which may be applied toward the program entrance requirements.

Degree Requirements

The College of Nursing and Health Professions faculty uses a variety of teaching and learning methods to facilitate the achievement of a student's personal objectives. Most courses incorporate e-mail and Internet assignments as well as a variety of innovative, active learning assignments. Courses are offered in several stimulating educational formats, including in an online format.

Students should contact their Academic Advisor for any changes to their plans of study prior to registration due to ongoing curriculum updates.

TIER 1 COURSES

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Or transfer in 2 English courses (3 semester credits from a semester school) must include one semester of composition)

Humanities Electives	3.0
Intro to Sociology	3.0
General Psychology	3.0
Developmental Psychology	3.0
Nursing Electives	45.0
Anatomy & Physiology I & II (w/ Labs)	10.0
Microbiology w/ Lab	5.0
Science Elective	3.0

TIER 2 COURSES

Intro to Computer Science of Communication	3.0
Statistics of the Health Sciences	4.0
Health Care Economics, Macro, or Micro	4.0
Health Care Ethics I or Advanced Health Care Ethics	3.0
Social Science Electives	3.0
Science Electives	6.0
Pharmacology or Advanced Physiology or Pathophysiology	5.0
Open Electives	23.0

TIER 3 COURSES

NURS 324	Intro to Online Learning:Tools for Success	3.0
NURS 325 [WI]	Critical Issues in Nursing	3.0
NURS 330 [WI]	Research Basis of Nursing	4.0
NURS 335	Genetics and Genomics: Application to Nursing Practice	3.0
NURS 340	Transformational Leadership	3.0
NURS 346	Health Assessment	6.0
NURS 375	Nurses Building a Healthy Community	6.0
NURS 380	Complex Systems of Care: Technology, Patient Safety & Quality	4.0
NURS 407 [WI]	Issues in Aging and Longevity	4.0
NURS 460	Global Health & Policy Issues	6.0
NURS 465	Senior Capstone in Nursing	3.0
Total Credits		180.0

The plan of study posted is contingent on all students having an active, non-restricted RN license, and having completed 45.0 quarter credits from an accredited nursing program and 135.0 quarter credits in Tier I & Tier II.

Students enter the program with a variable amount of credits to complete. Students need a minimum of 90.0 quarter credits, or Tier I completed, to be accepted into the program. Students may start Tier III upon entering the RN-BSN program; however, all course work in Tier I & II must be completed prior to graduation for a total of 180.0 quarter credits.

Accelerated RN/BSN/MSN

The RN-BSN-MSN Option is a pathway for students who are currently in the Drexel RN to BSN completion program and are interested in continuing their studies to pursue the MSN.

Admission

For the following tracks, students submit an application to the MSN program in the final term of BSN study:

- MSN in Nursing Education and Faculty Role
- MSN in Clinical Trials
- MSN in Clinical Nurse Leader
- MSN in Leadership in Health Systems Management
- MSN in Innovation & Intra/Entrepreneurship for Advanced Practice Nursing.

Students interested in either the Nurse Anesthesia program or Nurse Practitioner programs may opt for an accelerated option. The following Nurse Practitioner tracks are available:

- Adult-Gerontology Acute Care Nurse Practitioner (online track)
- Adult-Gerontology Primary Care Nurse Practitioner (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/adultgerontologyprimarycarecon>) (online track)
- Family/Individual Across the Life Span Nurse Practitioner (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/familynursepractitionercon>) (online track)
- Pediatric Acute Care Nurse Practitioner (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/pediatricacutecon>) (online track)
- Pediatric Primary Care Nurse Practitioner (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/pediatricprimarycarecon>) (online track)
- Psychiatric Mental Health Nurse Practitioner (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/psychiatricmentalhealthcon>) (online track)
- Women's Health/Gender Related Nurse Practitioner (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/womensnursepractitionercon>) (online track)

For both the Nurse Anesthesia and the Nurse Practitioner programs, students submit an application when close to completing their BSN degrees. The BSN students must meet the admission requirements for the MSN program. Specific admission criteria are outlined on the Admission Requirements RN to BSN to MSN Option (<http://drexel.edu/cnhp/academics/graduate/MSN-Bridge>) page.

Students may not register for graduate courses until they are accepted in the program. Additional information is available on the RN-BSN-MSN (<http://drexel.edu/cnhp/academics/graduate/MSN-Bridge>) program page.

Student in any of the MSN Nurse practitioner tracks may be admitted from any state, except New York. In addition, students taking an online course with a clinical component or practicum cannot do the clinical or practicum portion of the course within the state of Maryland at this time. If a student is a licensed registered nurse in Maryland, the student may complete a clinical or practicum in Virginia and/or Delaware, which share a nurse compact licensure with Maryland. Drexel University is in the process of applying for a certificate of approval to operate in Maryland.

Clinical Affiliations

Clinical Placement Sites

The Undergraduate Nursing Programs have an extensive network of clinical placement sites, including:

Stephen and Sandra Sheller 11th Street Family Health Services

Abington Memorial Hospital

Albert Einstein Medical Center

ARIA Health Torresdale

Belmont Behavioral Health

Bryn Mawr Hospital of Main Line Health

Chandler Hall Health Services

Chestnut Hill Hospital

Children's Hospital of Philadelphia

Cooper University Hospital

Crozer-Chester Medical Center

Delaware County Memorial Hospital

Doylestown Hospital

Einstein Medical Center Montgomery

Fairmount Behavioral Health

Hahnemann University Hospital

Holy Redeemer Health System

Hospital of the University of Pennsylvania

Inspira Health Network Woodbury

Kennedy Health

Kirkbride Center

Lankenau Medical Center

Mercy Philadelphia Hospital

Methodist Hospital

Nazareth Hospital

Norcom Community Center

Norris Square Civic Association

Northeast Treatment Centers

Our Brother's Place

Paoli Hospital

Paul's Run Retirement Community

Pennsylvania Hospital

Presbyterian Medical Center
 School District of Philadelphia
 St. Christopher's Hospital for Children
 St. Joseph's Manor
 St. Mary Medical Center
 Shriner's Hospital for Children
 The Ridge at Whitmarsh
 Thomas Jefferson University Hospital
 Watermark at Logan Square
 Wellington Terrace at Hershey's Mill
 Wesley Enhanced Living

* RN/BSN Online Distance-Learning students will have clinical placements at sites convenient to their locations.

Nutrition and Foods

Major: Nutrition and Foods

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 184.5

Co-op Options: One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 30.0901

Standard Occupational Classification (SOC) code: 29-1031

About the Program

The nutrition and foods curriculum emphasizes the relationship between food, food choices, nutrient metabolism, and medical nutrition therapy to meet health and nutrient needs of individuals and groups.

The BS in Nutrition and Foods program requires four years of study and the completion of at least 180.0 credits. The curriculum is designed to provide a sound basis for careers in dietetics and the application of the principles of nutrition and food science to the nutritional care of individuals and groups—such as in school food service or community nutrition—or to provide a sound basis for careers in the food and pharmaceutical industries.

The study of the biochemical nature of nutrients and foods, their interaction with the environment, and their eventual metabolic fate is a strong career path for more research-minded students and provides a unique base for graduate study.

About the Nutrition Program

Dietetics is the practical application of nutrition in the prevention and treatment of disease. Dietetics is an exciting and challenging profession because there are many diseases that are related to nutrition, such as heart disease, high blood pressure, stroke, cancer, diabetes and obesity.

The nutrition program at Drexel University is referred to as a Didactic Program in Dietetics (DPD) because it provides classroom training for students who want to become Registered Dietitians/Nutritionists (RD/RDN). Our Didactic Program in Dietetics is accredited by the Accreditation

Council For Education in Nutrition and Dietetics (ACEND) of the Academy of Nutrition and Dietetics:

Academy of Nutrition and Dietetics
 120 S. Riverside Plaza
 Suite 2000
 Chicago, IL 60606
 800-877-1600 x5400
www.eatright.org (<http://www.eatright.org>)

The Academy of Nutrition and Dietetics (AND) is the nation's largest organization of food and nutrition professionals, most of whom are Registered Dietitians (RD) or Registered Dietitian Nutritionists (RDN).

To become an RD/RDN, students must complete a:

- Minimum of a bachelor's degree with course work approved by ACEND. Coursework typically includes food and nutrition sciences, chemistry, biochemistry, physiology, microbiology, community nutrition, nutrition counseling, basic and quantity food preparation, foodservice systems management and medical nutrition therapy.
- An accredited, supervised practice program, also called a dietetic internship (DI), at health-care facilities, community agencies and in foodservice operations. The internship must provide a minimum of 1200 hours of hands-on training.
- Pass a national examination administered by the Commission on Dietetic Registration.

After successfully completing the BS program in Nutrition and all DPD-required courses with a C or better, students will receive a BS degree and a DPD Verification Statement. The Verification Statement is a certificate documenting completion of an accredited Didactic Program in Dietetics. Students need both a minimum of Bachelor's degree and a Verification Statement to be eligible for a dietetic internship.

During the senior year, most students apply for admission into a dietetic internship. To have a good chance of getting accepted into a dietetic internship, students should do the following:

- Maintain a cumulative GPA greater than 3.0 (this includes college courses regardless of where taken).
- Work several hundred hours in dietetics-related work and volunteer experience (especially in the food and nutrition departments at hospitals and nursing homes and in community programs such as WIC).
- Participate in activities that demonstrate leadership.

Mission, Goals, and Outcome Measures

The mission of the Drexel University Didactic Program in Dietetics is to integrate a foundation in the nutrition sciences with courses in the humanities to provide the knowledge, skills, and professional values (such as ethics) needed for successful entry into dietetic internships, graduate school, and/or dietetics employment. The learning environment is structured to allow students opportunities for experiential learning, including co-operative education, participation in research, and use of current technologies.

GOAL 1

To provide quality didactic instruction and learning experiences to prepare graduates to be accepted into dietetic internships and graduate schools, and/or work in the field of dietetics.

- 75% of graduating BS students and 90% of graduating MS students will apply to an accredited dietetic internship.
- 80% of students who apply to dietetic internships are accepted.
- 75% of students who apply to graduate school are accepted.
- Of those graduates seeking employment in nutrition and food-related careers, 80% will be employed within 6 months of program completion.
- On surveys to internship directors, graduate school advisors, and employers, the mean rating of each of 10 learning outcomes will exceed the rating of "3" (satisfactory).
- On surveys to students one year after graduation, the mean rating of each of 10 learning outcomes will meet or exceed the rating of "3" (satisfactory) or better.
- On course evaluation responses, 90% of the knowledge and skill statements identified in the course syllabi will be rated as competent.

GOAL 2

To prepare graduates who are accepted into accredited internship programs to become competent entry-level dietitians.

- The program's first time pass rate on the entry level exam is 80% or above.

GOAL 3

Through recruitment efforts, encouragement, motivation, and support, faculty and staff will increase the number of students and the diversity of students who enter and complete the didactic program in dietetics.

- At least 10% of DPD students will be from underrepresented groups.
- At least 90% of students will complete the program within 150% of the expected time frame for the program (BS full-time = 4 years; BS part-time = 5-7 years).

For more information, visit the College's Nutrition and Sciences (<https://www.drexel.edu/cnhp/academics/undergraduate/BS-Nutrition-and-Foods>) web page.

Admission/Graduation Requirements

Admission Requirements

Drexel takes into consideration a number of criteria when determining admission, including the applicant's application, transcripts, courses in progress, two recommendations, standardized test scores, essay, and special interests (list of extracurricular activities, employment, etc.). Applicants to the Nutrition and Foods program must have completed four years of high school mathematics (algebra I and II, geometry, and trigonometry) and two years of a laboratory science (biology, chemistry, or physics). Applicants should have a strong interest in, and aptitude for, the basic sciences that are required in the program.

To be considered as a transfer student, candidates should have completed a minimum of 24 college credits. Drexel operates on a rolling admission basis, which means that students will be notified about the admission decision as soon as possible after their files are complete.

Visit the Admissions (<http://drexel.edu/undergrad/academics/majors>) web site for more information and to apply online.

Graduation Requirements

To receive a BS in Nutrition and Foods, students in the program must complete a plan of study of all required courses and enough elective courses to total at least 180.0 credits. An overall GPA of 2.0 or higher for

all coursework undertaken at Drexel University must be earned to receive a BS. A "C" or better is required in all courses in the Didactic Program in Dietetics in order to receive a verification statement.

For the current academic calendar, visit Drexel University Academic Calendars (<http://drexel.edu/provost/calendars/academic-calendars>).

Degree Requirements

Communications and English

COM 230	Techniques of Speaking	3.0
COM 345	Intercultural Communication	3.0
or COM 310	Technical Communication	
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Physical and Biological Sciences

ANAT 101	Anatomy & Physiology I	5.0
ANAT 102	Anatomy & Physiology II	5.0
ANAT 103	Anatomy & Physiology III	5.0
BIO 122	Cells and Genetics	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
NFS 215	Nutritional Chemistry	3.0
NFS 217	Nutrient Quality & Composition	1.0

Humanities and Social Sciences

ANTH 101	Introduction to Cultural Diversity	3.0
or SOC 101	Introduction to Sociology	
PSY 101	General Psychology I	3.0

Management and Computing

CS 161	Introduction to Computing	3.0
HRM 455	Hospitality Human Resources Management	3.0
ORGB 300 [WI]	Organizational Behavior	4.0

Foods, Food Safety, and Food Production

CULA 115	Culinary Fundamentals	3.0
FDSC 154	Science of Food and Cooking	4.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
FDSC 350	Experimental Foods: Product Development	3.0
HRM 215	Commercial Food Production	4.0

Mathematics and Statistics

MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
STS 345	Statistics for the Health Sciences	4.0

Nutrition and Food Sciences

NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
NFS 203	Nutrition II: Nutrition in the Lifecycle	4.0
NFS 230	Intermediate Nutrition	4.0
NFS 265	Professional Issues in Nutrition and Foods	3.0
NFS 345	Foods and Nutrition of World Cultures	3.0
NFS 370	Foodservice Systems Management	4.0
NFS 391	Community Nutrition	4.0
NFS 415	Advanced Nutrition I: Macronutrition	4.0
NFS 416	Advanced Nutrition II: Micronutrients	4.0
NFS 431	Nutrition Counseling	4.0
NFS 443	Medical Nutrition Therapy I	3.0
NFS 444	Medical Nutrition Therapy II	3.0
NFS 445	Medical Nutrition Therapy III	3.0
NFS 475	Advanced Seminar in the Dietetics Profession	3.0
NFS 494	Senior Project I	2.0
NFS 495	Senior Project II	2.0

NFS 496	Senior Project III	2.0
Additional Requirements		
UNIV NH101	The Drexel Experience	2.0
Free Electives		30.0
Total Credits		184.5

Sample Plan of Study

BS Nutrition and Foods: 4 YR UG (with one co-op spring/summer junior year)

Term 1		Credits
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSY 101	General Psychology I	3.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
UNIV NH101	The Drexel Experience	2.0
Term Credits		14.5
Term 2		
CHEM 102	General Chemistry II	4.5
CS 161	Introduction to Computing	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 101	Introduction to Analysis I	4.0
Term Credits		14.5
Term 3		
CHEM 103	General Chemistry III	5.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FDSC 154	Science of Food and Cooking	4.0
MATH 102	Introduction to Analysis II	4.0
Term Credits		16.0
Term 4		
ANAT 101	Anatomy & Physiology I	5.0
BIO 122	Cells and Genetics	4.5
NFS 230	Intermediate Nutrition	4.0
Free Elective		3.0
Term Credits		16.5
Term 5		
ANAT 102	Anatomy & Physiology II	5.0
CULA 115	Culinary Fundamentals	3.0
FDSC 270	Microbial Food Safety and Sanitation	4.0
NFS 215	Nutritional Chemistry	3.0
NFS 217	Nutrient Quality & Composition	1.0
Term Credits		16.0
Term 6		
ANAT 103	Anatomy & Physiology III	5.0
COM 345	Intercultural Communication	3.0
NFS 203	Nutrition II: Nutrition in the Lifecycle	4.0
NFS 265	Professional Issues in Nutrition and Foods	3.0
Term Credits		15.0
Term 7		
ANTH 101 or SOC 101	Introduction to Cultural Diversity Introduction to Sociology	3.0
COM 230	Techniques of Speaking	3.0
STS 345	Statistics for the Health Sciences	4.0
Free Elective		6.0
Term Credits		16.0
Term 8		
HRM 215	Commercial Food Production	4.0
FDSC 350	Experimental Foods: Product Development	3.0
NFS 415	Advanced Nutrition I: Macronutrition	4.0

Free Elective		6.0
Term Credits		17.0
Term 9		
NFS 416	Advanced Nutrition II: Micronutrients	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Free Elective		6.0
Term Credits		14.0
Term 10		
NFS 391	Community Nutrition	4.0
NFS 443	Medical Nutrition Therapy I	3.0
NFS 475	Advanced Seminar in the Dietetics Profession	3.0
NFS 494	Senior Project I	2.0
Free Elective		3.0
Term Credits		15.0
Term 11		
NFS 370	Foodservice Systems Management	4.0
NFS 431	Nutrition Counseling	4.0
NFS 444	Medical Nutrition Therapy II	3.0
NFS 495	Senior Project II	2.0
Free Elective		3.0
Term Credits		16.0
Term 12		
HRM 455	Hospitality Human Resources Management	3.0
NFS 345	Foods and Nutrition of World Cultures	3.0
NFS 445	Medical Nutrition Therapy III	3.0
NFS 496	Senior Project III	2.0
Free Elective		3.0
Term Credits		14.0

Total Credit: 184.5

Minor in Nutrition

The minor in nutrition is designed for students interested in enhancing their major with an application in human nutrition. The nutrition minor should be especially attractive to students in the premedical, biological, and behavioral neurological sciences, as it provides a background for enhanced employment and post-baccalaureate study opportunities in areas closely allied to their basic disciplines.

The minor consists of 25.0 credits. Interested students should consult with a nutrition and food science faculty member to schedule courses appropriate for their background and goals.

Required courses

NFS 200	Nutrition I: Principles of Nutrition	4.0
or NFS 230	Intermediate Nutrition	
NFS 203	Nutrition II: Nutrition in the Lifecycle	4.0
NFS 315	Nutrition in Chronic Disease	4.0
Select four of the following courses:		12.0-14.0
NFS 320	Pediatric Nutrition	
NFS 325	Nutrition & Exercise Physiology	
NFS 415	Advanced Nutrition I: Macronutrition	
NFS 416	Advanced Nutrition II: Micronutrients	
NFS 446	Perspectives in World Nutrition	
NFS 480	Special Studies in Nutrition and Food	
Total Credits		24.0-26.0

Career Opportunities

Possible career opportunities in dietetics include the following:

- *Clinical Dietitians* are specialists in food nutrition services in hospitals, outpatient clinics, and private practices. They assess patient nutrition,

develop dietary plans, provide patient counseling, and monitor patient progress.

- *Community Dietitians* work in public health agencies, health and fitness clubs, and day care centers. They counsel people on food choices and direct programs in nutrition awareness and disease prevention.
- *Management Dietitians* specialize in food service systems or clinical management. They work in hospitals, nursing homes, school food service, cafeterias, and restaurants. They manage personnel, plan and conduct employee training programs, design food systems, and plan budgets.
- *Business Dietitians* work in the food industry in product development and marketing, public relations, food styling, and menu design.
- *Consultant Dietitians* are independent business people who work as consultants to nursing homes, sports team, and other clients.

Facilities

The Center for Integrated Nutrition and Performance (CINP), located in the Daskalakis Athletic Center, provides a variety of nutrition services to the Drexel community, including workshops, lectures, support for athletic teams, and individual counseling. An employee weight loss program is available through CINP.

Food preparation laboratories feature state-of-the-art equipment for both experimental and quantity food production.

Bioscience teaching laboratories are available with networked computers and advanced digital image analysis capabilities. Both teaching and research laboratories contain a range of equipment including microscopes, centrifuges, chromatographs, spectrophotometers, scintillation counters, culture chambers, and densitometers.

Nutrition Sciences Faculty

Joan Rosen Bloch, PhD, CRNP (*University of Pennsylvania*). Associate Professor. Maternal and infant health outcomes with a particular focus on racial and ethnic perinatal health disparities.

Joseph Boullata, PharmD, RPh, BCSNP, FASPEN (*University of Maryland*). Clinical Professor. Nutrition-medication interactions; vitamin D metabolism; nutrition support.

Charlene Compher, PhD, RD, CNSC, LDN, FADA, FASPEN (*Drexel University*) *Courtesy Appointment*. Visiting Research Professor.

Robin M. Danowski, MS, RD, LDN. Instructor. Renal Nutrition

Nyree Dardarian, MS, RD, LDN, CSSD, FAND (*Drexel University*) *Director, Center for Nutrition and Performance*. Clinical Assistant Professor. Energy expenditure; sports nutrition

Francesco De Luca, MD (*Catholic University of Sacred Heart, Rome, Italy*) *Courtesy Appointment*. Visiting Research Professor.

Angelo Del Parigi, MD (*University of Bari, Italy*) *Courtesy Appointment*. Visiting Research Professor.

Jonathan Deutsch, PhD (*New York University*). Professor. Social and cultural aspects of food, culinary education, culinary improvisation, recipe and product development; food sustainability.

Rose Ann DiMaria-Ghalili, PhD, MSN, BSN, CNSC (*New York University, School of Education, Division of Nursing*). Associate Professor. Nutrition

and surgical recovery to improve the care of older adults undergoing surgery; nutrition assessment, inflammation, and health outcomes.

Garrison L. Draper, MSc, CSCS, USAW, ISPAS (*Edith Cowan University, Perth, WA*) *Courtesy Appointment*. Visiting instructor

Susan Ettinger, PhD, RD, DABN, CDN (*Columbia University*) *Courtesy Appointment*. Visiting Research Professor.

Debi Page Ferrarello, RN, MSN, MS, IBCLC, RLC (*Jefferson University, Arcadia University*). Instructor. Human lactation

Andrea Judge, MPH, IBCLC, RLC (*University of North Carolina*). Clinical Instructor. Human lactation

Joseph Kehayias, PhD (*Indiana University*). Professor. Body composition analyses; measurement of sarcopenia; osteoporosis; energy expenditure.

Tanya V.E. Kral, PhD (*Pennsylvania State University*) *Courtesy Appointment*. Visiting Research Professor.

Jake Lahne, PhD (*University of Vermont*). Assistant Professor. Sensory perception and preference in foods; flavor chemistry and sensory properties of alcoholic beverages; artisan, traditional, and local foods; consumer food choice and taste; cooking practice and food agency

Beth L. Leonberg, MS, MA, RD (*Colorado State University, Rowan University*) *Director, Didactic Program in Dietetics*. Instructor. Pediatric nutrition.

Rachelle Lessen, MS, RD, IBCLC, LDN (*Arcadia University*). Instructor. Human lactation

Michael Lowe, PhD (*Boston College*). Professor. Prevention and treatment of eating disorders and obesity; effects of appetitive responsiveness and dietary restraint on eating regulation; psychobiology of obesity-proneness; empirical foundations of unconscious processes.

Janel L. Mensinger, PhD (*City University of New York*). Associate Teaching Professor. Behavioral health promotion strategies, treating obesity, clinical research methods, statistics. Body perception, obesity and eating disorders.

Brandy-Joe Milliron, PhD (*Arizona State University*). Assistant Professor. The development and evaluation of modifications in the natural environment to promote healthier living; farm to table school initiatives;

Juan Muniz, PhD (*Oregon State University*) *Director, Nutrition Biochemistry Laboratory*. Assistant Research Professor. Food microbiology; community-based research to assess pesticide levels in homes; prevention of health effects of pesticides for indigenous farmworkers.

Jennifer Nasser, PhD, RD, FTOS (*Rutgers University*). Associate Professor. Dopamine-mediated mechanisms of food intake regulation in humans and its impact on metabolic homeostasis, especially as it applies to obesity, eating disorders and aging.

Margaret O'Neil, PT, PhD, MPH (*MCP Hahnemann University; Duke University; University of North Carolina at Chapel Hill*). Associate Professor. Measurement of and interventions to improve physical activity and fitness levels and promote participation in children and youth with who are overweight/obese and those with physical disabilities (especially cerebral palsy).

Irene E. Olsen, PhD, RD, LDN (*Tufts University*) *Courtesy Appointment*. Visiting Research Professor.

Jennifer Quinlan, PhD (*North Carolina State University*). Associate Professor. Food microbiology; microbiological quality and safety of produce, dairy and meat products in markets in high vs. low socioeconomics areas, Bacillus and Clostridium spores in food processing.

Sobhana Ranjan, PhD, RD (*University of Delhi, India*) *Courtesy Appointment*. Visiting Research Professor.

Barry Ritz, PhD (*Drexel University*) *Courtesy Appointment*. Visiting Research Professor.

Patricia A. Shewokis, PhD (*University of Georgia*). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy (fNIR) and electroencephalography (EEG) and methodology and research design.

Sinclair A. Smith, MS, DSc (*Boston University*) *Chair, Health Sciences*. Professor. The use of magnetic resonance spectroscopy and near infrared spectroscopy to non-invasively study neuromuscular metabolism in humans; creatine supplementation on mitochondrial respiration; weight training studies.

Deeptha Sukuman, PhD (*Rutgers University*). Assistant Professor. Vitamin D and magnesium and bone mineral density; obesity and bone mineral density.

Alison Ventura, PhD (*Pennsylvania State University*) *Courtesy Appointment*. Visiting Research Professor. Factors that contribute to the development of eating behaviors and dietary preferences during infancy and early childhood.

Stella Lucia Volpe, PhD, RD, LDN, FACSM (*Virginia Polytechnic Institute and State University*) *Chair, Nutrition Sciences*. Professor. Prevention of obesity and diabetes across the lifespan; mineral metabolism and exercise; energy balance; sports nutrition.

Emeritus Faculty

Donna H. Mueller, PhD (*Temple University*) *Registered Dietitian, Nutrition and Foods*. Associate Professor Emeritus. Clinical nutrition; pediatric nutrition; nutrition in pulmonary diseases, especially cystic fibrosis; nutrition in developmental delay; dental nutrition; dietetic education and professional development.

Minor in Addictions Counseling

The minor in addictions counseling provides students with an understanding of current best-practice approaches in counseling interventions aimed at assisting people in recovery from substance use disorders. This minor appeals to students in a wide range of Drexel majors, including psychology, criminal justice, health services administration, sociology, health sciences, education, general humanities and social science, nutrition and foods, as well as other fields of study.

Academic Requirements

The minor requirements includes 15.0 credits in five required courses and 9.0 credits in three courses selected from a list of ten electives. Students may elect to begin coursework in this minor at any point in their undergraduate education. It is strongly suggested that students pursuing

this minor consult with faculty in the Behavioral Health Counseling (<https://www.drexel.edu/cnhp/academics/departments/Behavioral-Health>) program for advice in selecting electives that will best meet their goals in this minor.

Required Courses

BACS 220	Counseling Theory and Practice	3.0
BACS 234	Introduction to Addictive Disorders	3.0
BACS 304	Cognitive and Behavioral Counseling I	3.0
BACS 310	Recovery and Relapse Prevention	3.0
BACS 367	Advanced Counseling Intervention	3.0
Select three of the following:		9.0
BACS 232	Ethics and Professional Responsibility	
BACS 255	Multicultural Counseling	
BACS 301	Group Counseling I	
BACS 312	Case Management Methods	
BACS 325	Psychopharmacology for Counselors	
BACS 368	Addictions Counseling with Special Populations	
BACS 370	Problem Gambling Interventions	
BACS 401	Assessment and Treatment Planning	
BACS 412	Group Counseling II	
BACS 414	Co-Occurring Disorders	

Total Credits 24.0

Minor in Psychiatric Rehabilitation

The minor in psychiatric rehabilitation provides students with an understanding of how people with serious mental illnesses learn skills and acquire resources that promote recovery and wellness. The curriculum covers a variety of evidence-based practices that support healthy living, learning, working, and socializing. This minor appeals to students in a wide range of Drexel majors, including psychology, criminology and justice studies, health services administration, sociology, health sciences, education, general humanities and social science, nutrition and foods, as well as other fields of study.

Academic Requirements

The minor requires completion of 24.0 credits, comprised of 15.0 credits in five required courses and 9.0 credits in three courses selected from a list of twelve electives. Students may elect to begin coursework in this minor at any point in their undergraduate education. It is strongly suggested that students pursuing this minor consult with faculty in the Behavioral Health Counseling (<http://www.drexel.edu/cnhp/faculty/behavioral-health>) program for advice in selecting electives that will best meet their goals in this minor.

Required Courses

BACS 220	Counseling Theory and Practice	3.0
BACS 236	Psychiatric Rehabilitation Principles and Practices	3.0
BACS 320	Crisis and Brief Intervention	3.0
BACS 325	Psychopharmacology for Counselors	3.0
BACS 420	Psychiatric Rehabilitation Competencies	3.0
Select three of the following:		9.0
BACS 200	Foundation of Behavioral Health Care	
BACS 230	Genetics and Mental Health	
BACS 234	Introduction to Addictive Disorders	
BACS 255	Multicultural Counseling	
BACS 301	Group Counseling I	
BACS 304	Cognitive and Behavioral Counseling I	
BACS 401	Assessment and Treatment Planning	
BACS 404	Cognitive and Behavioral Counseling II	
BACS 405	Family-Focused Interventions	

BACS 411	Forensic Behavior Health Service
BACS 412	Group Counseling II
BACS 414	Co-Occurring Disorders
Total Credits	
24.0	

Human Lactation

Certificate Level: Undergraduate

Admission Requirements: High School Diploma

Certificate Type: Certificate

Number of Credits to Completion: 18.0

Instructional Delivery: Campus

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.0815

Standard Occupational Classification (SOC) Code: 31-9099

The Human Lactation Certificate Program is designed to provide an opportunity for individuals interested in becoming Internationally Board Certified Lactation Consultants (IBCLCs) to obtain the required 90 hours of didactic coursework and 300 hours of supervised practice to meet eligibility through the International Board Certified Lactation Examiner's Pathway 2. The courses are designed for current Drexel students, practicing health care and public health professionals outside of Drexel, and others interested in entering the health professions.

There is currently a strong global and national emphasis on increasing breastfeeding to promote health at the population level, prevent acute and chronic illness and decrease societal health care costs. The United States Surgeon General, the Centers for Disease Control and Prevention, Healthy People 2020, the Institutes of Medicine, the Joint Commission, Michelle Obama's Let's Move Campaign and many professional associations include breastfeeding as a key health strategy.

The certificate program consists of six, 3.0 credit courses in lactation. The didactic coursework is offered in the classroom setting. The supervised practice is offered at area hospitals with whom CNHP is affiliated, as well as a variety of community-based lactation education/support programs.

Students who wish to become IBCLCs must complete all six courses. To be eligible to take the certifying exam given by the International Board of Lactation Consultant Examiners they must have also completed coursework including anatomy and physiology, biology, child growth and development, nutrition, and psychology, which may be taken at Drexel or other institutions.

Admission Requirements

Applicants must have a high school diploma. The International Board of Lactation Consultant Examiners requires education in 14 health science subjects in addition to education provided in human lactation and breastfeeding in the Certificate Program. Health Sciences courses should be completed prior to enrolling in the Certificate Program; all health sciences courses, with the exception of those noted with an asterisk in the list below, *must* be completed before enrolling in the Certificate in Human Lactation.

A minimum of one quarter, term or semester of each of the following eight academic subjects must be completed at an accredited college or university:

- Biology
- Human Anatomy

- Human Physiology
- Infant and Child Growth and Development
- Introduction to Clinical Research
- Nutrition
- Psychology, OR Counseling Skills, OR Communication Skills
- Sociology, OR Cultural Sensitivity, OR Cultural Anthropology

The remaining six subjects may be completed at an accredited college or university, OR through continuing education courses:

- Basic Life Support*
- Medical Documentation
- Medical Terminology
- Occupational Safety and Security for Health Professionals*
- Professional Ethics for Health Professionals
- Universal Safety Precautions and Infection Control*

*These subjects will be covered during the Compliance process prior to beginning supervised practice, and *do not* need to be completed before enrolling in the program.

A detailed description of acceptable coursework to fulfill these requirements is available in the International Board of Lactation Consultant's *Health Sciences Education Guide*.

Transcripts:

- Official transcripts demonstrating completion of health science requirements must be sent directly to Drexel from all the colleges/universities that you have attended. Transcripts must be submitted in a sealed envelope with the college/university seal over the flap or delivered electronically via secure delivery directly to the Program Director. Please note that transcripts are required regardless of number of credits taken or if the credits were transferred to another school. An admission decision may be delayed if you do not send transcripts from all colleges/universities attended.
- Transcripts must show course-by-course grades and degree conferrals. If your school issues only one transcript for life, you are required to have a course-by-course evaluation completed by an approved transcript evaluation agency
- Please see the Drexel University Supporting Documents Submission Guide (<http://online.drexel.edu/support/supporting-documents.aspx>) for more information.

Requirements

NFS 205	Introduction to Human Lactation	3.0
NFS 305	Clinical Issues in Human Lactation	3.0
NFS 405	Public Policy of Breastfeeding	3.0
NFS 485	Lactation Supervised Practice (Taken 3 times)	9.0
Total Credits		18.0

A minimum grade of C is required for NFS 205, 305, and 405. NFS 485 is pass/fail.

Certificate in Medical Billing and Coding

Certificate Level: Undergraduate

Admission Requirements: High school transcript minimum

*Certificate Type: Certificate**Number of Credits to Completion: 18.0**Instructional Delivery: Online**Calendar Type: Quarter**Expected Time to Completion: 1 year**Financial Aid Eligibility: Aid eligible**Classification of Instructional Program (CIP) Code: 51.0713**Standard Occupational Classification (SOC) Code: 29-2071**Gainful Employment Disclosure (<http://deptapp08.drexel.edu/gainfulemployment/Medical-Coding-Billing/gedt.html>)*

This online certificate program is designed for those who want to begin medical billing, coding, and medical record auditing careers or prepare for certification exams in these areas. Students will learn principles of medical billing and coding related to the three main coding manuals: CPT, ICD-10-CM, ICD-10-PCS and HCPCS. The curriculum covers principles of medical billing and coding for in-patient and outpatient hospitals.

Required Courses

MBC 201	Medical Billing I	3.0
MBC 202	Medical Billing II	3.0
MBC 301	Physician-Based Medical Coding I	3.0
MBC 302	Physician-Based Medical Coding II	3.0
MBC 303	Hospital-Based Medical Coding I	3.0
MBC 304	Hospital-Based Medical Coding II	3.0

If a student has placed out of any of the above courses, he or she can substitute any of the following courses (provided that the prerequisites are met):

MBC 101	Medical Terminology for Billers and Coders
MBC 250	Medical Billing Software
MBC 350	Physician-Based Chart Auditing
MBC 360	Hospital-Based Case Studies

Total Credits	18.0
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Additional Information

CONTACT:

DREXEL UNIVERSITY ONLINE

Email: info@drexel.com

Phone: 877-215-0009

Goodwin College of Professional Studies

In today's competitive job market, education is a smart investment in your future. Goodwin responds to the demands of today's learner by offering programs that tailor a student's learning experience to their career aspirations. Our General Studies degree-completion program is ideal for transfer students who already possess an associate's degree or just have existing college credits. It is also ideal for students who wish to chart their own path toward a college degree.

Major

- Communication and Applied Technology (BS) (p. 323)
- General Studies (BS) (p. 324)
- Professional Studies (BS) (p. 325)

Communication and Applied Technology

Major: Communications and Applied Technology

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Classification of Instructional Programs (CIP) code: 52.0207

Standard Occupational Classification (SOC) code: 43-1011

About the Program

Note: Effective Winter Term 2014, students are no longer being accepted into this program.

The Bachelor of Science in Communications and Applied Technology is a multidisciplinary program designed for individuals who want to increase their knowledge of all aspects of business communications and relevant communication technologies, while understanding the business principles that are necessary to achieve corporate goals.

The major offers a multidisciplinary approach combining theoretical and applied learning principles and encompasses the spectrum of internal and external communications that organizations utilize in their management and marketing functions. The program is tailored to meet the needs of people who sell, communicate, and manage in industries that are heavily customer oriented and are involved in or affected by world markets. The goal of the program is to increase students' understanding of communication, management, applicable technology, business, the world economy, and relationships within their corporate culture.

Curriculum

To complete the Bachelor of Science degree in Communications and Applied Technology, students must earn a minimum of 180.0 quarter credits comprising the following:

- English Composition
- Humanities
- Social Sciences
- Physical Sciences
- Mathematics
- Business

- Computing Technology
- Customer Operations

Degree Requirements

English Composition Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Mathematics Requirements

MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0

College Requirements

GSTD 200	Lifelong Learning Theory & Practice	3.0
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Natural Science Electives *		9.0
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Liberal Studies Electives **		33.0
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Free Electives		36.0
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Business Minor Requirements ***		
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Select six of the following:		24.0
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ACCT 115	Financial Accounting Foundations	
BLAW 201	Business Law I	
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	
FIN 301	Introduction to Finance	
MKTG 301	Introduction to Marketing Management	
ORGB 300	Organizational Behavior [WI]	
OPM 200	Operations Management	
STAT 201	Introduction to Business Statistics	

Communications and Applied Technology

CAT 201 [WI]	Interpersonal Communication	3.0
CAT 302	Customer Service Theory and Practice	3.0
CAT 303	Client Relations Management	3.0
CAT 360	Applied Organizational Research	3.0
CAT 491	Senior Project in Communications and Applied Technology I	3.0
CAT 492	Senior Project in Communications and Applied Technology	3.0
COM 111	Principles of Communication	3.0
COM 230	Techniques of Speaking	3.0
COM 240	New Technologies In Communication	3.0
COM 270 [WI]	Business Communication	3.0
COM 330	Professional Presentations	3.0
COM 335	Electronic Publishing	3.0
COM 370	Advanced Business Writing	3.0
CT 230	Web Development I	3.0
CT 240	Web Development II	3.0
CT 385	Web Development III ****	3.0
PHIL 323	Organizational Ethics	3.0
PROJ 301	Introduction to Project Management	3.0
PRST 303	Interpersonal Skills for Virtual Teams	3.0

Total Credits		180.0
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* Students select 9.0 credits from any of the following sciences: ANAT, BIO,CHEM, ENVR, FDSC, NFS, PHEV, PHYS. Courses from other departments may be considered with advisor approval.

** Africana studies, anthropology, fine arts (history of architecture, art, film, music, theatre), foreign language, history, linguistics, literature, philosophy, political science, psychology, sociology, women's studies, writing.

*** No more than 2 transferred courses may be used to complete the minor. A grade of C (2.0) or better must be earned in each courses in the Minor in Business.

**** After completion of CT 230, CT 240 and CT 385, students can sit for the Certified Internet Webmaster (CIW) exam. Additional self-study may be necessary.

General Studies

Major: General Studies

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Classification of Instructional Programs (CIP) code: 24.0102

Standard Occupational Classification (SOC) code: 11-9199

About the Program

The Bachelor of Science (BS) in General Studies is the ideal degree completion program for self-directed students who desire a program they can tailor to their personal and professional interests. The program covers the fundamentals of a university education while allowing students to exhibit intellectual interest and discipline across a broad range of college-level coursework. A general studies degree informs employers of a graduate's ability to think creatively when problem solving and work independently at a high level with a minimum of direction.

General studies students have more options for courses which apply to their degree requirements when they register for a given term. The flexibility to study subjects which have produced some of the greatest ideas, innovations and art in recorded history, can be both a personally and professionally rewarding benefit of a general studies degree.

Designed for individuals with a diverse college background and varied educational interests that cannot be captured in a single degree program. Students have the opportunity to experiment in a variety of academic subjects through a generous amount of free electives.

The ability to include minors (<http://catalog.drexel.edu/minors>) within the General Studies major can be of great value to working adults who are seeking advancement or a change in their employment. Adult learners looking to improve their earning potential often find that a degree makes them eligible for higher-level positions within their organizations or others.

The Goodwin General Studies degree completion program offers students evening and online options to make it as convenient as possible for working adults to take advantage of the opportunity to return to school and complete their college degree.

Advising

Students in the BS in General Studies program are advised by an academic advisor (determined alphabetically by last name) who serves as an important resource to students as they progress and manage their educational and career goals.

Students receive one-on-one personal advisement to ensure that educational and professional objectives are met within the course of study.

For more information on this major, visit Goodwin College's (http://goodwin.drexel.edu/mep/ug_ptgstd.php) web page.

Degree Requirements

This program is designed for individuals with a diverse college background and varied educational interests that cannot be captured in a single degree program. In consultation with their academic advisor, students have the opportunity to experiment in a variety of academic subjects through a generous amount of free electives. An attractive feature is that students can complete minors (<http://catalog.drexel.edu/minors>) en route to their degree.

College Requirements

GSTD 200	Lifelong Learning Theory & Practice	3.0
GSTD 491	Senior Project in General Studies	3.0

English and Speech Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
COM 230	Techniques of Speaking	3.0

Mathematics Requirements

MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0

Computing Requirement *

Select one of the following:		3.0
CS 161	Introduction to Computing	
CS 171	Computer Programming I	
CT 220	Database I	
CT 230	Web Development I	
PRST 211	Computer Applications for Professionals	
PRST 212	Creative Studies in the World Wide Web	
Additional computing course options, with Advisor approval		

Upper Level Course Requirements

As students choose electives from the categories below, a minimum of 36.0 credits must be upper-level courses (typically 300-level and above).

Natural Science Electives

Students select 9.0 credits from the following: ANAT, BIO, CHEM, FDSC, NFS, PHEV, PHYS. Courses from other departments may be considered with advisor approval.	9.0
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Specialization Requirements

Students must complete 45.0 credits within an area of specialization. The specialization is a set of courses built around a cohesive area of study. An academic advisor must pre-approve the specialization. The specialization will not appear on the student transcript.	45.0
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Liberal Studies Requirements

Students must complete 36.0 credits in Liberal Studies, covering a range of subject areas in the humanities and/or social sciences: anthropology, psychology, sociology, political science, history, philosophy, religion, literature and fine arts. (Arts history or appreciation courses, rather than applied courses.)	36.0
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Free Electives

Total Credits	180.0
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* Courses older than three years will not be transferred into the curriculum.

Co-op/Career Opportunities

A well-rounded education results in an enriched view of the world. Full-time students majoring in General Studies find careers in diverse areas, taking skills they learn at Drexel to their future endeavors.

Some General Studies students are already established in their careers and simply need a bachelor's degree to move into higher positions within their organizations and industries and/or to pursue a master's degree.

Goodwin College's General Studies BS degree is designed for students planning to pursue graduate studies in various professional areas.

Professional Studies

About the Program

Note: Effective Winter Term 2014, students are no longer being accepted into this program.

The Bachelor of Science in Professional Studies program is a multidisciplinary major that prepares students to move into the professional ranks of an organization. Coursework for the major is constructed around five domains that are central to modern professional life—social science (understanding people in a diverse world), critical thinking, creativity, communication, and business. The curriculum is designed to enable students to become professionals in their field of choice, building on their prior education and experience.

The program is designed for aspiring professionals in any industry. Students are encouraged to take the technical knowledge they already possess in their fields, and learn to utilize it as creative and innovative leaders and communicators.

Career Opportunities

The program helps students from a variety of industries improve their professional skills and strengthen their position in the job market. Industries with employees that may benefit from the Professional Studies include, but are not limited to:

- Telecommunications
- Aerospace
- Pharmaceutical
- Retail

Opportunities for Professional Studies graduates include:

- Career advancement within students' current organizations and industries
- Preparation to pursue a master's degree in a variety of areas

Degree Requirements

English Composition Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Corporate Communication Requirements

COM 111	Principles of Communication	3.0
COM 230	Techniques of Speaking	3.0
COM 270 [WI]	Business Communication	3.0

Mathematics Requirements

MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0

College Requirements

GSTD 200	Lifelong Learning Theory & Practice	3.0
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Natural Science Requirements

Students select 9.0 credits from the following: ANAT, BIO, CHEM, FDSC, NFS, PHEV, or PHYS. Courses from other departments may be considered with Departmental approval.	9.0
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Humanities and Social and Behavioral Science Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
PHIL 323	Organizational Ethics	3.0
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
Select one of the following:		3.0
PSY 140	Approaches to Personality	
PSY 150	Introduction to Social Psychology	
PSY 240 [WI]	Abnormal Psychology	
PSY 244	Culture and Personality	
Select one of the following:		3.0
SOC 110	Sociology of the Future	
SOC 210	Race, Ethnicity and Social Inequality	
SOC 230	Gender and Society	
Students select one international or intercultural course. Suggested courses include the following:		3.0
COM 345	Intercultural Communication	
GSTD 150	Introduction to World Religions	
Humanities Elective *		3.0
Business Minor Requirements **		
Select six of the following		24.0
ACCT 115	Financial Accounting Foundations	
BLAW 201	Business Law I	
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	
FIN 301	Introduction to Finance	
MKTG 301	Introduction to Marketing Management	
ORGB 300	Organizational Behavior [WI]	
OPM 200	Operations Management	
STAT 201	Introduction to Business Statistics	
Professional Studies Core		
CAT 201 [WI]	Interpersonal Communication	3.0
CAT 302	Customer Service Theory and Practice	3.0
CAT 360	Applied Organizational Research	3.0
CRTV 301	Foundations in Creativity	3.0
CRTV 302	Tools and Techniques in Creativity	3.0
CRTV 303	Creativity in the Workplace	3.0
PROJ 301	Introduction to Project Management	3.0
PRST 211	Computer Applications for Professionals	3.0
PRST 212	Creative Studies in the World Wide Web	3.0
PRST 303	Interpersonal Skills for Virtual Teams	3.0
PRST 330	Career & Professional Development	3.0
PRST 440	Policy Analysis	3.0
PRST 450	Creative Leadership for Professionals	3.0
PRST 491 [WI]	Professional Portfolio I (not available online)	3.0
PRST 492 [WI]	Professional Portfolio II (not available online)	3.0
Free Electives ****		48.0
Depending on transfer credits and professional goals, students may use free electives to pursue a minor/certificate. Students should see their advisor for details.		
Total Credits		180.0

* Students select one humanities elective, such as English (ENGL); history (HIST); philosophy (PHIL); fine arts, or a foreign language course.

** No more than 2 transferred courses may be used to complete the minor. A grade of C (2.0) or better must be earned in each courses in the Minor in Business.

LeBow College of Business

About the College

The mission of the LeBow College of Business is to integrate Drexel University's technological prominence with experience-based education to develop world-class leaders and advance knowledge through research. At the undergraduate level, this objective is accomplished by providing high-quality educational programs that integrate theory and practice. Drexel's highly regarded co-operative education program in which students interchange periods of academic study and full-time, off-campus employment with partner companies, sets us apart from other business schools

The College and its distinguished faculty are committed to advancing the science and practice of management through basic, applied, and instructional research in the various disciplines of business. The College maintains strong connections to business professions and the community through participation in professional organizations, a commitment to community service, and dedication to providing opportunities for lifelong learning. Drexel's LeBow College of Business—fully accredited by AACSB-International—offers four distinct undergraduate degrees, twelve majors, ten minors and three certificate programs.

Majors

- Accounting (BS) (p. 328)
- Business Analytics (co-major) (BS) (p. 331)
- Business and Engineering (BS) (p. 334)
- Finance (BS) (p. 337)
- General Business (BS) (p. 340)
- Legal Studies (BS) (p. 342)
- Management Information Systems (BS) (p. 344)
- Marketing (BS) (p. 347)
- Operations and Supply Chain Management (BS) (p. 350)
- Organizational Management (co-major) (BS) (p. 353)
- Technology Innovation Management (co-major) (BS) (p. 355)

Minors

- Accounting (p. 330)
- Business Administration (p. 357)
- Business Analytics (p. 333)
- Finance (p. 339)
- Legal Studies (p. 343)
- Management Information Systems (p. 346)
- Marketing (p. 349)
- Operations and Supply Chain Management (p. 352)
- Organizational Management (p. 354)
- Technology Innovation Management (p. 357)

Certificates

- Brand and Reputation Management (p. 358)
- Social Responsibility in Business (p. 358)

About the College

The mission of the LeBow College of Business is to integrate Drexel University's technological prominence with experience-based education to develop world-class leaders and advance knowledge through research. At the undergraduate level, this objective is accomplished by providing high-quality educational programs that integrate theory and practice. Our highly regarded co-operative education program in which students interchange periods of academic study and full-time, off-campus employment with partner companies, sets us apart from other business schools. The College and its distinguished faculty are committed to advancing the science and practice of management through basic, applied, and instructional research in the various disciplines of business. The College maintains strong connections to business professions and the community through participation in professional organizations, a commitment to community service, and dedication to providing opportunities for lifelong learning. Drexel's LeBow College of Business—fully accredited by AACSB-International—offers four distinct undergraduate degrees, twelve majors, ten minors and three certificate programs.

About the Curriculum

BS in Business Administration Program

The Bachelor of Science in Business Administration program is designed to prepare students for managerial positions in business and other institutions. To accomplish this, the undergraduate curriculum has the following characteristics and goals:

- An early exposure to the structure and functions of business enterprises
- The bridging of theory and concepts with professional practice
- The integration of material across disciplines within business as well as between business and other fields
- The enhancement of effective communication, problem-solving, and interpersonal skills
- Coverage of the ethical issues inherent in a business setting
- Coverage of the global, political, social, and legal/regulatory environment in which businesses operate
- Coverage of the impact of technology and technological changes on the operation of the business enterprise
- An emphasis on career preparation
- Opportunities for experiential learning through traditional co-op programs and other "hands-on" opportunities

BS in Business and Engineering Program

The Business and Engineering Degree Program contains a broad-based business and engineering curriculum, enabling graduates to work successfully in technically oriented business positions. Students complete a set of broad functional business core courses along with a firm foundation in science, mathematics, and engineering. Students also study more deeply the areas of accounting, economics, finance, information systems, law, marketing, organizational behavior, entrepreneurship, operations, and statistics along with the functional areas of engineering. Graduates of this program will be well prepared to participate in innovative technological efforts in business.

The Business and Engineering Degree Program gives students the opportunity to:

- Develop a breadth and depth of knowledge in functional business areas such as accounting, economics, entrepreneurship, finance, information systems, law, marketing, organizational behavior, operations, and statistics.
- Complete a broad education in engineering disciplines after completing a firm foundation in science and mathematics.
- Develop skills in technical communication and critical reasoning.
- Study ethical issues faced by managers and engineers, and understand technology from a historical perspective.
- Apply acquired skills from co-op work experiences to further enhance their knowledge base.
- Study entrepreneurship from a management and finance perspective for preparation in innovative technological efforts.
- Learn the operational aspects of business operations to improve the functioning of technically oriented businesses

BS in Economics Program

The Bachelor of Science in Economics program is designed to provide students with an understanding of the market system, as well as economic institutions, policies and development. In addition to this deep coverage of economics, the major includes liberal arts and sciences requirements. The program is flexible, allowing the student to customize the curriculum and choose areas of emphasis including concentrations in business economics or mathematical economics, as well as to select a coordinating field from other majors and minors at Drexel. The BS in Economics program provides excellent training for graduate school in economics.

BA in Economics Program

The Bachelor of Arts in Economics introduces students to modern economics within the context of a broad-based liberal arts curriculum. The degree is oriented toward students with interest in the less quantitative features of economics and a broader liberal arts education, particularly in areas offered by the College of Arts and Sciences. The degree gives students the flexibility to major or minor in a coordinate field outside of economics.

The Economics program:

- Provides a deep understanding of economics and broad training in arts and sciences.
- Enables students to apply acquired skills from co-op work experiences to further enhance their knowledge base.
- Prepares students for a wide variety of opportunities after graduations ranging from; corporate positions, consulting, government agencies, business, and law.
- Is a rigorous program that develops students' critical thinking and problem solving skills.

Degree Requirements

The Business Administration curriculum requires a minimum of 180.0 credits. The Business & Engineering curriculum requires a minimum of 185 credits. The Economics curriculum requires a minimum of 187.0 credits. The courses in each curriculum may be grouped into three categories:

General Education

The liberal arts comprise 50 percent or more of total credits required. Courses in communications, economics, English, history, mathematics, natural science, political science, psychology, sociology, and statistics

teach students to think effectively and to communicate ideas to others. In addition, they provide a good understanding of the economic, social, and political systems within which we live and business operates.

Common Body of Knowledge in Business

Courses in accounting, business strategy and social responsibility, finance, law, organizational behavior, management information systems, production management, and marketing introduce students to all the functional areas of business, the quantitative aspects of decision-making, and the behavioral factors common to all organizational structures.

Major (BSBA) or Coordinated Field (BSECON & BAECON)

The curriculum permits students to pursue one or more majors within the (BSBA) programs. The major coursework and the common body of knowledge in business together comprise not more than 50 percent of the total credits required for graduation. In the Economic programs, students must select a coordinated field to augment the general education and economics course work.

Writing-Intensive Course Requirements

In order to graduate, all students must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog may indicate that this course can fulfill a writing-intensive requirement. For the most up-to-date list of writing-intensive courses being offered, students should check the Writing Intensive Course List (http://drexel.edu/engphil/about/DrexelWritingCenter/wiCourses/course_list) on the Drexel University Writing Center (<http://www.drexel.edu/engphil/writingcenter>) page. Students scheduling their courses in Banner/DrexelOne can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term.

Cooperative Education

The five-year cooperative education programs consist of 12 terms in college and six terms in co-operative employment. During the freshman year, students spend three terms in school (fall, winter, and spring) and have a summer vacation. For each of the next three years, students alternate two terms in school with two terms of co-op. The senior year consists of three terms in college with no cooperative employment.

The four-year cooperative education program consists of 12 terms in college and two terms in cooperative employment. The two terms of co-op experience take place in the third year.

The non-cooperative four-year program comprises 12 terms in school with vacations during the summers.

Cooperative education, academic eligibility requirements, acceptance of transfer students, and placement services are described in detail in other sections of this catalog. Students wishing to prepare for admission to professional schools may obtain preprofessional counseling from the Office of Preprofessional Programs, 215.895.2437.

Special Programs

Accelerated/Dual Degrees

LeBow College offers an accelerated BS/MBA and BS/MS degree programs that provides academically qualified students with the opportunity to earn both a bachelor's degree and an MBA or MS in Accounting in the time normally required for the undergraduate degree at Drexel University. The program combines the advantage of practical work experience in the renowned Drexel Co-op with the graduate credentials of our nationally recognized programs.

LeBow College also offers a five-year dual-degree program with the European Business School (ESB) at Reutlingen University in Germany. This exciting dual degree program allows undergraduate students to earn degrees from both Drexel University's LeBow College of Business and Reutlingen University's European School of Business. In total students will spend 18 months in Germany completing two semesters of study and one semester on Co-op.

Drexel in London

The College's *Drexel in London Program* offers flexible schedules for study abroad, ranging from six-week summer sessions to six-month (two-term) combined study and co-operative education programs in which students can earn up to 18 credits and fulfill one of their co-op requirements. The program's emphasis is on international business in general, with a particular focus on the United Kingdom and the European Union. Business course selections each year will be selected from the list of courses that constitute the international business concentration, but students in other concentrations may participate in the program. Housing is provided in South Kensington, one of central London's most desirable residential sections. Drexel in London applications are administered by the Study Abroad (<http://www.drexel.edu/studyabroad>) office, 215.571.3558.

Business Learning Community (BLC)

LeBow College's Business Learning Community (BLC) is a way of life at Drexel University - a cohort of freshman business students who live and attend classes together. The BLC was recently recognized by AACSB Accreditation Committee as a "strength and effective practice of the LeBow College of Business." The program is designed to ease transition to university life, (<http://catalog.drexel.edu/>) enhance student academic performance, (<http://catalog.drexel.edu/>) provide opportunities for student engagement and networking and improve the overall student experience.

LeBow BRIDGE

BRIDGE is a LeBow College of Business undergraduate program that provides support to students in four critical areas: academic excellence, financial literacy and social engagement and community service. BRIDGE scholars receive the tools to be successful through advising programs related to academics, financial skills, professional development, cultural awareness and community service.

Students work together to build relationships within a dynamic and diverse group experience. Mentors are also available to BRIDGE scholars to provide guidance and ensure a positive college experience. After freshman year, BRIDGE scholars can serve as peer mentors to underclassmen.

Global Classroom

The LeBow Global Classroom program prepares candidates to become 21st Century Executives, able to tackle the toughest business challenges in our increasingly globalized business world. Each year a select cohort of 20 high-potential students from around the world enters this rigorous global education experience to acquire the complex set of skills and attitudes to thrive in an increasingly uncharted and globalized marketplace. The learning community experience is akin to a "Global Classroom".

Peer Leader Program

LeBow College's Peer Leader Program is an outstanding learning experience for sophomore business students. Through a highly competitive application process, top-performing LeBow students with extraordinary leadership potential are identified, selected, trained and paired with UNIV 101 instructors to serve as mentors for new freshmen both inside and outside the classroom.

Summer Institutes

LeBow Summer Institutes offer an introduction to business education through exceptional summer programs designed for outstanding high school students with an interest in business. LeBow Summer Institutes offer the opportunity to maximize and develop the business and leadership skills sought after by employers and college admissions officers.

Accounting

Major: Accounting

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.0301

Standard Occupational Classification (SOC) code: 13-2011; 13-2080

About the Program

The LeBow College of Business's accounting major is designed to provide basic conceptual accounting and business knowledge for careers in accounting and taxation in many settings. Courses cover accounting, auditing, tax preparation, and related topics. Students learn how accounting produces information for making decisions about organizations.

The greatest range of career opportunities are in public, private and government accounting. Professional accountants are normally certified as public accountants (CPA) or managerial accountants (CMA) after passing professional examinations. The University's co-op program provides practical experience for accounting students. Time spent working in accounting co-op positions is accepted as part of the one year of accounting experience required for the Certified Public Accountant certificate in Pennsylvania and many other states.

Students planning to obtain a CPA license must take additional coursework to meet state mandated requirements. Interested students should contact the Department of Accounting (<http://www.lebow.drexel.edu/Faculty/Departments/Accounting>) upon declaring the major to ensure ample time to fulfill such requirements.

Degree Requirements

Bachelor of Science in Business Administration (BSBA) Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
English literature elective ENGL 200 through ENGL 399		3.0
Fine Arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0
BIO 100	Applied Cells, Genetics & Physiology	
or BIO 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	

General Education Electives

Students select seven (21.0 credits) general education electives, with a minimum of one course in each of the following three categories. Students take the remaining 12.0 credits from any of the topics listed under Additional General Education Electives.

Society and Culture

Communication, English, Fine Arts, Global Studies, Language or Philosophy 3.0

Social Science

Anthropology, History, Sociology, Political Science, Psychology 3.0

Science

Computer Science, Information Systems, Science 3.0

Additional General Education Electives

Twelve (12.0) credits must be earned by taking 4 courses from the following topics: Communication, English, Fine Arts, Global Studies, Language, Philosophy, Anthropology, History, Sociology, Political Science, Psychology, Computer Science, Information Systems, Math, Science 12.0

Business Requirements

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
BUSN 101	Foundations of Business I (Online students take BUSN 111)	4.0
BUSN 102	Foundations of Business II (Online students take BUSN 112)	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
MGMT 450	Strategy and Competitive Advantage	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0
Select one of the following:		4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	

Major Requirements

Eight required courses (See Major Requirements list below)	32.0
Free Electives	18.0
Total Credits	180.0

Required Accounting Major Courses

ACCT 321	Financial Reporting I	4.0
ACCT 322	Financial Reporting II	4.0
ACCT 323	Financial Reporting III	4.0
ACCT 329	Advanced Accounting	4.0
ACCT 331	Cost Accounting	4.0
ACCT 341	Principles of Auditing	4.0
TAX 341	Individual Income Taxes	4.0
TAX 342	Business Income Taxes	4.0
Total Credits	32.0	

A minimum of 20.0 elective (BUSN Non-BUSN) credits are required to fulfill degree completion. Students planning to take the CPA exam should review the educational requirements established by the State Board of Accountancy in the state in which they plan to sit for the examination. Students are qualified to sit for the examination in Pennsylvania by meeting the degree requirements above. Students planning to apply for a CPA license in Pennsylvania have to obtain 225.0 quarter credit hours, the equivalent to 150 semester hours.

Sample Plan of Study

Term 1		Credits
BUSN 101	Foundations of Business I	4.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV B101 [WI]	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
BUSN 102	Foundations of Business II	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
Term Credits		15.0
Term 3		
ACCT 115	Financial Accounting Foundations	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
Social science elective		3.0
Society and culture elective		3.0
Term Credits		17.0
Term 4		
ACCT 116	Managerial Accounting Foundations	4.0
STAT 201	Introduction to Business Statistics	4.0
History (HIST) elective		4.0
Select one of the following:		3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
Term Credits		15.0
Term 5		
BLAW 201	Business Law I	4.0
COM 270 [WI]	Business Communication	3.0

INTB 200	International Business	4.0
Select one of the following:		3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
Term Credits		14.0
Term 6		
ACCT 321	Financial Reporting I	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
ENGL 200 - ENGL 399 course		3.0
Term Credits		15.0
Term 7		
ACCT 322	Financial Reporting II	4.0
FIN 301	Introduction to Finance	4.0
MIS 200	Management Information Systems	4.0
Science elective		3.0
Term Credits		15.0
Term 8		
ACCT 323	Financial Reporting III	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
PHIL 105	Critical Reasoning	3.0
General education elective		3.0
Term Credits		14.0
Term 9		
ACCT 329	Advanced Accounting	4.0
TAX 341	Individual Income Taxes	4.0
General education elective		3.0
Free electives		4.0
Term Credits		15.0
Term 10		
ACCT 331	Cost Accounting	4.0
ACCT 341	Principles of Auditing	4.0
UNIV B201	Career Management	1.0
General education elective		3.0
Free elective		3.0
Term Credits		15.0
Term 11		
MGMT 450	Strategy and Competitive Advantage	4.0
TAX 342	Business Income Taxes	4.0
General education elective		3.0
Free electives		3.0
Term Credits		14.0
Term 12		
Select one of the following:		4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	
Free electives		8.0
Fine arts elective		3.0
Term Credits		15.0
Total Credit: 180.0		

Co-op/Career Opportunities

Public, private, and government accounting provide the greatest range of career possibilities. Professional accountants are normally certified as

public accountants (CPA) or managerial accountants (CMA) after passing the appropriate professional examinations.

Drexel's co-op program provides an added advantage to accounting students; time spent working in accounting co-op positions is often accepted as part of the one year of accounting experience needed for CPA certification.

Drexel's accounting graduates accept positions in public accounting, private industry, government, and nonprofit organizations. Many also choose to continue their studies in graduate schools, pursuing such degrees as a MBA, master's in taxation, master's in accounting or a PhD. Overall, Drexel's graduates enjoy a high placement rate.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Accounting

Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- Business administration, business & engineering and economic students may complete any of the business minors, including: economics, finance, international economics, legal studies, management information systems, marketing, business analytics, organizational management, technology innovation management, and operations & supply chain management.
- **Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Required Courses

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
ACCT 321	Financial Reporting I	4.0
ACCT 322	Financial Reporting II	4.0
ACCT 323	Financial Reporting III	4.0
Select one (1) of the following:		4.0
ACCT 331	Cost Accounting	
ACCT 341	Principles of Auditing	
TAX 341	Individual Income Taxes	
Total Credits		24.0

Accounting Faculty

Maureen Breen, MAS, MBA (*University of Illinois at Urbana-Champaign; Drexel University*). Assistant Clinical Professor.

Hsihui Chang, PhD (*University of Minnesota*) KPMG Professor of Accounting.

Hui Lam Choy, PhD (*University of Rochester*). Associate Professor. Financial accounting.

Anthony P. Curatola, PhD (*Texas A&M University*) *Joseph F. Ford Professor of Accounting*. Professor. Federal and state income tax policy, retirement income taxation, fringe benefits taxation, educational savings and tax incentives, federal and state income tax research.

Xin Dai, PhD (*University of Minnesota*). Assistant Professor.

Patricia L. Daniel Derrick, PhD (*The George Washington University*). Assistant Clinical Professor.

Hubert Glover, PhD (*Texas A&M University*). Associate Clinical Professor. International financial reporting.

Barbara Murray Grein, PhD (*Kenan-Flagler Business School, University of North Carolina*) *Department Head, Accounting and Tax*. Associate Professor. Auditing, auditor selection, audit adjustments, audit fees, corporate governance, financial reporting.

Curtis M. Hall, MBA (*University of Arizona*). Assistant Professor. Strategic cost management; corporate governance; capital markets research in accounting; human capital investment.

Kevin K. Jones, DBA (*Georgia State University*). Assistant Clinical Professor.

Natalya V. Khimich, PhD (*University of California at Berkeley*). Assistant Professor. Equity valuation, earnings quality, and accounting for innovation and intangible assets.

Stacy Kline, MBA (*Temple University*). Clinical Professor. Individual, corporation; S corporation and partnership taxation.

Gordian Ndubizu, PhD (*Temple University*). Professor. Financial accounting.

Duri Park, PhD (*Ohio State University*). Assistant Professor. Financial accounting, insider trading, investments, and cash holdings.

Bernhard Reichert, PhD, CPA (*University of Texas at Austin*). Assistant Professor. Behavioral research in accounting and experimental economics.

Mark Vargus, PhD (*Wharton School, University of Pennsylvania*). Assistant Professor. Capital market research and executive compensation.

Jennifer Wright, MTA (*Villanova University*) *Assistant Department Head, Accounting and Tax*. Associate Clinical Professor.

Business Analytics

Co-Major: Business Analytics

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 186.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.1301

Standard Occupational Classification (SOC) code: 11-1021

The Business Analytics program is a "co-major"

About the Program

How does a company design an effective social media campaign for its brand new product? How does a bank make credit card offers or

detect fraud? How does a chain store stock its shelves with just the right products at the right price? Technology has made it possible to collect, store, process and analyze massive data sets that can help businesses make better decisions. However, there remains a gap that can only be filled by those with a background in business analytics. From the junior analyst providing daily reports on production to the CEO seeking to transform his or her business, all are looking for guidance and talent in business analytics.

LeBow students are uniquely positioned to address descriptive, diagnostic, predictive, prescriptive and pre-emptive questions across the business analytics lifecycle from the corporate generation of data through the application and impact on managerial and leadership decision-making and innovation.

Ranked second in a Computerworld survey on the most difficult skills to find, Business Analytics expertise is not only scarce, but in demand. McKinsey Global Institute reports that the United States could face a shortage of between 140,000 and 190,000 individuals who possess Business Analytics skills and an additional 1.5 million managers with the skills to implement the results.

Example business analytics jobs include, BA Strategy Consultants, Business Intelligence and Performance Management Consultants, Advanced Analytics, Optimization Consultants.

Because students in this co-major are required to choose a major in one of the functional areas of business, the curriculum enables students to tailor the program to their interests and anticipated career path.

Students complete the business analytics co-major in conjunction with one of the following majors:

- Accounting
- International Business
- Finance
- Legal Studies
- Management Information Systems
- Marketing
- Operations & Supply Chain Management

An additional distinguishing feature of the business analytics co-major is the required senior project (BUSN 460) where students work in small teams on real business analytics projects from LeBow College's corporate partners. The projects require students to bring together all the key elements of the business analytics curriculum to derive business insights for a company's current business challenges. Experiencing this data driven decision-making process is invaluable career preparation.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	2.0

English Literature elective	3.0
Fine Arts elective	3.0
History elective	4.0
Science Requirement	6.0
Select two courses from the following:	
BIO 100 Applied Cells, Genetics & Physiology	
or BIO 101 Applied Biological Diversity, Ecology & Evolution	
CHEM 151 Applied Chemistry	
PHYS 151 Applied Physics	
General Education electives *	21.0
Business Requirements	
ACCT 115 Financial Accounting Foundations	4.0
ACCT 116 Managerial Accounting Foundations	4.0
BLAW 201 Business Law I	4.0
BUSN 101 Foundations of Business I	4.0
BUSN 102 Foundations of Business II	4.0
ECON 201 Principles of Microeconomics	4.0
ECON 202 Principles of Macroeconomics	4.0
FIN 301 Introduction to Finance	4.0
INTB 200 International Business	4.0
MGMT 450 Strategy and Competitive Advantage	4.0
MIS 200 Management Information Systems	4.0
MKTG 201 Introduction to Marketing Management	4.0
OPM 200 Operations Management	4.0
ORGB 300 [WI] Organizational Behavior	4.0
STAT 201 Introduction to Business Statistics	4.0
STAT 202 Business Statistics II	4.0
Primary Major Courses **	32.0
Business Analytics Requirements	
BUSN 260 Introduction to Business Analytics	4.0
BUSN 460 Business Analytics Senior Project	4.0
MIS 349 Predictive Business Analytics with Relational Database Data	4.0
OPR 320 Linear Models for Decision Making	4.0
Advanced Statistics Course	
Select one of the following:	4.0
ECON 350 [WI] Applied Econometrics	
STAT 331 Introduction to Data Mining for Business	
STAT 335 Introduction to Experimental Design	
MKTG 366 Customer Analytics	
MKTG 367 Data-Driven Digital Marketing	
Advanced Modeling Course	
Select one of the following:	4.0
ECON 301 Microeconomics	
OPR 330 Advanced Decision Making and Simulation	
Total Credits	186.0

- * Students select seven (21.0 credits) of additional general education electives with a minimum of one course in each of the following categories:
- Society and Culture (Communication, English, Fine Arts, International Area Studies, Language, Philosophy)
 - Social Science (Anthropology, History, Sociology, Political Science, Psychology)
 - Math and Science (Computer Science, Information Systems, Math, Science)

** Students completing the Business Analytics co-major must do so in conjunction with a primary business major. Students must select a primary major from the following list:

- Accounting
- Entrepreneurship
- Finance
- Legal Studies
- Management Information Systems
- Marketing
- Operations & Supply Chain Management
- Technology and Innovation Management

Sample Plan of Study

Term 1		Credits
BUSN 101	Foundations of Business I	4.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV B101 [WI]	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
BUSN 102	Foundations of Business II	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
Term Credits		15.0
Term 3		
ACCT 115	Financial Accounting Foundations	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
Select one of the following:		3.0
BIO 100 or 101	Applied Cells, Genetics & Physiology Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
General Education elective		3.0
Term Credits		17.0
Term 4		
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
COM 270 [WI]	Business Communication	3.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		15.0
Term 5		
INTB 200	International Business	4.0
MIS 200	Management Information Systems	4.0
STAT 202	Business Statistics II	4.0
Select one of the following:		3.0
BIO 101 or 100	Applied Biological Diversity, Ecology & Evolution Applied Cells, Genetics & Physiology	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
Term Credits		15.0
Term 6		
Any 200-399 English (ENGL) course		3.0
FIN 301	Introduction to Finance	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
Term Credits		15.0

Term 7		
MIS 343	Database Design and Implementation	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
PHIL 105	Critical Reasoning	3.0
Primary Major Course*		4.0
	Term Credits	15.0
Term 8		
OPR 320	Linear Models for Decision Making	4.0
History elective		4.0
Primary Major Course*		4.0
Science elective		3.0
	Term Credits	15.0
Term 9		
MIS 349	Predictive Business Analytics with Relational Database Data	4.0
Society and Culture elective		3.0
Primary Major Courses*		8.0
	Term Credits	15.0
Term 10		
UNIV B201	Career Management	1.0
Select one of the following advanced statistic courses:		4.0
ECON 350 [WI]	Applied Econometrics	
STAT 331	Introduction to Data Mining for Business	
STAT 335	Introduction to Experimental Design	
Primary Major Course*		4.0
Fine Arts elective		3.0
General education elective		3.0
	Term Credits	15.0
Term 11		
MGMT 450	Strategy and Competitive Advantage	4.0
Advanced modeling course - Select one of the following:		4.0
ECON 301	Microeconomics	
MKTG 366	Customer Analytics	
OPR 330	Advanced Decision Making and Simulation	
Primary Major courses*		8.0
	Term Credits	16.0
Term 12		
BUSN 460	Business Analytics Senior Project	4.0
Primary Major course*		4.0
Social Science elective		3.0
General education elective		6.0
	Term Credits	17.0
Total Credit: 186.0		

* See degree requirements (p. 331) for a list of business majors that may be completed in conjunction with the business analytics major.

Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- Business administration, business & engineering and economic students may complete any of the business minors, including: economics, finance, international economics, legal studies, management information systems, marketing, organizational

management, technology innovation management, and operations & supply chain management.

- **Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Minor in Business Analytics

How does a company design an effective social media campaign for its brand new product? How does a bank make credit card offers or detect fraud? How does a chain store stock its shelves with just the right products at the right price? Technology has made it possible to collect, store, process and analyze massive data sets that can help businesses make better decisions. However, there remains a gap that can only be filled by those with a background in business analytics. From the junior analyst providing daily reports on production to the CEO seeking to transform his or her business, all are looking for guidance and talent in business analytics.

LeBow students are uniquely positioned to address descriptive, diagnostic, predictive, prescriptive and pre-emptive questions across the business analytics lifecycle from the corporate generation of data through the application and impact on managerial and leadership decision-making and innovation.

Ranked second in a Computerworld survey on the most difficult skills to find, Business Analytics expertise is not only scarce, but in demand. McKinsey Global Institute reports that the United States could face a shortage of between 140,000 and 190,000 individuals who possess Business Analytics skills and an additional 1.5 million managers with the skills to implement the results.

The Business Analytics minor at LeBow consists of basic courses in statistics, operations research, and management information systems as well as advanced courses in management information systems, statistics/econometrics, and modeling. The curriculum enables students to tailor the program to their interests and anticipated career path.

One of the distinguishing features of the business analytics minor is the required senior project (BUSN 460) where students work in small teams on real business analytics projects from LeBow College's corporate partners. The projects require students to bring together all the key elements of the business analytics curriculum to derive business insights for a company's current business challenges. Experiencing this data driven decision making process is invaluable career preparation.

BUSN 260	Introduction to Business Analytics	4.0
MIS 349	Predictive Business Analytics with Relational Database Data	4.0
OPR 320	Linear Models for Decision Making	4.0
BUSN 460	Business Analytics Senior Project	4.0
Advanced Statistics Courses (select one of the following):		4.0
ECON 350 [WI]	Applied Econometrics	
STAT 331	Introduction to Data Mining for Business	
MKTG 366	Customer Analytics	
MKTG 367	Data-Driven Digital Marketing	
STAT 335	Introduction to Experimental Design	
Advanced Modeling Course (select one of the following):		4.0
ECON 301	Microeconomics	
OPR 330	Advanced Decision Making and Simulation	
Total Credits		24.0

Business Analytics Faculty

Pramod Abichandani, PhD. Assistant Clinical Professor.

Murugan Anandarajan, PhD (*Drexel University*) *Department Chair, Management; Department Head, Decision Sciences and MIS.* Professor. Cyber crime, strategic management of information technology, unstructured data mining, individual internet usage behavior (specifically abuse and addiction), application of artificial intelligence techniques in forensic accounting and ophthalmology.

Orakwue B. Arinze, PhD (*London School of Economics*). Professor. Client/Server computing; Enterprise Application Software (EAS)/ Enterprise Resource Planning Software (ERP); knowledge-based and decision support applications in operations management.

Hande Benson, PhD (*Princeton University*) *Assistant Department Head, Decision Sciences & MIS.* Associate Professor. Interior-point methods, Large Scale Optimization, Mathematical Programming, Nonlinear Optimization, Operations and Supply Chain Optimization, Optimization Software, Portfolio Optimization

Qizhi Dai, PhD (*University of Minnesota*). Associate Professor. Business Value of Information Technology, eCommerce, Economics of Information Technology, Information System Management.

Michaela Draganska, PhD (*Kellogg School of Management, Northwestern University*) *Department of Marketing.* Associate Professor. Advertising strategy, product assortment decisions, new product positioning, distribution channels. Marketing analytics and big data, marketing communications, marketing research, marketing strategy, technology and innovation.

Elea Feit, PhD (*University of Michigan*) *Department of Marketing.* Assistant Professor. Bayesian hierarchical models, interactive (eCommerce), marketing research, missing data.

David Gefen, PhD (*Georgia State University*) *Provost Distinguished Research Professor.* Professor. Strategic IT management; IT development and implementation management; research methodology; managing the adoption of large IT systems, such as MRP II, ERP, and expert systems; research methodology, eCommerce; Online Auctions; Outsourcing; SAS; Technology Adoption.

Merrill W. Liechty, PhD (*Duke University*). Clinical Professor. Bayesian statistics, portfolio selection, higher moment estimation, higher moment estimation, Markov Chain Monte Carlo

Chuanren Liu, PhD (*Rutgers University*). Assistant Professor. Data Mining, Decision Models, Risk Assessment, Sequential Analysis.

Bruce D. McCullough, PhD (*University of Texas Austin*). Professor. Applied Econometrics, Data Mining, Econometric Techniques, Reliability of Statistical and Econometric Software.

Samir Shah, DPS (*Pace University*). Associate Clinical Professor. Drexel University's Provost Fellow India Partnerships

Chaojiang Wu, PhD (*University of Cincinnati*). Assistant Professor. Business Analytics, Computational Statistics, Healthcare Analytics, Semiparametric Regression, Statistical Data Mining.

Business and Engineering

Major: Business and Engineering

Degree Awarded: Bachelor of Science in Business and Engineering (BSBAE)

Calendar: Quarter

Total Credit Hours: 183.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.0101

Standard Occupational Classification (SOC) code: 11-1021

About the Program

The major in business and engineering combines two of Drexel's most exciting programs, linking business and engineering to provide students with expertise in both fields.

The program contains a curriculum combining coursework in both business and engineering, enabling graduates to work successfully in technically oriented business positions. Students complete a set of broad functional business core courses along with a firm foundation in science, mathematics, and engineering. Students also study quantitative decision making within a business context, technology innovation management, and operations management. They complete a minor in business as well as a concentration in engineering. Graduates of this program will be well prepared to participate in innovative technological efforts in business.

The major gives students the opportunity to learn important concepts in functional business areas such as accounting, economics, finance, information systems, law, marketing, organizational behavior, operations, and statistics.

Mission

The Bachelor of Science in Business and Engineering program provides students the opportunity to:

- Learn important concepts in functional business areas such as accounting, economics, finance, information systems, law, marketing, organizational behavior, operations, and statistics.
- Study in more depth the areas of operations, technology innovation management, and other functional business areas.
- Complete a course of studies in an engineering discipline after completing a firm foundation in science and mathematics.
- Develop skills in technical communication and critical reasoning.
- Study ethical issues faced by managers and engineers, and understand technology from a historical perspective.
- Apply acquired skills in co-op work experiences to further enhance their knowledge base.
- Study entrepreneurship from a management and finance perspective for preparation in innovative technological efforts.
- Learn to improve the functioning of technically oriented businesses through operational competencies.

About the Business Minors

All Business and Engineering students are required to complete a business minor under the curriculum, and they will have the ability to choose from any of the business minors that are currently offered by the LeBow College of Business.

- Accounting (p. 330)
- Business Analytics
- Economics

- Finance
- International Economics (p. 375)
- Legal Studies (p. 343)
- Management Information Systems (p. 346)
- Marketing (p. 349)
- Operations & Supply Chain Management (p. 352)
- Organizational Management (p. 354)
- Technology Innovation Management (p. 357)

About the Engineering Concentrations

All Business and Engineering students are required to complete an engineering concentration under the curriculum, and they will have the ability to choose from the following:

- Chemical Engineering
- Civil Engineering
- Electrical and Computer Engineering
- Mechanical Engineering
- General Engineering

For more information on the specific courses for the concentration, please refer to the Degree Requirements Page (p. 335).

Additional Information

For additional information about the program or to schedule an appointment, please contact the Department of Decision Sciences and MIS (<http://www.lebow.drexel.edu/Faculty/Departments/Decision>).

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 310 [WI]	Technical Communication (WI)	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHIL 105	Critical Reasoning	3.0
Select one of the following:		3.0-4.0
HIST 285	Technology in Historical Perspective	
PHIL 301	Business Ethics	
PHIL 315	Engineering Ethics	
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0

Science and Computing Requirements

CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0

Business Requirements

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
BUSN 101	Foundations of Business I	4.0
BUSN 102	Foundations of Business II	4.0

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
MGMT 201	Introduction to Technology Innovation Management	4.0
MGMT 450	Strategy and Competitive Advantage	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 321	Planning and Control of Operations	4.0
ORGB 300 [WI]	Organizational Behavior (WI)	4.0
STAT 205	Statistical Inference I	4.0
STAT 206	Statistical Inference II	4.0

Business and Engineering Focus

Quantitative Decision Making in Business

OPR 320	Linear Models for Decision Making	4.0
Select one of the following:		4.0
MKTG 366	Customer Analytics	
MKTG 367	Data-Driven Digital Marketing	
OPR 330	Advanced Decision Making and Simulation	
STAT 325	Six-Sigma Quality Implementation	
STAT 331	Introduction to Data Mining for Business	

Technology Innovation Management

Select one of the following:		4.0
MGMT 301	Designing Innovative Organizations	
MGMT 302	Competing in Technology Industries	
MGMT 364	Technology Management	

Operations Management

Select one of the following:		4.0
MIS 361	Information System Project Management	
OPM 315	Service Operations Management	
OPM 325	Advanced Planning and Control of Operations	

Engineering Requirements

ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 220	Fundamentals of Materials	4.0

Business Minor *		16.0
Engineering Concentration **		15.0

Total Credits		183.0-184.0
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* Students must take 4-5 LeBow courses to complete the requirements of a business minor. Students must select a minor from the following list:

- Accounting
- Economics
- Entrepreneurship
- Finance
- International Economics
- Legal Studies
- Management Information Systems
- Marketing
- Operations & Supply Chain Management
- Technology Innovation Management

- ** Students must select an engineering concentration and complete all five courses required for it:
- Electrical and Computer Engineering: ECE 200, ECE 201, ECEL 301 [WI], ECE 203, ECES 301
 - Mechanical Engineering: ENGR 210, MEM 201, MEM 202, MEM 220, MEM 371
 - Civil Engineering: ENGR 210, CAEE 202, CAEE 203, CAEE 212, MEM 202
 - Chemical Engineering: ENGR 210, CHE 201, CHE 202, CHE 206, (CHE 301 or CHE 307)
 - General Engineering: Any 5 courses from those listed for the above concentrations

Sample Plan of Study

Term	Courses	Credits
Term 1		
BUSN 101	Foundations of Business I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
UNIV B101 [WI]	The Drexel Experience	1.0
	Term Credits	16.0
Term 2		
BUSN 102	Foundations of Business II	4.0
CHEM 101	General Chemistry I	3.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
	Term Credits	17.5
Term 3		
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
	Term Credits	18.5
Term 4		
ACCT 115	Financial Accounting Foundations	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 102	Fundamentals of Physics II	4.0
STAT 205	Statistical Inference I	4.0
	Term Credits	15.0
Term 5		
ACCT 116	Managerial Accounting Foundations	4.0
ENGR 232	Dynamic Engineering Systems	3.0
MIS 200	Management Information Systems	4.0
STAT 206	Statistical Inference II	4.0
	Term Credits	15.0
Term 6		
ECON 201	Principles of Microeconomics	4.0
ENGR 220	Fundamentals of Materials	4.0
OPM 321	Planning and Control of Operations	4.0
OPR 320	Linear Models for Decision Making	4.0
	Term Credits	16.0
Term 7		
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
MKTG 201	Introduction to Marketing Management	4.0

Engineering Concentration*		3.0
	Term Credits	15.0
Term 8		
COM 310 [WJ]	Technical Communication	3.0
MGMT 201	Introduction to Technology Innovation Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
PHIL 105	Critical Reasoning	3.0
Engineering Concentration*		3.0
	Term Credits	17.0
Term 9		
BLAW 201	Business Law I	4.0
INTB 200	International Business	4.0
Select one of the following:		3.0-4.0
HIST 285	Technology in Historical Perspective	
PHIL 301	Business Ethics	
PHIL 315	Engineering Ethics	
Engineering Concentration*		3.0
	Term Credits	14.0-15.0
Term 10		
UNIV B201	Career Management	1.0
Select one of the following:		4.0
MKTG 366	Customer Analytics	
MKTG 367	Data-Driven Digital Marketing	
OPR 330	Advanced Decision Making and Simulation	
STAT 325	Six-Sigma Quality Implementation	
STAT 331	Introduction to Data Mining for Business	
Engineering Concentration*		3.0
Business Minor*		4.0
	Term Credits	12.0
Term 11		
Select one of the following:		4.0
MGMT 301	Designing Innovative Organizations	
MGMT 302	Competing in Technology Industries	
MGMT 364	Technology Management	
MIS 250	Introduction to Enterprise Application Software Using SAP - Logistics	
Select one of the following:		4.0
MIS 361	Information System Project Management	
OPM 315	Service Operations Management	
OPM 325	Advanced Planning and Control of Operations	
Engineering Concentration*		3.0
Business Minor*		4.0
	Term Credits	15.0
Term 12		
MGMT 450	Strategy and Competitive Advantage	4.0
Business Minor*		8.0
	Term Credits	12.0
Total Credit: 183.0-184.0		

* See degree requirements (p. 335).

Decision Sciences & MIS Faculty

Pramod Abichandani, PhD. Assistant Clinical Professor.

Murugan Anandarajan, PhD (*Drexel University*) *Department Chair, Management; Department Head, Decision Sciences and MIS.* Professor. Cyber crime, strategic management of information technology, unstructured data mining, individual internet usage behavior (specifically abuse and addiction), application of artificial intelligence techniques in forensic accounting and ophthalmology.

Orakwue B. Arinze, PhD (*London School of Economics*). Professor. Client/Server computing; Enterprise Application Software (EAS)/ Enterprise Resource Planning Software (ERP); knowledge-based and decision support applications in operations management.

Avijit Banerjee, PhD (*The Ohio State University*) *Department of Decision Sciences*. Professor. Interface with Marketing, Pricing Revenue Management, Inventory Control, Operations Planning and Scheduling, Production Planning and Control, Supply Chain Management

Hande Benson, PhD (*Princeton University*) *Assistant Department Head, Decision Sciences & MIS*. Associate Professor. Interior-point methods, Large Scale Optimization, Mathematical Programming, Nonlinear Optimization, Operations and Supply Chain Optimization, Optimization Software, Portfolio Optimization

Oben Ceryan, PhD (*University of Michigan Ann Arbor*) *Department of Decision Sciences*. Assistant Professor. Dynamic Pricing, Inventory Control, Revenue Management, Stochastic Optimization, Supply Chain Management

Qizhi Dai, PhD (*University of Minnesota*). Associate Professor. Business Value of Information Technology, eCommerce, Economics of Information Technology, Information System Management.

Christopher Gaffney, PhD (*Rutgers University, New Brunswick*). Assistant Clinical Professor. Applied Probability, Decision Theory, Risk Analysis

David Gefen, PhD (*Georgia State University*) *Provost Distinguished Research Professor*. Professor. Strategic IT management; IT development and implementation management; research methodology; managing the adoption of large IT systems, such as MRP II, ERP, and expert systems; research methodology, eCommerce; Online Auctions; Outsourcing; SAS; Technology Adoption.

Seung-Lae Kim, PhD (*Penn State University*) *Department of Decision Sciences*. Professor. Inventory control, Production Planning and Control, Quality Management, Six-Sigma, Supply Chain Management

Jeongsik Lee, PhD (*University of California Los Angeles*). Assistant Professor. Economics of Innovation; Social networks; Technology management

Benjamin Lev, PhD (*Case Western Reserve University*). Trustee Professor. Inventory Control, Mathematical Programming, Operations Planning and Scheduling.

Merrill W. Liechty, PhD (*Duke University*). Clinical Professor. Bayesian statistics, portfolio selection, higher moment estimation, higher moment estimation, Markov Chain Monte Carlo

Chuanren Liu, PhD (*Rutgers University*). Assistant Professor. Data Mining, Decision Models, Risk Assessment, Sequential Analysis.

Hazem Maragah, PhD (*Louisiana University*) *Department of Decision Sciences*. Associate Professor. Statistical quality control, total equity management, applied statistics.

Bruce D. McCullough, PhD (*University of Texas Austin*). Professor. Applied Econometrics, Data Mining, Econometric Techniques, Reliability of Statistical and Econometric Software.

Fariborz Y. Partovi, PhD (*The Wharton School, University of Pennsylvania*) *Department of Decision Sciences*. Professor.

Manufacturing Technology Development, Quality Implementation, Quality Management, Service Management, Six-Sigma

Matthew Reindorp Associate Clinical Professor.

Samir Shah, DPS (*Pace University*). Associate Clinical Professor. Drexel University's Provost Fellow India Partnerships

Wenjing Shen, PhD (*University of Michigan*) *Department of Decision Sciences*. Associate Professor. The interface of operations management and marketing; inventory management; supply chain management.

Min Wang, PhD (*Columbia University*) *Department of Decision Sciences*. Assistant Professor. Healthcare Operations Management, Inventory Control, Production Planning and Control, Service Management, Supply Chain Management

Chaojiang Wu, PhD (*University of Cincinnati*). Assistant Professor. Business Analytics, Computational Statistics, Healthcare Analytics, Semiparametric Regression, Statistical Data Mining.

Finance

Major: Finance

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.0801

Standard Occupational Classification (SOC) code: 11-3031;13-2052; 13-2041; 13-2051

About the Program

Students with a major in finance obtain a thorough understanding of the basic concepts, principles, operating procedures, and analytical techniques in the various areas of finance.

Throughout the finance curriculum, students develop and apply quantitative skills for financial decision making within the business environment.

This major prepares students for careers in private business firms, including positions involving forecasting and budgeting for financial resources, cost-effectiveness analysis, control of expenditures, evaluation and financing of new projects, and evaluation of alternative methods of financing; in the investment field, including positions in security analysis, sales and trading, and investment banking and in the public sector, including positions at the federal, state, and local government levels.

For more information about the program, contact the Department of Finance (<http://www.lebow.drexel.edu/faculty-and-research/disciplines/finance>).

Major Requirements

All core mathematics and statistics courses should be completed before embarking on the upper-level finance major courses. A second course in business statistics, STAT 202, must be completed as a prerequisite for the major's required courses.

Because of the relevance of financial accounting to the field of finance, it is strongly recommended that finance students also complete ACCT 321

and ACCT 322 (Financial Accounting I and II) as two of their free electives.

Bachelor of Science in Business Administration (BSBA) Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
English literature elective ENGL 200 through ENGL 399		3.0
Fine Arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0
BIO 100	Applied Cells, Genetics & Physiology	
	or BIO 101 Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	

General Education Electives

Students select seven (21.0 credits) general education electives, with a minimum of one course in each of the following three categories. Students take the remaining 12.0 credits from any of the topics listed under Additional General Education Electives.

Society and Culture	
Communication, English, Fine Arts, Global Studies, Language or Philosophy	3.0
Social Science	
Anthropology, History, Sociology, Political Science, Psychology	3.0
Science	
Computer Science, Information Systems, Science	3.0

Additional General Education Electives

Twelve (12.0) credits must be earned by taking 4 courses from the following topics: Communication, English, Fine Arts, Global Studies, Language, Philosophy, Anthropology, History, Sociology, Political Science, Psychology, Computer Science, Information Systems, Math, Science	12.0
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Business Requirements

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
BUSN 101	Foundations of Business I (Online students take BUSN 111)	4.0
BUSN 102	Foundations of Business II (Online students take BUSN 112)	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
MGMT 450	Strategy and Competitive Advantage	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0
Select one of the following:		4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	

STAT 202	Business Statistics II	
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Major Requirements

Eight required courses (See Major Requirements list below)	32.0
Free Electives	18.0
Total Credits	180.0

Required Finance Major Courses

FIN 302	Intermediate Corporate Finance	4.0
FIN 321	Investment Securities & Markets	4.0
FIN 325	Financial Institutions and Markets	4.0
Select five of the following:		20.0
FIN 323	Risk Management	
FIN 330	Derivative Securities	
FIN 332	Investment Analysis	
FIN 335	Entrepreneurial Finance	
FIN 338	Money and Capital Markets	
FIN 340	Seminar in Finance	
FIN 341	Applied Portfolio Management	
FIN 342	Advanced Portfolio Management	
FIN 346	Global Financial Management	
FIN 348	Corporate Financial Reporting to Executives	
FIN 450	Personal Wealth Management	
Total Credits		32.0

Sample Plan of Study

Term	Courses	Credits	
Term 1	BUSN 101	Foundations of Business I	4.0
	ECON 201	Principles of Microeconomics	4.0
	ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
	MATH 101	Introduction to Analysis I	4.0
	UNIV B101 [WI]	The Drexel Experience	1.0
	Term Credits	16.0	
Term 2	BUSN 102	Foundations of Business II	4.0
	CIVC 101	Introduction to Civic Engagement	1.0
	ECON 202	Principles of Macroeconomics	4.0
	ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
	MATH 102	Introduction to Analysis II	4.0
	Term Credits	16.0	
Term 3	ACCT 115	Financial Accounting Foundations	4.0
	ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
	PSY 101	General Psychology I	3.0
	Society and culture course *		3.0
	General Education elective *		3.0
	Term Credits	16.0	
Term 4	ACCT 116	Managerial Accounting Foundations	4.0
	STAT 201	Introduction to Business Statistics	4.0
	History (HIST) elective		4.0
	Select one of the following:		3.0
	BIO 100	Applied Cells, Genetics & Physiology	
	or 101 Applied Biological Diversity, Ecology & Evolution		
CHEM 151	Applied Chemistry		
PHYS 151	Applied Physics		
	Term Credits	15.0	
Term 5	BLAW 201	Business Law I	4.0
	COM 270 [WI]	Business Communication	3.0
	STAT 202	Business Statistics II	4.0

Select one of the following:	3.0
BIO 100 Applied Cells, Genetics & Physiology or 101 Applied Biological Diversity, Ecology & Evolution	
CHEM 151 Applied Chemistry	
PHYS 151 Applied Physics	
Term Credits	14.0
Term 6	
FIN 301 Introduction to Finance	4.0
MKTG 201 Introduction to Marketing Management	4.0
ORGB 300 [WI] Organizational Behavior	4.0
Social Science Elective	3.0
Term Credits	15.0
Term 7	
FIN 302 Intermediate Corporate Finance	4.0
MIS 200 Management Information Systems	4.0
OPM 200 Operations Management	4.0
Science Elective*	3.0
Term Credits	15.0
Term 8	
FIN 321 Investment Securities & Markets	4.0
PHIL 105 Critical Reasoning	3.0
Free Electives	6.0
Term Credits	13.0
Term 9	
FIN 325 Financial Institutions and Markets	4.0
INTB 200 International Business	4.0
Free Elective	4.0
General Education Elective*	3.0
Term Credits	15.0
Term 10	
FIN Major Courses (see major requirements for list)	8.0
Free Electives	4.0
General Education Elective*	3.0
Term Credits	15.0
Term 11	
UNIV B201 Career Management	1.0
FIN Major Courses (see major requirements for list)	8.0
ENGL 200 Through ENGL 399	3.0
Fine Arts Elective	3.0
Term Credits	15.0
Term 12	
MGMT 450 Strategy and Competitive Advantage	4.0
FIN Major Course (see major requirements for list)	4.0
Free Elective	4.0
General Education Elective*	3.0
Term Credits	15.0

Total Credit: 180.0

* See degree requirements (p. 337).

Co-op/Career Opportunities

The finance program at Drexel prepares students for careers in corporate financial management, the investment field, and the public sector. It also provides excellent basic preparation for various types of professional certification, including chartered financial analyst (CFA) and certified financial planner (CFP). In money and capital markets, finance students often find careers in banking, securities analysis, and portfolio management. In government, many choose to work for regulatory agencies.

Typical positions include financial analyst, capital budgeting officer, credit analyst, merger and acquisition manager, bank trust officer, portfolio analyst, personal financial planner, and securities broker.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) for more detailed information on co-op and post-graduate opportunities.

Minor in Finance Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- Business administration, business & engineering and economic students may complete any of the business minors, including: accounting, economics, international economics, legal studies, management information systems, marketing, business analytics, organizational management, technology innovation management, and operations & supply chain management.
- **Cannot do a major and a minor in the same field of study.**

All core mathematics and statistics courses should be completed before embarking on the upper-level finance minor courses. A second course in business statistics, STAT 202, must be completed as a prerequisite for the minor's required courses.

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment. Prospective students may also consult with the Finance Department (<http://www.lebow.drexel.edu/academics/undergraduate/majors/finance>).

Required Courses

ACCT 115	Financial Accounting Foundations	4.0
or ACCT 110	Accounting for Professionals	
ACCT 116	Managerial Accounting Foundations	4.0
FIN 301	Introduction to Finance	4.0
FIN 302	Intermediate Corporate Finance	4.0
FIN 321	Investment Securities & Markets	4.0
FIN 325	Financial Institutions and Markets	4.0
Total Credits		24.0

Finance Faculty

David A. Becher, PhD (*Pennsylvania State University*) Department of Finance. Associate Professor. Mergers and acquisitions, corporate governance, financial institutions.

Erik Benrud, PhD, FRM, CAIA, CFA (*University of Virginia*) Department of Finance. Clinical Professor. Economics/managerial economics: game theory; finance: alternative investments, derivatives.

Jie Cai, PhD (*University of Iowa*) Department of Finance. Associate Professor. Investment banking, mergers and acquisitions, corporate finance and corporate governance.

Thomas Chi-Nan Chiang, PhD (*The Pennsylvania State University*) Marshall M. Austin Professor of Finance. Professor. International finance;

time series analysis of financial data; econometric modeling & forecasting; financial markets; international risk management; monetary theory; macroeconomics; emerging markets; and global country funds.

Naveen Daniel, PhD (*Arizona State University*). Associate Professor. Corporate governance, mutual funds, hedge funds.

Daniel Dorn, PhD (*Columbia University*) *Department of Finance*. Associate Professor. Capital markets and investments; behavioral finance.

Casey Dougal, PhD (*University of North Carolina, Chapel Hill*). Assistant Professor. Empirical asset pricing, financial media, behavioral finance, and urban economics.

Eliezer M. Fich, PhD (*New York University*) *Department of Finance*. Associate Professor. Empirical topics in corporate finance.

Michael Joseph Gombola, PhD (*University of South Carolina*) *Department Chair, Finance*. Professor. Stock offerings and repurchases, mergers, acquisitions, and restructuring; working capital management, time series analysis; options and derivatives, financial statement analysis.

Jennifer Juergens, PhD (*Pennsylvania State University*). Assistant Professor. Corporate Control and Mergers and Acquisitions; Corporate Governance; Executive Compensation; Investments; Securities Analysts

Amy Kratchman, MBA (*Drexel University*). Associate Clinical Professor. Investments; Portfolio Management

Michelle Lowry, PhD (*University of Rochester*) *TD Bank Endowed Professor*. Empirical corporate finance, including initial public offerings, mergers, and corporate governance

Edward Nelling, PhD, CFA (*University of Pennsylvania-Wharton*) *Department of Finance*. Professor. Investments; corporate finance; real estate finance.

Gregory Nini, PhD (*The Wharton School, University of Pennsylvania*). Assistant Professor. Creditor control rights, corporate governance, and firm value; insurance economics.

Patricia Robak, PhD (*Lehigh University*) *Department of Finance*. Associate Clinical Professor. Investments, money and banking, international finance.

John Robinson, PhD (*Arizona State University*). Assistant Clinical Professor. Board of Directors; Capital Structure; Executive Compensation

Diana Sandberg, MS (*Drexel University*) *Department of Finance*. Associate Clinical Professor. Portfolio management, derivatives, investment management.

Samuel H. Szewczyk, PhD (*Pennsylvania State University*) *Department of Finance*. Associate Professor. Corporate governance, mergers and acquisitions, financial engineering, investment banking, financial institutions.

George Tsetsekos, PhD (*The University of Tennessee*) *Dean Emeritus, LeBow College of Business; Francis Professor of Finance*. Professor. Valuation and corporate restructuring, treasury and risk/hedging operations, investment banking, securitization, emerging capital markets, multinational finance, bank asset-liability management.

Ralph Walkling, PhD (*University of Maryland*) *Stratakis Professor of Corporate Governance, Department of Finance*. Professor. Corporate governance, mergers and acquisitions.

General Business

Major: General Business

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.0101

Standard Occupational Classification (SOC) code: 11-1021; 11-2022; 11-3011; 11-9199

About the Program

The major in general business equips students with a thorough understanding of theory and practice in the fundamental areas of business such as accounting, economics, finance, management, and marketing. This major is intended for business students who wish to gain breadth within their undergraduate studies. Students will develop the skills and competencies necessary for success across a diverse spectrum of business organizations.

Students selecting the major in general business should choose eight courses from at least five of the following fields: accounting (ACCT), economics (ECON), finance (FIN), human resource management (HRMT), international business (INTB), legal studies (BLAW), management (MGMT), marketing (MKTG), management information systems (MIS), business statistics (STAT), organizational behavior (ORGB), operations research (OPR) and operations management (OPM).

Degree Requirements

Bachelor of Science in Business Administration (BSBA) Degree Requirements

General Education Requirements		
CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
English literature elective ENGL 200 through ENGL 399		3.0
Fine Arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0
BIO 100	Applied Cells, Genetics & Physiology	
or BIO 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	

General Education Electives

Students select seven (21.0 credits) general education electives, with a minimum of one course in each of the following three categories. Students take the remaining 12.0 credits from any of the topics listed under Additional General Education Electives.

Society and Culture	
Communication, English, Fine Arts, Global Studies, Language or Philosophy	3.0
Social Science	
Anthropology, History, Sociology, Political Science, Psychology	3.0
Science	
Computer Science, Information Systems, Science	3.0
Additional General Education Electives	
Twelve (12.0) credits must be earned by taking 4 courses from the following topics: Communication, English, Fine Arts, Global Studies, Language, Philosophy, Anthropology, History, Sociology, Political Science, Psychology, Computer Science, Information Systems, Math, Science	12.0
Business Requirements	
ACCT 115 Financial Accounting Foundations	4.0
ACCT 116 Managerial Accounting Foundations	4.0
BLAW 201 Business Law I	4.0
BUSN 101 Foundations of Business I (Online students take BUSN 111)	4.0
BUSN 102 Foundations of Business II (Online students take BUSN 112)	4.0
ECON 201 Principles of Microeconomics	4.0
ECON 202 Principles of Macroeconomics	4.0
FIN 301 Introduction to Finance	4.0
INTB 200 International Business	4.0
MGMT 450 Strategy and Competitive Advantage	4.0
MIS 200 Management Information Systems	4.0
MKTG 201 Introduction to Marketing Management	4.0
OPM 200 Operations Management	4.0
ORGB 300 [WI] Organizational Behavior	4.0
STAT 201 Introduction to Business Statistics	4.0
Select one of the following:	4.0
MGMT 260 Introduction to Entrepreneurship	
MGMT 370 Business Consulting	
MGMT 371 Business Consulting for Nonprofits	
MGMT 451 Management Simulation	
STAT 202 Business Statistics II	
Major Requirements	
Eight required courses (See Major Requirements list below)	32.0
Free Electives	18.0
Total Credits	180.0

General Business Major

Business Administration: Plan of Study

Term 1		Credits
BUSN 101	Foundations of Business I	4.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV B101 [WI]	The Drexel Experience	1.0
	Term Credits	16.0
Term 2		
BUSN 102	Foundations of Business II	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
	Term Credits	15.0
Term 3		
ACCT 115	Financial Accounting Foundations	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
General education elective		3.0

Select one of the following:		3.0
BIO 100 Applied Cells, Genetics & Physiology		
or 101 Applied Biological Diversity, Ecology & Evolution		
CHEM 151 Applied Chemistry		
PHYS 151 Applied Physics		
	Term Credits	16.0
Term 4		
ACCT 116 Managerial Accounting Foundations		4.0
BLAW 201 Business Law I		4.0
COM 270 [WI] Business Communication		3.0
STAT 201 Introduction to Business Statistics		4.0
	Term Credits	15.0
Term 5		
INTB 200 International Business		4.0
MIS 200 Management Information Systems		4.0
Select one of the following:		4.0
BUSN 451 Business Consulting		
MGMT 260 Introduction to Entrepreneurship		
MGMT 451 Management Simulation		
STAT 202 Business Statistics II		
Select one of the following:		3.0
BIO 100 Applied Cells, Genetics & Physiology		
or 101 Applied Biological Diversity, Ecology & Evolution		
CHEM 151 Applied Chemistry		
PHYS 151 Applied Physics		
	Term Credits	15.0
Term 6		
FIN 301 Introduction to Finance		4.0
MKTG 301 Introduction to Marketing Management		4.0
OPM 200 Operations Management		4.0
English Literature elective (ENGL 200 - 399)		3.0
	Term Credits	15.0
Term 7		
Major Elective 1		4.0
Major Elective 2		4.0
PHIL 105 Critical Reasoning		3.0
ORGB 300 [WI] Organizational Behavior		4.0
	Term Credits	15.0
Term 8		
Major Elective 3		4.0
Major Elective 4		4.0
Fine Arts Elective		3.0
History (HIST) Elective		3.0
Science Elective		3.0
	Term Credits	17.0
Term 9		
Major Elective 6		4.0
Social Science Elective		3.0
Society and Culture Elective		3.0
Major Elective 5		4.0
	Term Credits	14.0
Term 10		
Major Elective 7		4.0
Free Electives		7.0
UNIV B101 [WI] The Drexel Experience		1.0
General Education elective		3.0
	Term Credits	15.0
Term 11		
Major Elective 8		4.0
General Education		3.0
MGMT 450 Strategy and Competitive Advantage		4.0

Free Elective	3.0
Term Credits	14.0
Term 12	
General Education	3.0
Free Electives	10.0
Term Credits	13.0
Total Credit: 180.0	

General Business Faculty

Beth Buckman, MBA (*Drexel University*). Assistant Clinical Professor. Unique needs of transfer student research

Jodi Cataline, MBA (*University of Delaware*). Associate Clinical Professor. Research on financial literacy

Dana D'Angelo, CPA (*Drexel University*). Clinical Professor. Global classrooms and use of backchannel research

Susan Epstein, MBA (*Drexel University*). Associate Clinical Professor. Research surrounding the development writing in first year business students

Christopher Finnin, EdD (*Drexel University*) *Director, General Business Studies*. Associate Clinical Professor. Student engagement, learning communities, writing across the curriculum

Julia LaRosa, MBA (*Michigan State University*). Associate Clinical Professor. Utilizing peer mentors to support the acculturation of international students

Eric Rios, MBA, M.ED (*Eastern University, Drexel University*). Assistant Clinical Professor. Research on the needs of first generation college students

Legal Studies

Major: Legal Studies

Degree Awarded: Bachelor of Science in Business Administration (BSBA)
Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 22.9999

Standard Occupational Classification (SOC) code: 11-9199

About the Program

Law is pervasive in all aspects of business and life. The major in legal studies provides Drexel University students with the ability to recognize the influence of the law, understand its application and make informed and intelligent decisions regarding the course of action to take.

Although the major in legal studies will benefit those interested in pursuing a career in law, it is not intended solely for students aspiring to attend law school. This major enhances any business student's perspective on the impact of legal issues within their respective professions.

Students will learn the basics of various areas of the law and the legal environment of business and will learn to identify the factual situation in which to apply that law. They will be able to analyze the facts, determine which aspects of the law are pertinent, apply that to those facts, and draw a conclusion. Clarity of thought, reasoning and expression (both oral and written) are additional results of this process.

Emphasis is on critical thinking as a tool for problem solving, so that whatever the discipline, students will be able to identify and prevent possible problems or seek proper and timely assistance for critical decision making.

For more information about the program, contact the Department of Legal Studies (<http://www.lebow.drexel.edu/Faculty/Departments/Legal>).

Degree Requirements

Bachelor of Science in Business Administration (BSBA) Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
English literature elective ENGL 200 through ENGL 399		3.0
Fine Arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0
BIO 100	Applied Cells, Genetics & Physiology	
or BIO 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	

General Education Electives

Students select seven (21.0 credits) general education electives, with a minimum of one course in each of the following three categories. Students take the remaining 12.0 credits from any of the topics listed under Additional General Education Electives.

Society and Culture	
Communication, English, Fine Arts, Global Studies, Language or Philosophy	3.0
Social Science	
Anthropology, History, Sociology, Political Science, Psychology	3.0
Science	
Computer Science, Information Systems, Science	3.0

Additional General Education Electives

Twelve (12.0) credits must be earned by taking 4 courses from the following topics: Communication, English, Fine Arts, Global Studies, Language, Philosophy, Anthropology, History, Sociology, Political Science, Psychology, Computer Science, Information Systems, Math, Science

Business Requirements

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
BUSN 101	Foundations of Business I (Online students take BUSN 111)	4.0
BUSN 102	Foundations of Business II (Online students take BUSN 112)	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
MGMT 450	Strategy and Competitive Advantage	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0

Select one of the following:	4.0
MGMT 260 Introduction to Entrepreneurship	
MGMT 370 Business Consulting	
MGMT 371 Business Consulting for Nonprofits	
MGMT 451 Management Simulation	
STAT 202 Business Statistics II	

Major Requirements

Eight required courses (See Major Requirements list below)	32.0
Free Electives	18.0
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Total Credits	180.0

Legal Studies Major Degree Requirements

Select eight of the following:	32.0
BLAW 202 Business Law II	
BLAW 321 Law of Business Organizations	
BLAW 330 Real Estate	
BLAW 334 Labor Law	
BLAW 338 Government Regulation and Business	
BLAW 340 International Business Law	
BLAW 342 Criminal Law	
BLAW 346 Entrepreneurial Law	
BLAW 348 White Collar Crime	
BLAW 356 Legal Issues in Corporate Governance	
BLAW 358 Employment Law	
BLAW 360 Intellectual Property and Cyber Law	
<hr/>	
Total Credits	32.0

Sample Plan of Study

	Credits
Term 1	
BUSN 101 Foundations of Business I	4.0
ECON 201 Principles of Microeconomics	4.0
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101 Introduction to Analysis I	4.0
UNIV B101 [WI] The Drexel Experience	1.0
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Term Credits	16.0
Term 2	
BUSN 102 Foundations of Business II	4.0
ECON 202 Principles of Macroeconomics	4.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102 Introduction to Analysis II	4.0
<hr/>	
Term Credits	15.0
Term 3	
ACCT 115 Financial Accounting Foundations	4.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
PSY 101 General Psychology I	3.0
General education elective	3.0
Society and culture elective	3.0
<hr/>	
Term Credits	16.0
Term 4	
ACCT 116 Managerial Accounting Foundations	4.0
STAT 201 Introduction to Business Statistics	4.0
History (HIST) elective	3.0
Select one of the following:	3.0
BIO 100 Applied Cells, Genetics & Physiology or 101 Applied Biological Diversity, Ecology & Evolution	
CHEM 151 Applied Chemistry	
PHYS 151 Applied Physics	
<hr/>	
Term Credits	14.0

Term 5

BLAW 201 Business Law I	4.0
MIS 200 Management Information Systems	4.0

Select one of the following 3.0

BIO 100 Applied Cells, Genetics & Physiology or 101 Applied Biological Diversity, Ecology & Evolution	
CHEM 151 Applied Chemistry	
PHYS 151 Applied Physics	

Social science elective	3.0
<hr/>	
Term Credits	14.0

Term 6

FIN 301 Introduction to Finance	4.0
MKTG 301 Introduction to Marketing Management	4.0
ORGB 300 [WI] Organizational Behavior	4.0
ENGL 200 Through ENGL 399	3.0
<hr/>	
Term Credits	15.0

Term 7

Business Legal Studies (BLAW) Course	4.0
INTB 200 International Business	4.0
OPM 200 Operations Management	4.0
COM 270 [WI] Business Communication	3.0
<hr/>	
Term Credits	15.0

Term 8

PHIL 105 Critical Reasoning	3.0
Business Legal Studies (BLAW) Course	4.0
Select one of the following:	4.0

BUSN 451 Business Consulting	
MGMT 260 Introduction to Entrepreneurship	
MGMT 451 Management Simulation	
STAT 202 Business Statistics II	
Free elective	4.0
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Term Credits	15.0

Term 9

Business Legal Studies (BLAW) Course	4.0
Business Legal Studies (BLAW) Course	4.0
Science elective	3.0
Free elective	4.0
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Term Credits	15.0

Term 10

Business Legal Studies (BLAW) Course	4.0
Business Legal Studies (BLAW) Course	4.0
General education elective	3.0
Free elective	4.0
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Term Credits	15.0

Term 11

Business Legal Studies (BLAW) Course	4.0
MGMT 450 Strategy and Competitive Advantage	4.0
Fine arts elective	3.0
Free electives	4.0
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Term Credits	15.0

Term 12

Business Legal Studies (BLAW) Course	4.0
UNIV B201 Career Management	1.0
General studies electives	3.0
General studies electives	3.0
Free electives	4.0
<hr/>	
Term Credits	15.0

Total Credit: 180.0

* See degree requirements (p. 342).

Minor in Legal Studies

Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- Business administration, business & engineering and economic students may complete any of the business minors, including: accounting, economics, finance, international economics, management information systems, marketing, business analytics, organizational management, technology innovation management, and operations & supply chain management.
- **Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Requirements

BLAW 201	Business Law I	4.0
Select five of the following:		20.0
BLAW 202	Business Law II	
BLAW 321	Law of Business Organizations	
BLAW 330	Real Estate	
BLAW 334	Labor Law	
BLAW 338	Government Regulation and Business	
BLAW 340	International Business Law	
BLAW 342	Criminal Law	
BLAW 346	Entrepreneurial Law	
BLAW 348	White Collar Crime	
BLAW 356	Legal Issues in Corporate Governance	
BLAW 358	Employment Law	
BLAW 360	Intellectual Property and Cyber Law	
Total Credits		24.0

Legal Studies Faculty

Roger D. Collons, JD, PhD (*George Washington University; Georgia State University*) Department of Legal Studies. Professor. Patent law, preservation of wealth.

Richard P. Freedman, JD, LLM (*Temple University*) Head of the Department of Legal Studies. Associate Professor. Taxation, corporate and business matters, real estate, estate planning, estate administration and elder law.

Andrew Genetta, JD (*Cleveland-Marshall College of Law*). Associate Clinical Professor.

Rosalie S. Kreider, JD (*Villanova University*) Department of Legal Studies. Clinical Professor. Business law, international business law.

Neal Orkin, JD (*Temple University*) Department of Legal Studies. Associate Professor. Intellectual property rights of employed inventors and authors; labor relations.

Natalie Pedersen, JD (*Harvard University*) Department of Legal Studies. Assistant Professor. American law, contract law, labor and employment law.

Steven R. Sher, JD (*Georgetown University Law Center*) Department of Legal Studies. Associate Professor. Business law, product liability, negligence, medical malpractice.

Management Information Systems

Major: Management Information Systems

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.1201

Standard Occupational Classification (SOC) code: 11-3021

About the Major

Management Information Systems (MIS) is about managing how and why people, organizations, and markets apply, design, and deploy information technology to achieve tactical and strategic business goals. MIS is about the integration of both areas of expertise and applying the power of technology to solving business problems.

The major in management information systems prepares students for opportunities in the information technology field and business. Aimed at producing graduates who bridge the gap between technical knowledge and business functions, the program focuses on a mix of applied computer systems content, interpersonal interaction, and a practical business orientation.

While administered by the Department of Decision Sciences and MIS (<http://www.lebow.drexel.edu/Faculty/Departments/Management>), the major in management information systems is interdisciplinary in nature. The courses may be taken by students in other colleges and departments who wish to complement other computer-related studies with business-oriented information systems subjects.

Degree Requirements

Bachelor of Science in Business Administration (BSBA) Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
English literature elective ENGL 200 through ENGL 399		3.0
Fine Arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0
BIO 100	Applied Cells, Genetics & Physiology	
or BIO 101	Applied Biological Diversity, Ecology & Evolution	

CHEM 151	Applied Chemistry
PHYS 151	Applied Physics

General Education Electives

Students select seven (21.0 credits) general education electives, with a minimum of one course in each of the following three categories. Students take the remaining 12.0 credits from any of the topics listed under Additional General Education Electives.

Society and Culture	
Communication, English, Fine Arts, Global Studies, Language or Philosophy	3.0
Social Science	
Anthropology, History, Sociology, Political Science, Psychology	3.0
Science	
Computer Science, Information Systems, Science	3.0

Additional General Education Electives

Twelve (12.0) credits must be earned by taking 4 courses from the following topics: Communication, English, Fine Arts, Global Studies, Language, Philosophy, Anthropology, History, Sociology, Political Science, Psychology, Computer Science, Information Systems, Math, Science 12.0

Business Requirements

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
BUSN 101	Foundations of Business I (Online students take BUSN 111)	4.0
BUSN 102	Foundations of Business II (Online students take BUSN 112)	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
MGMT 450	Strategy and Competitive Advantage	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0
Select one of the following:		4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	

Major Requirements

Eight required courses (See Major Requirements list below) 32.0

Free Electives 18.0

Total Credits 180.0

Management Information Systems Major Required Courses

MIS 342	Systems Analysis and Design	4.0
MIS 343	Database Design and Implementation	4.0
Select six of the following:		24.0
MIS 344	Networking Technologies for Business	
MIS 345	Client/Server Computing for Business	
MIS 346	Management Information Systems Strategy	
MIS 347	Domestic and Global Outsourcing Management	
MIS 348	Visual Basic Database Programming for Business	
MIS 349	Predictive Business Analytics with Relational Database Data	
MIS 351	Introduction to Programming for Business in C#	
MIS 352	Advanced Business Programming with ASP.Net	
MIS 361	Information System Project Management	

Total Credits 32.0

* Students select from the following courses, or any other course at LeBow with the program manager's permission.

Sample Plan of Study

Term 1		Credits
BUSN 101	Foundations of Business I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV B101 [WI]	The Drexel Experience	1.0
Select one of the following:		3.0
BIO 100 or 101	Applied Cells, Genetics & Physiology Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
Term Credits		15.0
Term 2		
BUSN 102	Foundations of Business II	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
Select one of the following:		3.0
BIO 100 or 101	Applied Cells, Genetics & Physiology Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
Term Credits		15.0
Term 3		
ACCT 115 or ECON 201	Financial Accounting Foundations Principles of Microeconomics	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
General education elective		3.0
Society and culture elective		3.0
Term Credits		16.0
Term 4		
ACCT 115 or ECON 201	Financial Accounting Foundations Principles of Microeconomics	4.0
ACCT 116 or ECON 202	Managerial Accounting Foundations Principles of Macroeconomics	4.0
STAT 201	Introduction to Business Statistics	4.0
History (HIST) elective		4.0
Term Credits		16.0
Term 5		
BLAW 201	Business Law I	4.0
MIS 200	Management Information Systems	4.0
Social science elective		3.0
ECON 202 or ACCT 116	Principles of Macroeconomics Managerial Accounting Foundations	4.0
Term Credits		15.0
Term 6		
COM 270 [WI]	Business Communication	3.0
INTB 200	International Business	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
Term Credits		15.0
Term 7		
FIN 301	Introduction to Finance	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Science elective		3.0
Free elective		4.0
Term Credits		15.0
Term 8		
MIS 342	Systems Analysis and Design	4.0
PHIL 105	Critical Reasoning	3.0

Management Information Systems (MIS) Major Course*	4.0
Free elective	4.0
Term Credits	15.0
Term 9	
MIS 343 Database Design and Implementation	4.0
Management Information Systems (MIS) Major Course*	4.0
General Education elective	3.0
Free elective	4.0
Term Credits	15.0
Term 10	
Management Information Systems (MIS) Major Courses*	8.0
Select one of the following:	4.0
MGMT 260 Introduction to Entrepreneurship	
MGMT 370 Business Consulting	
MGMT 371 Business Consulting for Nonprofits	
MGMT 451 Management Simulation	
STAT 202 Business Statistics II	
General education elective	3.0
Term Credits	15.0
Term 11	
MGMT 450 Strategy and Competitive Advantage	4.0
ENGL 200 - ENGL 399 course	3.0
Management Information Systems (MIS) Major Course*	4.0
Free elective	3.0
Term Credits	14.0
Term 12	
UNIV B201 Career Management	1.0
Management Information Systems (MIS) Major Course*	4.0
Fine arts elective	3.0
General education elective	3.0
Free electives	3.0
Term Credits	14.0
Total Credit: 180.0	

* *See course options in the list of degree requirements.

Co-op/Career Opportunities

Career opportunities exist in a wide range of business settings. Students prepare for careers as managers of information resource units, or as staff members who develop and support computer systems.

Recent Management Information System (MIS) graduates have gone on to work for many types of businesses and other organizations. Some job titles include: Management Consultants, IS Business Analysts, IT Project Management, IT Consultants, IT Systems Managers, Systems Analysts. Some MIS students also choose to continue their studies with an MBA; recent Drexel MIS graduates are now attending Columbia, Princeton, and the University of Pennsylvania.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Management Information Systems

Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.

- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- Business administration, business & engineering and economic students may complete any of the business minors, including: accounting, economics, finance, international economics, legal studies, marketing, business analytics, organizational management, technology innovation management, and operations & supply chain management.
- Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Required Courses

MIS 200	Management Information Systems	4.0
MIS 342	Systems Analysis and Design	4.0
MIS 343	Database Design and Implementation	4.0
MIS 346	Management Information Systems Strategy	4.0
MIS 347	Domestic and Global Outsourcing Management	4.0
MIS 348	Visual Basic Database Programming for Business	4.0
Total Credits		24.0

Facilities

Decision Sciences & MIS Faculty

Pramod Abichandani, PhD. Assistant Clinical Professor.

Murugan Anandarajan, PhD (*Drexel University*) *Department Chair, Management; Department Head, Decision Sciences and MIS.* Professor. Cyber crime, strategic management of information technology, unstructured data mining, individual internet usage behavior (specifically abuse and addiction), application of artificial intelligence techniques in forensic accounting and ophthalmology.

Orakwue B. Arinze, PhD (*London School of Economics*). Professor. Client/Server computing; Enterprise Application Software (EAS)/ Enterprise Resource Planning Software (ERP); knowledge-based and decision support applications in operations management.

Avijit Banerjee, PhD (*The Ohio State University*) *Department of Decision Sciences.* Professor. Interface with Marketing, Pricing Revenue Management, Inventory Control, Operations Planning and Scheduling, Production Planning and Control, Supply Chain Management

Hande Benson, PhD (*Princeton University*) *Assistant Department Head, Decision Sciences & MIS.* Associate Professor. Interior-point methods, Large Scale Optimization, Mathematical Programming, Nonlinear Optimization, Operations and Supply Chain Optimization, Optimization Software, Portfolio Optimization

Oben Ceryan, PhD (*University of Michigan Ann Arbor*) *Department of Decision Sciences.* Assistant Professor. Dynamic Pricing, Inventory Control, Revenue Management, Stochastic Optimization, Supply Chain Management

Qizhi Dai, PhD (*University of Minnesota*). Associate Professor. Business Value of Information Technology, eCommerce, Economics of Information Technology, Information System Management.

Christopher Gaffney, PhD (*Rutgers University, New Brunswick*). Assistant Clinical Professor. Applied Probability, Decision Theory, Risk Analysis

David Gefen, PhD (*Georgia State University*) *Provost Distinguished Research Professor*. Professor. Strategic IT management; IT development and implementation management; research methodology; managing the adoption of large IT systems, such as MRP II, ERP, and expert systems; research methodology, eCommerce; Online Auctions; Outsourcing; SAS; Technology Adoption.

Seung-Lae Kim, PhD (*Penn State University*) *Department of Decision Sciences*. Professor. Inventory control, Production Planning and Control, Quality Management, Six-Sigma, Supply Chain Management

Jeongsik Lee, PhD (*University of California Los Angeles*). Assistant Professor. Economics of Innovation; Social networks; Technology management

Benjamin Lev, PhD (*Case Western Reserve University*). Trustee Professor. Inventory Control, Mathematical Programming, Operations Planning and Scheduling.

Merrill W. Liechty, PhD (*Duke University*). Clinical Professor. Bayesian statistics, portfolio selection, higher moment estimation, higher moment estimation, Markov Chain Monte Carlo

Chuanren Liu, PhD (*Rutgers University*). Assistant Professor. Data Mining, Decision Models, Risk Assessment, Sequential Analysis.

Hazem Maragah, PhD (*Louisiana University*) *Department of Decision Sciences*. Associate Professor. Statistical quality control, total equity management, applied statistics.

Bruce D. McCullough, PhD (*University of Texas Austin*). Professor. Applied Econometrics, Data Mining, Econometric Techniques, Reliability of Statistical and Econometric Software.

Fariborz Y. Partovi, PhD (*The Wharton School, University of Pennsylvania*) *Department of Decision Sciences*. Professor. Manufacturing Technology Development, Quality Implementation, Quality Management, Service Management, Six-Sigma

Matthew Reindorp Associate Clinical Professor.

Samir Shah, DPS (*Pace University*). Associate Clinical Professor. Drexel University's Provost Fellow India Partnerships

Wenjing Shen, PhD (*University of Michigan*) *Department of Decision Sciences*. Associate Professor. The interface of operations management and marketing; inventory management; supply chain management.

Min Wang, PhD (*Columbia University*) *Department of Decision Sciences*. Assistant Professor. Healthcare Operations Management, Inventory Control, Production Planning and Control, Service Management, Supply Chain Management

Chaojiang Wu, PhD (*University of Cincinnati*). Assistant Professor. Business Analytics, Computational Statistics, Healthcare Analytics, Semiparametric Regression, Statistical Data Mining.

Marketing

Major: Marketing

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.1401

Standard Occupational Classification (SOC) code: 11-2021

About the Program

Marketing is one of the most dynamic areas of business because it focuses on satisfying the ever-changing wants and needs of people. Professional marketers research and identify target audiences, develop products and services, formulate pricing strategies, develop advertising and promotional campaigns, and implement methods of distribution so that customers receive products and services where and when they want them. Perhaps the most basic marketing skill is to be able to see an organization's activities from the customer's viewpoint.

A major in marketing prepares students for the many opportunities that exist in product and brand management, marketing research, advertising, digital marketing, customer analytics, retailing, channel management, logistics and physical distribution, professional personal selling and sales management, purchasing, wholesaling, marketing planning and analysis, public relations, marketing entrepreneurship, and new-product development. In combination with the commerce and engineering curriculum, this major prepares students to fill marketing positions that require a technical background.

For more information about the major, contact the Department of Marketing (<http://www.lebow.drexel.edu/academics/disciplines/marketing>).

Degree Requirements

Bachelor of Science in Business Administration (BSBA) Degree Requirements

General Education Requirements		
CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
English literature elective ENGL 200 through ENGL 399		3.0
Fine Arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0
BIO 100	Applied Cells, Genetics & Physiology	
or BIO 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
General Education Electives		
Students select seven (21.0 credits) general education electives, with a minimum of one course in each of the following three categories. Students take the remaining 12.0 credits from any of the topics listed under Additional General Education Electives.		
Society and Culture		
Communication, English, Fine Arts, Global Studies, Language or Philosophy		3.0
Social Science		
Anthropology, History, Sociology, Political Science, Psychology		3.0

Science	
Computer Science, Information Systems, Science	3.0
Additional General Education Electives	
Twelve (12.0) credits must be earned by taking 4 courses from the following topics: Communication, English, Fine Arts, Global Studies, Language, Philosophy, Anthropology, History, Sociology, Political Science, Psychology, Computer Science, Information Systems, Math, Science	12.0
Business Requirements	
ACCT 115 Financial Accounting Foundations	4.0
ACCT 116 Managerial Accounting Foundations	4.0
BLAW 201 Business Law I	4.0
BUSN 101 Foundations of Business I (Online students take BUSN 111)	4.0
BUSN 102 Foundations of Business II (Online students take BUSN 112)	4.0
ECON 201 Principles of Microeconomics	4.0
ECON 202 Principles of Macroeconomics	4.0
FIN 301 Introduction to Finance	4.0
INTB 200 International Business	4.0
MGMT 450 Strategy and Competitive Advantage	4.0
MIS 200 Management Information Systems	4.0
MKTG 201 Introduction to Marketing Management	4.0
OPM 200 Operations Management	4.0
ORGB 300 [WI] Organizational Behavior	4.0
STAT 201 Introduction to Business Statistics	4.0
Select one of the following:	4.0
MGMT 260 Introduction to Entrepreneurship	
MGMT 370 Business Consulting	
MGMT 371 Business Consulting for Nonprofits	
MGMT 451 Management Simulation	
STAT 202 Business Statistics II	
Major Requirements	
Eight required courses (See Major Requirements list below)	32.0
Free Electives	18.0
Total Credits	180.0
Marketing Major Required Course	
MKTG 326 Marketing Insights	4.0
MKTG 356 Consumer Behavior	4.0
MKTG 380 Seminar in Marketing Strategy	4.0
Select five of the following:	20.0
MKTG 321 Selling and Sales Management	
MKTG 322 Advertising & Integrated Marketing Communications	
MKTG 324 Marketing Channels and Distribution Systems	
MKTG 344 Professional Personal Selling	
MKTG 347 New Product Development	
MKTG 348 Services Marketing	
MKTG 351 Marketing for Non-Profit Organizations	
MKTG 353 Business-to-Business Marketing	
MKTG 355 Interactive Marketing	
MKTG 357 Global Marketing	
MKTG 358 Transportation and Logistics	
MKTG 362 Brand and Reputation Management	
MKTG 364 Marketing for New Ventures	
MKTG 366 Customer Analytics	
MKTG 367 Data-Driven Digital Marketing	
MKTG 368 Corporate Responsibility Management	
Total Credits	32.0

Sample Plan of Study

Term 1	Credits
BUSN 101 Foundations of Business I	4.0
ECON 201 Principles of Microeconomics	4.0

ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101 Introduction to Analysis I	4.0
UNIV B101 [WI] The Drexel Experience	1.0
Term Credits	16.0
Term 2	
BUSN 102 Foundations of Business II	4.0
ECON 202 Principles of Macroeconomics	4.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102 Introduction to Analysis II	4.0
Term Credits	15.0
Term 3	
ACCT 115 Financial Accounting Foundations	4.0
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
PSY 101 General Psychology I	3.0
General education elective	3.0
Society and culture course	3.0
Term Credits	17.0
Term 4	
ACCT 116 Managerial Accounting Foundations	4.0
STAT 201 Introduction to Business Statistics	4.0
Select one of the following	3.0
BIO 100 Applied Cells, Genetics & Physiology or 101 Applied Biological Diversity, Ecology & Evolution	
CHEM 151 Applied Chemistry	
PHYS 151 Applied Physics	
History elective	4.0
Term Credits	15.0
Term 5	
BLAW 201 Business Law I	4.0
COM 270 [WI] Business Communication	3.0
INTB 200 International Business	4.0
Select one of the following	3.0
CHEM 151 Applied Chemistry	
BIO 100 Applied Cells, Genetics & Physiology or 101 Applied Biological Diversity, Ecology & Evolution	
PHYS 151 Applied Physics	
Term Credits	14.0
Term 6	
FIN 301 Introduction to Finance	4.0
MKTG 201 Introduction to Marketing Management	4.0
ORGB 300 [WI] Organizational Behavior	4.0
ENGL 200 Through ENGL 399	3.0
Term Credits	15.0
Term 7	
MIS 200 Management Information Systems	4.0
OPM 200 Operations Management	4.0
MKTG major course	4.0
Science or Computer Science elective	3.0
Term Credits	15.0
Term 8	
PHIL 105 Critical Reasoning	3.0
Select one of the following:	4.0
MGMT 260 Introduction to Entrepreneurship	
MGMT 370 Business Consulting	
MGMT 371 Business Consulting for Nonprofits	
MGMT 451 Management Simulation	
STAT 202 Business Statistics II	
Free electives	4.0
MKTG major course	4.0
Term Credits	15.0

Term 9		
MKTG major courses		8.0
General education elective		3.0
Free electives		4.0
	Term Credits	15.0
Term 10		
MGMT 450	Strategy and Competitive Advantage	4.0
Fine arts elective		3.0
MKTG major courses		8.0
	Term Credits	15.0
Term 11		
MKTG 380	Seminar in Marketing Strategy	4.0
UNIV B201	Career Management	1.0
General education elective		3.0
Social science elective		3.0
Free elective		3.0
	Term Credits	14.0
Term 12		
MKTG major course		4.0
General education elective		3.0
Free electives		7.0
	Term Credits	14.0

Total Credit: 180.0

Co-op/Career Opportunities

Marketing opportunities abound in all types of organizations — including manufacturing firms, wholesalers, retail stores, Internet firms, service organizations, banking and financial institutions, law and accounting firms, hospitals, colleges and universities, museums, chambers of commerce, professional sports teams, government agencies, charitable foundations, churches, and countless other settings. Any organization that seeks to reach a particular audience or consumer group needs the skills of marketers.

There are many specialized jobs in marketing, including product and brand managers, marketing researchers, advertising executives, pricing analysts, direct (non-store) marketers, Internet marketers, professional buyers, manufacturing agents, transportation and distribution managers, industrial and consumer salespeople, stockbrokers, sales managers, college enrollment managers, wholesalers, retailers, marketing planners, sales forecasters, marketing cost analysts, public relations managers, media and event planners, sales promotion managers, trade show or exhibit marketers, new product development managers, management consultants, digital marketers, marketing data analytics and international marketers.

Co-op Experiences

When students complete their co-op jobs, they are asked to write an overview of their experiences. These brief quotes are taken from some recent student reports:

Marketing research assistant, manufacturing firm: “Assisted in the development of new products, which included gathering information concerning competitive products, markets, pricing. Conducted testing of new products. Assisted in special projects. . .gained good experience.”

Retail analyst, producer of luxury home products: “Supported the sales and production divisions. Tracked weekly and monthly sales information. Developed product placement charts for forecasting. Assisted in maintaining productivity reports. Developed and presented a window treatment market analysis.”

Activity-based management (ABM) analyst, pharmaceuticals manufacturer: “Supported the ABM team (5 people). Member of two sub-project teams. Maintained full participation on both sub-teams while still maintaining responsibilities on core team. Developed proficiencies in re-engineering methodologies, activity-based costing methodologies, and support of change management. . .included as a full team member. ”

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Marketing Requirements

- No more than 2 courses or 8.0 credits required by a student’s major may be counted towards this minor.
- A grade of “C” (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- **Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Requirements		
MKTG 201	Introduction to Marketing Management	4.0
MKTG 380	Seminar in Marketing Strategy	4.0
Select four of the following:		16.0
MKTG 321	Selling and Sales Management	
MKTG 322	Advertising & Integrated Marketing Communications	
MKTG 324	Marketing Channels and Distribution Systems	
MKTG 326	Marketing Insights	
MKTG 344	Professional Personal Selling	
MKTG 347	New Product Development	
MKTG 348	Services Marketing	
MKTG 351	Marketing for Non-Profit Organizations	
MKTG 353	Business-to-Business Marketing	
MKTG 355	Interactive Marketing	
MKTG 356	Consumer Behavior	
MKTG 357	Global Marketing	
MKTG 358	Transportation and Logistics	
MKTG 362	Brand and Reputation Management	
MKTG 364	Marketing for New Ventures	
MKTG 365	New Media Marketing	
MKTG 366	Customer Analytics	
Total Credits		24.0

Marketing Faculty

Rolph E. Anderson, PhD (*University of Florida*) *Royal H. Gibson Sr. Professor of Marketing*. Professor. Personal selling and sales management; multivariate data analysis; customer relationship management (CRM); customer satisfaction and customer loyalty.

Trina Larsen Andras, PhD (*University of Texas at Austin*) *Head of the Department of Marketing; Academic Director, Center for Corporate Research Management*. Professor. International marketing, marketing channels management, cross-cultural communication.

Boryana Dimitrova, PhD (*Drexel University*). Assistant Clinical Professor. Global marketing, inter-organizational, marketing channels, retailing and retail management.

Michaela Draganska, PhD (*Kellogg School of Management, Northwestern University*) *Department of Marketing*. Associate Professor. Advertising strategy, product assortment decisions, new product positioning, distribution channels. Marketing analytics and big data, marketing communications, marketing research, marketing strategy, technology and innovation.

Lawrence Duke, MBA (*Harvard Business School*). Associate Clinical Professor. International marketing and strategy, new product development, business-to-business marketing, marketing of financial services.

Elea Feit, PhD (*University of Michigan*) *Department of Marketing*. Assistant Professor. Bayesian hierarchical models, interactive (eCommerce), marketing research, missing data.

Michael Howley, PhD (*Arizona State University*). Associate Clinical Professor. Investments in dissatisfied customers, service recovery, health-care marketing, marketing of service organizations, financial consequences of marketing actions.

Yanliu Huang, PhD (*The Wharton School, University of Pennsylvania*). Assistant Professor. Consumer n-store decision making, consumer planning, health marketing, memory and learning.

Daniel Korschun, PhD (*Boston University*). Assistant Professor. Brand and corporate reputation management, corporate social responsibility, internal marketing, marketing strategy, relationship marketing.

Hyokjin Kwak, PhD (*University of Georgia*) *Department of Marketing*. Associate Professor. Advertising effects, consumer behaviors and e-commerce.

Bert Rosenbloom, PhD (*Temple University*) *Rauth Chair of Electronic Commerce*. Professor. Marketing channels and distribution systems, electronic commerce, inter-organizational marketing management, wholesale and retail distribution, marketing strategy and planning.

Prashant Srivastava, PhD (*Oklahoma State University*) *Department of Marketing*. Associate Clinical Professor. New product development, supply chain management, B2B marketing, sales, strategic alliances, organizational learning, market orientation, healthcare marketing, and database marketing.

Rajneesh Suri, PhD (*University of Illinois at Urbana-Champaign*) *Associate Dean for Research, Marketing Department*. Professor. Pricing, promotions and branding.

Srinivasan Swaminathan, PhD (*University of Texas-Austin*). Professor. Marketing research and strategy, pricing and promotions, loyalty and satisfaction.

Chen Wang, PhD (*University of British Columbia*). Assistant Professor. Consumer curiosity, self-regulation and goals, sensory perception.

Operations & Supply Chain Management

Major: Operations & Supply Chain Management

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.0205

Standard Occupational Classification (SOC) code: 11-3051; 11-3071

About the Program

The major in operations and supply chain management is designed to prepare students for eventual participation as managers or specialists in the operations activity of industrial and service systems.

Operations and supply chain management stresses a thorough knowledge of the rapidly accumulating analytical techniques in systems analysis, in addition to a full appreciation of all other phases of business.

With the proper choice of electives, this program also prepares students for graduate studies in industrial management, industrial engineering, management science, or operations research.

Additional Information

For additional information about the program, students should contact the Department of Decision Sciences and MiS (<http://www.lebow.drexel.edu/Faculty/Departments/Decision>).

Degree Requirements

Bachelor of Science in Business Administration (BSBA) Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
English literature elective ENGL 200 through ENGL 399		3.0
Fine Arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0
BIO 100	Applied Cells, Genetics & Physiology	
	or BIO 101 Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	

General Education Electives

Students select seven (21.0 credits) general education electives, with a minimum of one course in each of the following three categories. Students take the remaining 12.0 credits from any of the topics listed under Additional General Education Electives.

Society and Culture		
Communication, English, Fine Arts, Global Studies, Language or Philosophy		3.0
Social Science		
Anthropology, History, Sociology, Political Science, Psychology		3.0
Science		
Computer Science, Information Systems, Science		3.0

Additional General Education Electives

Twelve (12.0) credits must be earned by taking 4 courses from the following topics: Communication, English, Fine Arts, Global Studies, Language, Philosophy, Anthropology, History, Sociology, Political Science, Psychology, Computer Science, Information Systems, Math, Science

Business Requirements

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
BUSN 101	Foundations of Business I (Online students take BUSN 111)	4.0
BUSN 102	Foundations of Business II (Online students take BUSN 112)	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
MGMT 450	Strategy and Competitive Advantage	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0
Select one of the following:		4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	

Major Requirements

Eight required courses (See Major Requirements list below) 32.0

Free Electives 18.0

Total Credits 180.0

Operations and Supply Chain Management Major Requirements

OPM 315	Service Operations Management	4.0
OPR 320	Linear Models for Decision Making	4.0
OPM 321	Planning and Control of Operations	4.0
OPM 325	Advanced Planning and Control of Operations	4.0
OPM 341	Supply Chain Management	4.0
Select three of the following:		12.0
OPM 342	Sustainable Supply Chain Management and Logistics	
OPM 343	Managing Queues for Service Operations	
OPM 344	Revenue Management	
OPR 330	Advanced Decision Making and Simulation	
OPR 340	Decision Models for the Public Sector	
STAT 325	Six-Sigma Quality Implementation	
STAT 331	Introduction to Data Mining for Business	
STAT 335	Introduction to Experimental Design	

Total Credits 32.0

Sample Plan of Study

Term 1		Credits
BUSN 101	Foundations of Business I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV B101 [WI]	The Drexel Experience	1.0
ECON 201	Principles of Microeconomics	4.0
	Term Credits	16.0
Term 2		
BUSN 102	Foundations of Business II	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0

ECON 202	Principles of Macroeconomics	4.0
	Term Credits	16.0

Term 3

ACCT 115	Financial Accounting Foundations	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
	Social science course *	3.0
	Society and culture course *	3.0
	Term Credits	16.0

Term 4

STAT 201	Introduction to Business Statistics	4.0
ACCT 116	Managerial Accounting Foundations	4.0
	History elective	4.0
	Select one of the following:	3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
	Term Credits	15.0

Term 5

COM 270 [WI]	Business Communication	3.0
BLAW 201	Business Law I	4.0
INTB 200	International Business	4.0
	Select one of the following:	3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
	Term Credits	14.0

Term 6

MIS 200	Management Information Systems	4.0
OPM 200	Operations Management	4.0
MKTG 201	Introduction to Marketing Management	4.0
ENGL 200 Through ENGL 399		3.0
	Term Credits	15.0

Term 7

FIN 301	Introduction to Finance	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
	Science or Computer Science elective *	3.0
	Free elective	4.0
	Term Credits	15.0

Term 8

OPM 321	Planning and Control of Operations	4.0
OPR 320	Linear Models for Decision Making	4.0
PHIL 105	Critical Reasoning	3.0
	Free elective	4.0
	Term Credits	15.0

Term 9

OPM 315	Service Operations Management	4.0
OPM 325	Advanced Planning and Control of Operations	4.0
	General Education Elective *	3.0
	Free Elective	4.0
	Term Credits	15.0

Term 10

UNIV B201	Career Management	1.0
	Operations & Supply Chain Mgmt major course	4.0
	Select one of the following:	4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	

General education elective*	3.0
General education elective	3.0
Term Credits	15.0
Term 11	
Operations & Supply Chain Mgmt major course	4.0
MGMT 450 Strategy and Competitive Advantage	4.0
General education elective*	3.0
Free elective	3.0
Term Credits	14.0
Term 12	
Operations & Supply Chain Mgmt major course	4.0
OPM 341 Supply Chain Management	4.0
Fine arts elective	3.0
Free electives	3.0
Term Credits	14.0
Total Credit: 180.0	

* See degree requirements (p. 350).

Co-op/Career Opportunities

Many production and operation management students go on to work in a variety of fields, including manufacturing, product planning and research and development.

When students complete their co-op jobs, they are asked to write an overview of their experiences. These brief quotes are taken from some recent student reports:

Manufacturing engineering co-op, corporate setting: "Developed manufacturing projects, procedures, and documentation in assisting (with International Standards Organization) certification. The best feature of the job was the chance to work within a manufacturing plant and witness the accomplishments and setbacks that can and will occur in all manufacturing jobs."

Meter operation co-op, major utility company: "Coordinated customer demand survey. Gathered and analyzed statistics pertaining to the water usage of residential, industrial, and commercial customers. . . .Management in department was excellent; very supportive."

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Operations and Supply Chain Management

The minor in operations and supply chain management is designed to prepare students for eventual participation as managers or specialists in the operations activity of industrial and service systems. Today, companies worldwide are competing in very different ways and very different environments than they were in the past because of technological advances. Operations, Supply Chain Management, and Logistics are key functions through which companies can gain strategic advantage, and companies are hiring graduates to drive innovations for their new economic surroundings. In this minor, courses drawing on the foundations and the state-of-the-art for both production and service industries allows students to craft a course of study that can complement their existing major.

Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- Business administration and business & engineering & economic students may complete any of the business minors, including: accounting, economics, finance, international economics, legal studies, management information systems, marketing, business analytics, organizational management and technology innovation management.
- **Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Required Courses

OPM 321	Planning and Control of Operations	4.0
OPR 320	Linear Models for Decision Making	4.0
Select four of the following:		16.0
OPM 200	Operations Management	
OPM 315	Service Operations Management	
OPM 325	Advanced Planning and Control of Operations	
OPM 341	Supply Chain Management	
OPM 342	Sustainable Supply Chain Management and Logistics	
OPM 343	Managing Queues for Service Operations	
OPM 344	Revenue Management	
OPR 330	Advanced Decision Making and Simulation	
OPR 340	Decision Models for the Public Sector	
STAT 325	Six-Sigma Quality Implementation	
Total Credits		24.0

Additional Information

For additional information about the program, students should contact the Department of Decision Sciences (<http://www.lebow.drexel.edu/Faculty/Departments/Decision>).

Facilities

Decision Sciences & MIS Faculty

Pramod Abichandani, PhD. Assistant Clinical Professor.

Murugan Anandarajan, PhD (*Drexel University*) *Department Chair, Management; Department Head, Decision Sciences and MIS.* Professor. Cyber crime, strategic management of information technology, unstructured data mining, individual internet usage behavior (specifically abuse and addiction), application of artificial intelligence techniques in forensic accounting and ophthalmology.

Orakwue B. Arinze, PhD (*London School of Economics*). Professor. Client/Server computing; Enterprise Application Software (EAS)/ Enterprise Resource Planning Software (ERP); knowledge-based and decision support applications in operations management.

Avijit Banerjee, PhD (*The Ohio State University*) *Department of Decision Sciences.* Professor. Interface with Marketing, Pricing Revenue Management, Inventory Control, Operations Planning and Scheduling, Production Planning and Control, Supply Chain Management

Hande Benson, PhD (*Princeton University*) Assistant Department Head, *Decision Sciences & MIS*. Associate Professor. Interior-point methods, Large Scale Optimization, Mathematical Programming, Nonlinear Optimization, Operations and Supply Chain Optimization, Optimization Software, Portfolio Optimization

Oben Ceryan, PhD (*University of Michigan Ann Arbor*) Department of *Decision Sciences*. Assistant Professor. Dynamic Pricing, Inventory Control, Revenue Management, Stochastic Optimization, Supply Chain Management

Qizhi Dai, PhD (*University of Minnesota*). Associate Professor. Business Value of Information Technology, eCommerce, Economics of Information Technology, Information System Management.

Christopher Gaffney, PhD (*Rutgers University, New Brunswick*). Assistant Clinical Professor. Applied Probability, Decision Theory, Risk Analysis

David Gefen, PhD (*Georgia State University*) Provost Distinguished Research Professor. Professor. Strategic IT management; IT development and implementation management; research methodology; managing the adoption of large IT systems, such as MRP II, ERP, and expert systems; research methodology, eCommerce; Online Auctions; Outsourcing; SAS; Technology Adoption.

Seung-Lae Kim, PhD (*Penn State University*) Department of *Decision Sciences*. Professor. Inventory control, Production Planning and Control, Quality Management, Six-Sigma, Supply Chain Management

Jeongsik Lee, PhD (*University of California Los Angeles*). Assistant Professor. Economics of Innovation; Social networks; Technology management

Benjamin Lev, PhD (*Case Western Reserve University*). Trustee Professor. Inventory Control, Mathematical Programming, Operations Planning and Scheduling.

Merrill W. Liechty, PhD (*Duke University*). Clinical Professor. Bayesian statistics, portfolio selection, higher moment estimation, higher moment estimation, Markov Chain Monte Carlo

Chuanren Liu, PhD (*Rutgers University*). Assistant Professor. Data Mining, Decision Models, Risk Assessment, Sequential Analysis.

Hazem Maragah, PhD (*Louisiana University*) Department of *Decision Sciences*. Associate Professor. Statistical quality control, total equity management, applied statistics.

Bruce D. McCullough, PhD (*University of Texas Austin*). Professor. Applied Econometrics, Data Mining, Econometric Techniques, Reliability of Statistical and Econometric Software.

Fariborz Y. Partovi, PhD (*The Wharton School, University of Pennsylvania*) Department of *Decision Sciences*. Professor. Manufacturing Technology Development, Quality Implementation, Quality Management, Service Management, Six-Sigma

Matthew Reindorp Associate Clinical Professor.

Samir Shah, DPS (*Pace University*). Associate Clinical Professor. Drexel University's Provost Fellow India Partnerships

Wenjing Shen, PhD (*University of Michigan*) Department of *Decision Sciences*. Associate Professor. The interface of operations management and marketing; inventory management; supply chain management.

Min Wang, PhD (*Columbia University*) Department of *Decision Sciences*. Assistant Professor. Healthcare Operations Management, Inventory Control, Production Planning and Control, Service Management, Supply Chain Management

Chaojiang Wu, PhD (*University of Cincinnati*). Assistant Professor. Business Analytics, Computational Statistics, Healthcare Analytics, Semiparametric Regression, Statistical Data Mining.

Organizational Management

Co-Major: Organizational Management

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 186.0

Classification of Instructional Programs (CIP) code: 52.0213

Standard Occupational Classification (SOC) code: 11-9199

The Organizational Management program is a co-major that must be taken in conjunction with the following majors Accounting, Finance, International Business, Legal Studies, Management Information Systems, Marketing or Operations and Supply Chain Management.

About the Program

The co-major in “Organizational Management” is designed for students with varied backgrounds who seek to develop knowledge and skills in leadership, teamwork, and communication. These organizational management skills are intended to supplement core technical skills such as Finance, Accounting, Marketing, etc. The curriculum provides students with a foundation of skills for effectively working with others in a variety of contexts and situations. This co-major complements a variety of degrees and is suitable for business majors.

Degree Requirements

Required Courses		
ORGB 320	Leadership: Theory and Practice	4.0
ORGB 400	Team Development and Leadership	4.0
ORGB 420	Negotiations and Conflict Resolution	4.0
ORGB 430	Strategic Career Development	4.0
Select two of the following:		
HRMT 323	Principles of Human Resource Administration	
MGMT 301	Designing Innovative Organizations	
MGMT 370	Business Consulting	
MGMT 451	Management Simulation	
Total Credits		24.0

Primary Major Courses

Students completing the Organizational Management co-major (requirements listed above) must do so in conjunction with a primary business major. Students must select a primary major from the following list (Accounting, Finance, Legal Studies, International Business, Management Information Systems, Marketing, or Operations & Supply Chain Management.)

Sample Plan of Study

Term 1		Credits
BUSN 101	Foundations of Business I	4.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0

UNIV B101 [WI]	The Drexel Experience	1.0
	Term Credits	16.0
Term 2		
BUSN 102	Foundations of Business II	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
	Term Credits	16.0
Term 3		
ACCT 115	Financial Accounting Foundations	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
	Select one of the following:	3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
	General Education elective	3.0
	Term Credits	16.0
Term 4		
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
COM 270 [WI]	Business Communication	3.0
STAT 201	Introduction to Business Statistics	4.0
	Term Credits	15.0
Term 5		
INTB 200	International Business	4.0
MIS 200	Management Information Systems	4.0
	Select one of the following:	3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
	Social Science elective	3.0
	Term Credits	14.0
Term 6		
	ENGL 200 through ENGL 399	3.0
FIN 301	Introduction to Finance	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
	Term Credits	15.0
Term 7		
ORGB 300 [WI]	Organizational Behavior	4.0
ORGB 320	Leadership: Theory and Practice	4.0
PHIL 105	Critical Reasoning	3.0
	Primary major course	4.0
	Term Credits	15.0
Term 8		
ORGB 400	Team Development and Leadership	4.0
	Primary major courses	8.0
	History (HIST) elective	4.0
	Term Credits	16.0
Term 9		
ORGB 420	Negotiations and Conflict Resolution	4.0
	Primary major courses	8.0
	Society and Culture elective	3.0
	Term Credits	15.0
Term 10		
ORGB 430	Strategic Career Development	4.0
UNIV B201	Career Management	1.0

	Primary major course	4.0
	Fine Arts elective	3.0
	General Education elective	3.0
	Term Credits	15.0
Term 11		
MGMT 450	Strategy and Competitive Advantage	4.0
	Select one of the following:	4.0
HRMT 323	Principles of Human Resource Administration	
MGMT 301	Designing Innovative Organizations	
MGMT 370	Business Consulting	
MGMT 451	Management Simulation	
	Primary major course	4.0
	Science or Computer Science elective	3.0
	Term Credits	15.0
Term 12		
	Select one of the following:	4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	
	Select one of the following:	4.0
HRMT 323	Principles of Human Resource Administration	
MGMT 301	Designing Innovative Organizations	
MGMT 370	Business Consulting	
MGMT 451	Management Simulation	
	Primary major course	4.0
	General Education electives	6.0
	Term Credits	18.0
Total Credit: 186.0		

Minor in Organizational Management

The minor in “Organizational Management” is designed for students with varied backgrounds who seek to develop knowledge and skills in leadership, teamwork, and communication. These organizational management skills are intended to supplement other majors from around the university. The curriculum provides students with a foundation of skills for effectively working with others in a variety of contexts and situations.

Required Courses

ORGB 300 [WI]	Organizational Behavior	4.0
ORGB 320	Leadership: Theory and Practice	4.0
ORGB 400	Team Development and Leadership	4.0
ORGB 420	Negotiations and Conflict Resolution	4.0
Select two of the following courses:		8.0
HRMT 323	Principles of Human Resource Administration	
ORGB 430	Strategic Career Development	
MGMT 370	Business Consulting	
MGMT 451	Management Simulation	

Total Credits 24.0

Requirements

- No more than 2 courses or 8.0 credits required by a student’s major may be counted towards this minor.
- A grade of “C” (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.

- Business & engineering and economic students may complete any of the business minors, including: accounting, economics, finance, international economics, legal studies, management information systems, marketing, business analytics, technology innovation management, organizational management and operations & supply chain management.
- **Cannot do a major and a minor in the same field of study.**

Learning Goals

Upon completing the minor, students will be able to:

- Discover important insights about oneself as a leader and develop a self-awareness of strengths and opportunities for personal growth
- Manage career and networks to achieve personal growth
- Develop the skills and competencies needed to lead effectively in today's dynamic and diverse environment
- Increase conceptual understanding of leadership in different types of situations and facing different types of challenges
- Learn how to influence and manage conflict within organizations
- Identify various approaches and imperatives for leading teams
- Recognize ethical dilemmas in management practice and how to infuse ethical standards within a group or team
- Learn how to effectively function within a team and lead a team for success
- Recognize how human factors can both distort and enhance the process of managerial decision making
- Understand how the changing nature of work (e.g., global, technological, etc.) influences choices about design and practices within organizations

Organizational Management Faculty

Lauren D'Innocenzo, PhD (*University of Connecticut*). Assistant Professor. Groups/Teams; Multi-Level Modeling; Shared Leadership.

Cuneyt Gozu, PhD (*University of Albany*). Associate Clinical Professor. Attitudes; Groups/Teams; Leadership; Motivation; Power and Influence

Jeffrey H. Greenhaus, PhD (*New York University*) *William A. Mackie Professor of Management*. Professor. Work-Life Balance.

David Kurz, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Business Education; Groups/Teams; Leadership; Supply Chain Leadership.

Mary Mawritz, PhD (*University of Central Florida*). Assistant Professor. Management Department Abusive supervision; deviant behavior; leadership.

Christian Resick, PhD (*Wayne State University*). Associate Professor. Groups/Teams; Leadership; Organizational Culture and Fit; Personality.

Joan Weiner, PhD (*The Wharton School, University of Pennsylvania*). Professor. Business ethics, leadership, communication and decision making; educational innovation; health system management design.

Jonathan C. Ziegert, PhD (*University of Maryland*). Associate Professor. Management Department Attitudes; Diversity; Groups/Teams; Leadership; Organizational Culture and Fit.

Technology Innovation Management

Co-Major: Technology Innovation Management

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 186.0

Classification of Instructional Programs (CIP) code: 52.0201

Standard Occupational Classification (SOC) code: 11-1021; 11-9199

The Technology Innovation Management program is a co-major that must be taken in conjunction with the following majors Accounting, Finance, International Business, Legal Studies, Management Information Systems, Marketing or Operations and Supply Chain Management.

About the Program

Over the last two decades, Technology and Innovation Management has emerged as a unique and exciting area within the broad field of management. The field focuses broadly on understanding the process of innovation, and management approaches to innovation with special emphasis on technology change a source of innovations.

The Technology Innovation Management program offers a very significant way of differentiating the Drexel business student in the marketplace by embedding skill sets and knowledge base emphasizing technology innovation management which is built on a solid business background. Students most likely to benefit from a technology innovation management co-major will have majors in Operations and Supply Chain Management, Marketing, and Management Information Systems; however, this is not a restricted co-major. Technology Innovation Management courses are oriented primarily toward innovation, with an emphasis on technology-based innovation.

Degree Requirements

Required Courses: *	16.0
MGMT 201	Introduction to Technology Innovation Management
MGMT 301	Designing Innovative Organizations
MGMT 302	Competing in Technology Industries
MGMT 364	Technology Management
Select two courses from either track:	8.0
Product Innovation Track	
MGMT 370	Business Consulting
ORGB 400	Team Development and Leadership
ORGB 420	Negotiations and Conflict Resolution
MKTG 355	Interactive Marketing
MKTG 357	Global Marketing
MKTG 347	New Product Development
MKTG 365	New Media Marketing
BLAW 360	Intellectual Property and Cyber Law
Process Innovation Track	
MGMT 370	Business Consulting
MIS 261	Introduction to Enterprise Application Software Using SAP - Logistics
MIS 262	Intro to Enterprise Application Software Using SAP - Accounting & Analytics
MIS 361	Information System Project Management
OPM 315	Service Operations Management
Total Credits	24.0
Suggested Electives:	
ENTP 250	Ideation
	3.0

ENTP 329	Entrepreneurship & New Technologies	3.0
ENTP 340	Managing Entrepreneurial Growth	3.0
ENTP 385	Innovation in Established Companies	3.0
ENTP 450	Launch It!	3.0

Sample Plan of Study

First Year

Term 1		Credits
BUSN 101	Foundations of Business I	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
ECON 201	Principles of Microeconomics	4.0
UNIV B101 [WI]	The Drexel Experience	1.0
Term Credits		16.0

Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
BUSN 102	Foundations of Business II	4.0
ECON 202	Principles of Macroeconomics	4.0
Term Credits		15.0

Term 3		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ACCT 115	Financial Accounting Foundations	4.0
PSY 101	General Psychology I	3.0
General Education Elective		3.0
CIVC 101	Introduction to Civic Engagement	1.0
Select one of the following		3.0
BIO 100	Applied Cells, Genetics & Physiology	
BIO 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
Term Credits		17.0

Second Year

Term 4		
ACCT 116	Managerial Accounting Foundations	4.0
STAT 201	Introduction to Business Statistics	4.0
BLAW 201	Business Law I	4.0
COM 270 [WI]	Business Communication	3.0
Term Credits		15.0

Term 5		
INTB 200	International Business	4.0
MIS 200	Management Information Systems	4.0
Social Science Elective		3.0
Select one of the following		3.0
BIO 100		
BIO 101		
CHEM 151		
PHYS 151		
Term Credits		14.0

Third Year

Term 6		
OPM 200	Operations Management	4.0
FIN 301	Introduction to Finance	4.0
MKTG 201	Introduction to Marketing Management	4.0
English Literature Elective ENGL 200 through 399		3.0
Term Credits		15.0

Term 7		
ORGB 300 [WI]	Organizational Behavior	4.0
PHIL 105	Critical Reasoning	3.0
Primary Major Course 1		4.0
MGMT 201	Introduction to Technology Innovation Management	4.0
Term Credits		15.0

Fourth Year

Term 8		
MGMT 301	Designing Innovative Organizations	4.0
Primary Major Course 2		4.0
Primary Major Course 3		4.0
HIST Elective		4.0
Term Credits		16.0

Term 9		
MGMT 302	Competing in Technology Industries	4.0
Primary Major Course 4		4.0
Primary Major Course 5		4.0
Society and Culture Elective		3.0
Term Credits		15.0

Fifth Year

Term 10		
Fine Arts Elective		3.0
Primary Major Course 6		4.0
UNIV B201	Career Management	1.0
MGMT 364	Technology Management	4.0
General Education Elective		3.0
Term Credits		15.0

Term 11		
Science or Computer Science Elective		3.0
Primary Major Course 7		4.0
MGMT 450	Strategy and Competitive Advantage	4.0
Select course from Product Innovation or Process Innovation Track		4.0
Term Credits		15.0

Term 12		
Select course from Track chosen in term 11		4.0
Select one of the following		4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	
Primary Major Course 8		4.0
General Education Elective		3.0

General Education Elective	3.0
Term Credits	18.0

Total Credit: 186.0

The minor in Technology Innovation is designed for students with varied backgrounds who seek to develop knowledge and skills in innovation process and strategic approaches to technology. These technology innovation management skills are intended to supplement other majors from around the university.

Minor in Technology Innovation Management

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- Business & engineering and economic students may complete any of the business minors, including: accounting, economics, finance, international economics, international business, legal studies, management information systems, marketing, business analytics, organizational management, and operations & supply chain management.
- **Cannot do a major and a minor in the same field of study.**

Required Courses

MGMT 201	Introduction to Technology Innovation Management	4.0
MGMT 301	Designing Innovative Organizations	4.0
MGMT 302	Competing in Technology Industries	4.0
MGMT 364	Technology Management	4.0

Select 2 courses from either track: 8.0

Product Innovation Track

BLAW 360	Intellectual Property and Cyber Law	
FIN 335	Entrepreneurial Finance	
MGMT 370	Business Consulting	
MKTG 347	New Product Development	
MKTG 355	Interactive Marketing	
MKTG 357	Global Marketing	
MKTG 365	New Media Marketing	
ORGB 400	Team Development and Leadership	
ORGB 420	Negotiations and Conflict Resolution	

Process Innovation Track

MGMT 370	Business Consulting	
MIS 350	Intro to Enterprise Application Software Using SAP - Accounting & Analytics	
MIS 361	Information System Project Management	
OPM 315	Service Operations Management	

Total Credits 24.0

Technology Innovation Management Faculty

Shanti Dewi Anak Agung Istri, PhD (*Georgia Institute of Technology*). Assistant Professor. Technology commercialization; Technology entrepreneurship.

Suresh Chandran, PhD (*Vanderbilt University*). Associate Clinical Professor. Corporate entrepreneurship; corporate social responsibility;

global management; intellectual property and employee rights; Sustainability; Technological Innovation.

Robert W. Keidel, PhD (*Wharton School, University of Pennsylvania*). Clinical Professor. Cognitive coaching; Executive team building; Organizational design; Strategic thinking; Strategy creation

Jeongsik Lee, PhD (*University of California Los Angeles*). Assistant Professor. Economics of Innovation; Social networks; Technology management

Yu-Chieh Lo, PhD (*University of Southern California*). Assistant Professor. Categorization in markets; Organization theory; Technology innovation.

Dali Ma, PhD (*University of Chicago*). Assistant Professor. Social hierarchy; Social networks; Sociology of entrepreneurship; Sociology of transitional China

Michele K. Masterfano, DBA (*Argosy University*). Associate Clinical Professor. Business Planning; Marketing Research; Marketing Strategy; Social Capital; Social Networking

Rajiv Nag, PhD (*Pennsylvania State University*). Assistant Professor. Organizational Knowledge and Identity; Organizational learning and change; Strategic Leadership; Strategic Performativity

V. K. Narayanan, PhD (*University of Pittsburgh*) *Deloitte Touche Jones Stubbs Professor*. Management Department Cognition and Strategy; Corporate Entrepreneurship; Organization design

Haemin Park, PhD (*University of Washington*). Assistant Professor. IPO, Knowledge-based Vie of the Firm; Technology Entrepreneurship; Venture capital

Stanley Ridgley, PhD (*Duke University*). Assistant Clinical Professor. Business communication; Cognition and strategy; Competitive intelligence; Determinants of Firm Performance; Global Management; New Markets in Emerging Countries; Russian Business Culture.

Daniel Tzabbar, PhD (*University of Toronto*). Assistant Professor. Management Department Accessing and managing knowledge; Alliances; Human capital; Organizational learning and change; Social Capital; Technology Entrepreneurship; Technology Innovation

Minor in Business Administration

The minor in business administration is designed to provide some flexibility while at the same time assuring exposure to a number of critical business functional areas.

Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- Business administration and business & engineering & economic students may complete any of the business minors, including: accounting, economics, finance, international economics, legal

studies, management information systems, marketing, business analytics, organizational management, technology innovation management, and operations & supply chain management.

- **Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Students select six of the following:		24.0
ACCT 115	Financial Accounting Foundations or ACCT 11 Accounting for Professionals	
BLAW 201	Business Law I or BLAW 32 Law of Business Organizations	
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	
FIN 301	Introduction to Finance	
MIS 200	Management Information Systems	
MKTG 201	Introduction to Marketing Management	
OPM 200	Operations Management	
ORGB 300	Organizational Behavior [WJ]	
STAT 201	Introduction to Business Statistics	
STAT 202	Business Statistics II	
Total Credits		24.0

Certificate in Brand and Reputation Management

Certificate Level: Undergraduate

Admission Requirements: Current Drexel students only

Certificate Type: Certificate

Number of Credits to Completion: 16.0

Instructional Delivery: Campus

Calendar Type: Quarter

Expected Time to Completion: 3 years

Classification of Instructional Program (CIP) Code: 52.1499

Standard Occupational Classification (SOC) Code: 11-2021

In the increasingly competitive and volatile global marketplace, brand and reputation management have gained considerable interest and importance in organizations, including corporations, non-profits, and those in the public sector.

The Brand and Reputation Management Certificate program introduces the concept of the product and/or corporate brand, the components that make up a good brand, and how to develop brand strategies that are appropriate for various types of organizations. Students will also learn about the various stakeholders that impact or enhance an organization's ability to build its brand and reputation as well as learn to analyze the business environment in order to identify a desired image, to create brand positioning strategy, and to develop and nurture the positive perception of a product, organization, individual or place.

Following the completion of all other required courses, all students must also complete an "honors" project as part of MKTG 363 Brand & Reputation Management Project. The topic and scope of the project must be approved by the Department Head in the Department of Marketing (<http://www.lebow.drexel.edu/faculty-and-research/disciplines/marketing>). Completed projects will be a written project submitted to the Department Head of Marketing for evaluation in a pass/fail manner.

MKTG 322	Advertising & Integrated Marketing Communications	4.0
MKTG 362	Brand and Reputation Management	4.0
MKTG 363	Brand & Reputation Management Project *	1.0
Students must complete one course from the following options, depending upon career interests:		4.0
MKTG 324	Marketing Channels and Distribution Systems	
MKTG 347	New Product Development	
MKTG 348	Services Marketing	
MKTG 356	Consumer Behavior	
Or a course from outside the LeBow College in a related field, with the approval of the Department Head in the department of Marketing.		
Total Credits		16.0

* Taken upon the completion of all other requirements.

Certificate in Social Responsibility in Business

Certificate Level: Undergraduate

Admission Requirements: Current Drexel students only

Certificate Type: Certificate

Number of Credits to Completion: 15.0

Instructional Delivery: Campus

Calendar Type: Quarter

Classification of Instructional Program (CIP) Code: 33.0104

Standard Occupational Classification (SOC) Code: 11-9199

Through course work, civic engagement and related co-op experience, the Certificate in Social Responsibility in Business provides a well-rounded look at corporate social responsibility, giving students a unique perspective on ethical leadership in the business community. The certificate program encourages students to seek co-op experience and positions after graduation with firms committed to acting with social responsibly.

Program Requirements

In conjunction with the Lindy Center for Civic Engagement, (<http://drexel.edu/lindycenter>) students initiate and complete a socially focused winter break or spring break project during any one term/break. The scope of the project entails civic responsibility and focuses on business applications. An example would be to assist in the preparation of income tax forms for under privileged Philadelphia residents. This project is in addition to requirements of the University 101 course.

Student will use their My LIFE e-portfolios to retain reflections and relevant writings from each of the required courses.

Coordinated with the Center for Civic Engagement, students will complete a minimum of sixty hours (60) of civic engagement while a student at Drexel University.

Students are required to earn a minimum of "C" in the following required courses, and a "B" average over all the courses.

Required Courses *		
BUSN 103	Advanced First Year Business Seminar *	2.0
ENTP 270	Social Entrepreneurship	3.0
MKTG 368	Corporate Responsibility Management	4.0
ORGB 320	Leadership: Theory and Practice	4.0
PHIL 301	Business Ethics	3.0
Total Credits		16.0

* Students must take BUSN 103 Social Responsibility in Business.

LeBow College of Business: School of Economics

Economics is one of Drexel LeBow's strongest disciplines. The LeBow College of Business celebrated its strengths in economics teaching and research by elevating its economics department into a School of Economics. The School of Economics will continue Drexel LeBow's commitment to offering a curriculum that is current and challenging, and to conducting research that aligns with business trends and informs policy makers.

A degree, major or minor in Economics provides students with a robust understanding of the workings of the market system and major economic institutions, economic policy, and development.

Majors

BA, BS, BS-JD Economics

- Economics (BA, BS, BS-JD) (p. 360)

BS Business Administration

- Business Economics co-major (p. 367)
- International Business (p. 370)
- International Business co-major (p. 372)

Minors

- Economics (p. 364)
- International Economics (p. 375)

Economics

Major: Economics

Degree Awarded: Bachelor of Science in Economics (BS) or Bachelor of Arts in Economics (BA)

Calendar Type: Quarter

Total Credit Hours: 187.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: (BS) 45.0603; (BA) 45.0601

Standard Occupational Classification (SOC) code: 19-3011; 13-2000

About the Program

Economics is at the root of business decisions, government policy making, and global relations. As a course of study, it can lead to diverse career opportunities, and is often viewed favorably as excellent preparation for graduate programs such as business and law.

Bachelor of Arts in Economics

The BA in Economics introduces students to modern economics within the context of a broad-based liberal arts curriculum. The degree is oriented toward students with interest in the less quantitative features of economics and a broader liberal arts education, particularly in areas offered by the College of Arts and Sciences. The degree requires students

develop a depth of knowledge in a coordinate field (minor or secondary major) outside of economics.

Bachelor of Science in Economics

The BS in Economics program introduces students to modern economics within the context of a general scientific and humanities curriculum. This degree is oriented towards students interested in acquiring a broad-based education with a focus on quantitative and professional skills.

The program is designed to provide students with an understanding of the market system, as well as economic institutions, policies and development. In addition to this deep coverage of economics, the major includes liberal arts and sciences requirements. The degree stipulates that students either complete one of the specific economic concentrations (Business Economics or Mathematical Economics) or develop a depth of knowledge in a minor or secondary major field outside of economics. The BS in Economics program provides excellent training for graduate school in economics.

The BS in Economics offers concentration choices in both Business Economics and Mathematical Economics.

Business Economics Concentration

This concentration prepares students to apply the rigorous methods of modern quantitative economics as professionals in a business context. This program combines coursework in economics and the functional fields of business administration within the context of a general scientific and humanities curriculum.

Mathematical Economics Concentration

This concentration prepares students for graduate study in quantitative and rigorous programs in economics and related fields. This program will also prepare students for professional work in quantitative economics or closely related areas, by providing coursework in economics and mathematics, in the context of a general scientific and humanities curriculum.

Coordinate Field Option

As an alternative to choosing one of these concentrations, students may also personalize their degree by developing a depth of knowledge in a minor or secondary major field outside of economics such as finance, social sciences, international studies or natural sciences. Examples of possible coordinating minors could include a minor in History and Politics for students interested in political economy or policy studies; a minor in American or European Studies for students interested in the economics of those countries, or a minor in Communication for students interested in economic journalism. In addition, students can complete a specialization in business economics or mathematical economics as an area of concentration.

Minor in Economics

The minor in Economics provides a solid background in the application of economic theory to markets. Students complete standard courses in micro- and macroeconomics that emphasize core training in economic decision making. Students also choose a course that applies this training to areas such as international economics, firm and industry behavior, quantitative economic analysis, and public policy. This type of analytical training provides a strong complement to many majors, including business

fields, but would be especially useful for students interested in careers in public policy or law.

Minor in International Economics

The minor in International Economics is designed for students with varied backgrounds who have a particular interest in learning more about the international economic environment. The curriculum provides the students a basic understanding of economics and exposes them to advanced topics dealing with international trade, multinational corporations, and other aspects of international economics. The minor complements a variety of degrees, particularly for students interested in applying their major discipline within an international context or within a multinational corporation.

Additional Information

For more information about this major, contact the School of Economics. (<http://www.lebow.drexel.edu/Faculty/Departments/Economics>)

Degree Requirements (BS)

While a variety of options are available for study in coordinating fields, two specific concentrations have been developed to address key areas in economics.

- The business economics concentration
- The mathematical economics concentration

The requirements for those concentrations are listed beneath the general requirements for the BS in Economics program.

General education requirements

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
CS 143	Computer Programming Fundamentals	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0

Select one of the following math sequences:

MATH 101	Introduction to Analysis I	3.0
& MATH 102	and Introduction to Analysis II	
MATH 121	Calculus I	3.0
& MATH 122	and Calculus II	
Fine arts elective		3.0
Three laboratory science electives		9.0
Two English literature electives: (ENGL 200 through ENGL 399)		6.0
One history elective		4.0
Two philosophy electives		6.0

Economics Requirements

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ECON 250	Game Theory and Applications	4.0
ECON 301	Microeconomics	4.0
ECON 321	Macroeconomics	4.0
ECON 322 [WI]	Economics Seminar	4.0
ECON 350 [WI]	Applied Econometrics	4.0
ECON 360	Time Series Econometrics	4.0
INTB 334	International Trade	4.0

INTB 336	International Money and Finance	4.0
STAT 201	Introduction to Business Statistics	8.0
& STAT 202	and Business Statistics II	

Economics Electives

Select 20.0 credits from any of the following:

ECON 203	Survey of Economic Policy	4.0
ECON 260	Economics of Small Business	
ECON 326	Economic Ideas [WI]	4.0
ECON 330	Managerial Economics	
ECON 331	International Macroeconomics	4.0
ECON 334	Public Finance	
ECON 336	Labor Economics	4.0
ECON 338	Industrial Organization	
ECON 342	Economic Development	4.0
ECON 344	Comparative Economic Systems	
ECON 348	Mathematical Economics	4.0
ECON 351	Resource and Environmental Economics	
ECON T480	Special Topics in ECON	4.0
ENVS 370	Practice of Environmental Economics	
FIN 301	Introduction to Finance	4.0
FIN 325	Financial Institutions and Markets	
INTB 332	Multinational Corporations	4.0
INTB 440	Seminar in International Business	
INTB 338	Regional Studies in Economic Policies and International Business	4.0
SOC 240	Urban Sociology	
SOC 260	Classical Social Theory	4.0

Additional Requirements **

Coordinate Field 26.0

Additional courses as required to satisfy a coordinating field (a second major, minor, or one of the two available concentrations below)

Free electives 30.0

Total Credits 187.0

* Students pursuing the concentration in Mathematical Economics can select CS 171 instead of CS 143.

** Students who take the Mathematical Economics or Business Economics concentrations must complete the required concentration courses and free electives for a total of 56.0 credits.

Mathematical Economics Concentration

Students selecting this concentration must have satisfied the general educational mathematics requirements by completing MATH 121 and MATH 122.

ECON 348	Mathematical Economics	4.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	4.0
MATH 210	Differential Equations	4.0

Select three of the following:

MATH 220	Introduction to Mathematical Reasoning [WI]	9.0-12.0
MATH 285	Differential Equations II	
MATH 300	Numerical Analysis I	4.0
MATH 301	Numerical Analysis II	
MATH 305	Introduction to Optimization Theory	4.0
MATH 320	Actuarial Mathematics	
MATH 401	Elements of Modern Analysis I	4.0
MATH 402	Elements of Modern Analysis II	

Free electives	27.0-24.0
Total Credits	56.0

Business Economics Concentration

Required Courses

ACCT 115	Financial Accounting Foundations	4.0
ECON 330	Managerial Economics	4.0
FIN 301	Introduction to Finance	4.0
MIS 200	Management Information Systems	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
or BLAW 201	Business Law I	
Select two of the following:		8.0
ACCT 116	Managerial Accounting Foundations	
FIN 302	Intermediate Corporate Finance	
FIN 321	Investment Securities & Markets	
MKTG 201	Introduction to Marketing Management	
OPM 200	Operations Management	
Free electives		28.0
Total Credits		56.0

Sample Plan of Study (BS)

Term		Credits	
Term 1	ECON 201	Principles of Microeconomics	4.0
	ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
	MATH 121	Calculus I	4.0
	or 101	Introduction to Analysis I	
	PSY 101	General Psychology I	3.0
	UNIV B101 [WI]	The Drexel Experience	1.0
	Term Credits		15.0
Term 2	CS 143	Computer Programming Fundamentals	3.0
	ECON 202	Principles of Macroeconomics	4.0
	ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
	MATH 122	Calculus II	4.0
	or 102	Introduction to Analysis II	
	SOC 101	Introduction to Sociology	3.0
	Term Credits		17.0
Term 3	ANTH 101	Introduction to Cultural Diversity	3.0
	CIVC 101	Introduction to Civic Engagement	1.0
	ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
	Laboratory science course		3.0
	Philosophy elective		3.0
	Economics elective*		4.0
	Term Credits		17.0
Term 4	COM 270 [WI]	Business Communication	3.0
	ECON 301	Microeconomics	4.0
	STAT 201	Introduction to Business Statistics	4.0
	History elective		4.0
	Laboratory Science course		3.0
	Term Credits		18.0
Term 5	ECON 250	Game Theory and Applications	4.0
	ECON 321	Macroeconomics	4.0
	STAT 202	Business Statistics II	4.0
	Laboratory Science course		3.0
	Term Credits		15.0

Term 6	ECON 350 [WI]	Applied Econometrics	4.0
	INTB 334	International Trade	4.0
	ENGL 200 through ENGL 399		3.0
	Coordinate Field course (concentration/minor) or a Free elective		3.0
	Philosophy elective		3.0
Term Credits		17.0	

Term 7	ECON 360	Time Series Econometrics	4.0
	INTB 336	International Money and Finance	4.0
	Coordinate Field course (concentration/minor) or Free elective		3.0
	Free elective		4.0
	Term Credits		15.0

Term 8	Economics electives*		8.0
	ENGL 200 through ENGL 399 course		3.0
	Coordinate field course (concentration/minor) or a Free elective		3.0
	Fine Arts elective		3.0
	Term Credits		17.0

Term 9	Economics elective*		4.0
	Coordinate Field courses (concentration/minor) or Free electives		6.0
	Free electives		5.0
	Term Credits		15.0

Term 10	ECON 322 [WI]	Economics Seminar	4.0
	UNIV B101 [WI]	The Drexel Experience	1.0
	Coordinate Field course (concentration/minor) or a Free elective		3.0
	Economics elective*		4.0
	Free elective		3.0
Term Credits		15.0	

Term 11	Coordinate Field courses (concentration/minor) or Free electives		6.0
	Economics elective*		4.0
	Free elective		4.0
	Term Credits		14.0

Term 12	Free electives		12.0
	Term Credits		12.0

Total Credit: 187.0

* See degree requirements for a list of courses that satisfy the Economics elective requirements.

Degree Requirements (BA)

General Education Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
INTB 200	International Business	4.0
MATH 101	Introduction to Analysis I	4.0
or MATH 121	Calculus I	
MATH 102	Introduction to Analysis II	4.0
or MATH 122	Calculus II	
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 105	Critical Reasoning	3.0

or PHIL 371	Philosophy of Social Sciences	
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
College of Media Arts and Design	elective	3.0
Two Laboratory Science courses *		6.0
Political Science elective		3.0
Social Science elective		3.0
Diversity elective		3.0
International Studies elective		3.0
Two Modern Language courses (at least through 201 level)		8.0

Required Economics Courses

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ECON 250	Game Theory and Applications	4.0
ECON 301	Microeconomics	4.0
ECON 321	Macroeconomics	4.0
ECON 322 [WI]	Economics Seminar	4.0
ECON 326 [WI]	Economic Ideas	4.0
INTB 334	International Trade	4.0
INTB 336	International Money and Finance	4.0
STAT 201	Introduction to Business Statistics	4.0

Economics Electives

20.0

Select five of the following:

ECON 203	Survey of Economic Policy	
ECON 260	Economics of Small Business	
ECON 330	Managerial Economics	
ECON 331	International Macroeconomics	
ECON 334	Public Finance	
ECON 336	Labor Economics	
ECON 338	Industrial Organization	
ECON 342	Economic Development	
ECON 344	Comparative Economic Systems	
ECON 348	Mathematical Economics	
ECON 350 [WJ]	Applied Econometrics	
ECON 351	Resource and Environmental Economics	
ECON 360	Time Series Econometrics	
ENVS 370	Practice of Environmental Economics	
FIN 301	Introduction to Finance	
FIN 325	Financial Institutions and Markets	
INTB 332	Multinational Corporations	
INTB 338	Regional Studies in Economic Policies and International Business	
INTB 440	Seminar in International Business	
SOC 240	Urban Sociology	
SOC 260	Classical Social Theory	

Coordinate Field (Minor or Major)

24.0

Two of the courses in the chosen coordinate field must be 200 level or above.

Free Electives

29.0

Total Credits 187.0

* Science courses are selected from Biology (BIO), Chemistry (CHEM), Environmental Science (ENVS), Physics (PHYS), or Physics-Environmental Science (PHEV).

Plan of Study (BA)

Term 1		Credits
UNIV 101	The Drexel Experience	1.0
ECON 201	Principles of Microeconomics	4.0

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101 or 121	Introduction to Analysis I Calculus I	4.0
PSY 101	General Psychology I	3.0
	Term Credits	15.0

Term 2

ECON 202	Principles of Macroeconomics	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 101 or 122	Introduction to Analysis I Calculus II	4.0
SOC 101	Introduction to Sociology	3.0
	Term Credits	14.0

Term 3

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
INTB 200	International Business	4.0
PHIL 105	Critical Reasoning	3.0
Lab Science (BIO, CHEM, ENVS, PHYS or PHEV)		3.0
	Term Credits	17.0

Term 4

COM 230	Techniques of Speaking	3.0
ECON 301	Microeconomics	4.0
STAT 201	Introduction to Business Statistics	4.0
Lab Science (BIO, CHEM, ENVS, PHYS, OR PHEV)		3.0
AWCOMAD elective		3.0
	Term Credits	17.0

Term 5

ECON 250	Game Theory and Applications	4.0
ECON 321	Macroeconomics	4.0
Political Science (PSCI) elective		4.0
Modern Language 101		4.0
	Term Credits	16.0

Term 6

COM 270 [WJ]	Business Communication	3.0
ECON 326 [WI]	Economic Ideas	4.0
INTB 334	International Trade	4.0
Modern Language 102		4.0
	Term Credits	15.0

Term 7

INTB 336	International Money and Finance	4.0
PHIL 105 or 371	Critical Reasoning Philosophy of Social Sciences	3.0
Coordinate Field Course		3.0
Economics (ECON) elective		4.0
Modern Language 103 or Free elective		4.0
	Term Credits	18.0

Term 8

Coordinate Field Courses		6.0
Modern Language 201 / Free elective		4.0
Diversity elective		3.0
Economics (ECON) elective		4.0
	Term Credits	17.0

Term 9

Coordinate Field Courses		6.0
Economics (ECON) elective		4.0
Social Science elective		3.0
International elective		3.0
	Term Credits	16.0

Term 10

ECON 322 [WI]	Economics Seminar	4.0
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UNIV B201	Career Management	1.0
Coordinate Field Courses		6.0
Economics (ECON) elective		4.0
Term Credits		15.0
Term 11		
Coordinate Field Course		3.0
Economics (ECON) elective		4.0
Free electives		7.0
Term Credits		14.0
Term 12		
Free electives		13.0
Term Credits		13.0
Total Credit: 187.0		

Co-op/Career Opportunities

The study of economics prepares students for a variety of fields: research economists in banks, government and universities; law; economic development for local government, banks and firms; business management and consulting; government and international agencies, such as the CIA, World Bank, IMF and USAID; and business and economic journalism.

Career Paths and Degree Combinations

Economics provides an excellent foundation for many career options and can also be combined with many other majors and minors in preparing students for great careers.

For example:

Banking and Finance

- Economics and Finance
- Economics and Business
- Economics and Mathematics
- Business Economics Concentration
- Economics and Physics

Academia

- Economics and Anthropology
- Economics and Psychology
- Economics and Mathematics
- Economics and Philosophy

Economics Research in Industry

- Economics and Mathematics
- Mathematical Economics Concentration
- Economics and Marketing
- Economics and Finance

High Tech and IT Industries

- Economics and Information Systems
- Economics and Chemistry
- Economics and Biology

Economics Research in Governments and International Organizations

- Economics and Environmental Studies
- Economics and Political Science

- Economics and International Studies

Law School and Other Graduate School Options

- Economics and Legal Studies
- Economics and Philosophy
- Economics and Political Science
- Economics and International Studies

Opportunities

Recently, economics students have obtained positions at the following institutions:

- Federal Reserve Bank, Board of Governors
- Citibank
- Vanguard Corporation
- Deloitte Consulting
- Black Rock Inc.
- Tyco Electronics

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Economics

The minor in economics provides a solid background in the application of economic theory to markets. Students complete standard courses in micro- and macroeconomics that emphasize core training in economic decision making. Students also choose a course that applies this training to areas such as international economics, firm and industry behavior, quantitative economic analysis, and public policy. This type of analytical training provides a strong complement to many majors, including business fields, but would be especially useful for students interested in careers in public policy or law.

Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- **Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Required Courses

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ECON 301	Microeconomics	4.0
ECON 321	Macroeconomics	4.0
ECON 322 [WI]	Economics Seminar	4.0

Select one of the following:

ECON 203	Survey of Economic Policy	4.0
ECON 250	Game Theory and Applications	4.0
ECON 260	Economics of Small Business	4.0

ECON 326	Economic Ideas	[WI]
ECON 331	International Macroeconomics	
ECON 334	Public Finance	
ECON 336	Labor Economics	
ECON 338	Industrial Organization	
ECON 342	Economic Development	
ECON 348	Mathematical Economics	
ECON 350	Applied Econometrics	[WI]
ECON 351	Resource and Environmental Economics	
INTB 332	Multinational Corporations	
INTB 334	International Trade	
INTB 336	International Money and Finance	
INTB 338	Regional Studies in Economic Policies and International Business	
Total Credits		24.0

Minor in International Economics

This minor is designed for students with varied backgrounds who have a particular interest in learning more about the international economic environment. The curriculum provides the students a basic understanding of economics and exposes them to advanced topics dealing with international trade, multinational corporations, and other aspects of international economics. The minor complements a variety of degrees, particularly for students interested in applying their major discipline within an international context or within a multinational corporation.

Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- **Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Required Courses

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
INTB 200	International Business	4.0
INTB 334	International Trade	4.0
or INTB 336	International Money and Finance	
Select two of the following (at least one from the following list):		8.0
INTB 332	Multinational Corporations	
INTB 334	International Trade	
INTB 336	International Money and Finance	
INTB 338	Regional Studies in Economic Policies and International Business	
ECON 342	Economic Development	
Other Options		
ECON 301	Microeconomics	
ECON 321	Macroeconomics	
ECON 322	Economics Seminar	[WI]
ECON 336	Labor Economics	

ECON 338	Industrial Organization	
ECON 348	Mathematical Economics	
ECON 350	Applied Econometrics	[WI]
ECON 351	Resource and Environmental Economics	
BLAW 340	International Business Law	
FIN 346	Global Financial Management	
MKTG 357	Global Marketing	
Total Credits		24.0

Dual/Accelerated Degree

Dual Degree Bachelor's Programs

With careful planning, students can complete two full degrees in the time usually required to complete one. The double major option works best in closely related areas. For detailed information the student should contact his or her advisor.

Degree Requirements BS ECON Dual Degree

General Education Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication (WI)	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Select one of the following sequences:

MATH 101	Introduction to Analysis I	
& MATH 102	and Introduction to Analysis II	
MATH 121	Calculus I	
& MATH 122	and Calculus II (recommended)	
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
Fine Arts Elective		3.0
Three Laboratory Science Electives		9.0-12.0
Two English Literature Electives: (ENGL 200 through ENGL 399)		6.0
History Elective		4.0
Two Philosophy Electives		6.0
Select one of the following:		3.0
CS 161	Introduction to Computing	
CS 171	Computer Programming I	

Professional Requirements

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ECON 250	Game Theory and Applications	4.0
ECON 301	Microeconomics	4.0
ECON 321	Macroeconomics	4.0
ECON 322 [WI]	Economics Seminar	4.0
ECON 330	Managerial Economics *	4.0
ECON 348	Mathematical Economics **	4.0
ECON 350 [WI]	Applied Econometrics (WI)	4.0
ECON 360	Time Series Econometrics	4.0
INTB 334	International Trade	4.0
INTB 336	International Money and Finance	4.0
Select one of the following sequences:		8.0

MATH 311	Probability and Statistics I	
& MATH 312	and Probability and Statistics II	
STAT 201	Introduction to Business Statistics	
& STAT 202	and Business Statistics II	

Professional Electives

Select six of the following:	20.0
Any other ECON courses numbered above 240	
Any other INTB courses	
ENVS 370 Practice of Environmental Economics	
FIN 301 Introduction to Finance ***	
FIN 325 Financial Institutions and Markets ***	
SOC 240 Urban Sociology	
SOC 260 Classical Social Theory	

Additional Requirements:**BS in Economics****Coordinate Field** 24.0

Additional courses as required to satisfy a coordinating field (a second major, minor, or one of the two available concentrations below).

Free Electives	29.0
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Total Credits	184.0-187.0
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* Only required for students pursuing the BS in Economics/Business Economics Concentration

** Only required for students pursuing the BS in Economics/Mathematical Economics Concentration

*** Required for the BS in Economics/Business Economics Concentration

Bachelor of Science / Juris Doctor

This program is a modified BS in Economics that allows students the ability to consider a BS/JD degree.

Conditional on successful admittance into Drexel's Kline School of Law (<http://drexel.edu/law>).

Due to the complex nature of this program students should work closely with their advisor when selecting courses.

General Education

ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
COOP 101	Career Management and Professional Development	0.0
CS 131	Computer Programming A	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Two ENGL 200 - ENGL 399 courses		3.0
MATH 101	Introduction to Analysis I	4.0
or MATH 121	Calculus I	
MATH 102	Introduction to Analysis II	4.0
or MATH 122	Calculus II	
PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0
UNIV B101 [WI]	The Drexel Experience (Part 1)	1.0
UNIV B201	Career Management	1.0
Three Science w/ Lab courses		9.0
CoMAD Elective		3.0
HIST Elective		4.0
PHIL Electives		6.0

Econ. Requirements

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
ECON 250	Game Theory and Applications	4.0
ECON 301	Microeconomics	4.0

ECON 321	Macroeconomics	4.0
ECON 322 [WI]	Economics Seminar	4.0
ECON 350 [WI]	Applied Econometrics	4.0
ECON 360	Time Series Econometrics	4.0
INTB 334	International Trade	4.0
INTB 336	International Money and Finance	4.0
STAT 201	Introduction to Business Statistics	4.0
STAT 202	Business Statistics II	4.0
Econ. Electives		20.0
Free Electives		28.0
First Year Law School Classes		28.0

School of Economics Faculty

Marco Airaud, PhD (*University of Pennsylvania Philadelphia*). Associate Professor. Computational economics, international economics, macroeconomics and monetary economics.

Patricia Awerbuch, MBA (*Drexel University*). Assistant Clinical Professor. Performance of on-campus students in an online classroom designed for distance learners; business professors.

Richard Barnett, PhD (*University of Minnesota*). Clinical Professor. Economic theory, macroeconomics.

Sebastien Bradley, PhD (*University of Michigan*). Assistant Professor. Public finance, international economics.

Mian Dai, PhD (*Northwestern University*). Assistant Professor. Managerial economics and strategy.

Pia DiGirolamo, PhD (*Purdue University*). Assistant Clinical Professor. Macroeconomics, international finance.

Matthew Freedman, PhD (*University of Maryland*). Associate Professor. Labor economics, public economics.

Shawkat M. Hammoudeh, PhD (*University of Kansas*). Professor. Applied econometrics, financial economics, international economics, and natural resource economics.

Teresa D. Harrison, PhD (*University of Texas Austin*) *Associate Dean, Academic Affairs*. Associate Professor. *School of Economics* Econometrics, public finance, industrial organization, empirical microeconomics including health and nonprofit organizations.

Paul E. Jensen, PhD (*Penn State University*) *Associate Dean, College of Business*. Associate Professor. International trade. Primary research interest is international trade, particularly in empirical studies of international trade patterns.

Bang Nam Jeon, PhD (*Indiana University*) *Department of Economics and International Business*. Professor. Financial economics, world financial market linkages, foreign direct investment flows in the Asia-Pacific economies, the Korean economy: currency crisis, FDI, and macroeconomic issues, regional economic integration and newly industrializing economies: the

Stephen Joyce, MA (*Temple University*). Assistant Clinical Professor. Education and human capital.

Andre Kurmann, PhD (*University of Virginia*). Associate Professor. Computational economics, financial economics, labor economics, macroeconomics and monetary economics.

Christopher A. Laincz, PhD (*Duke University*). Associate Professor. Economic development, technological change, and growth, industrial organization, macroeconomics and monetary economics.

Philip Luck, PhD (*University of California, Davis*). Assistant Professor. International economics, international trade.

Vibhas Madan, PhD (*Michigan State University*). Professor. International trade theory, applied microeconomics.

Roger A. McCain, PhD (*Louisiana State University*). Professor. Computational economics, game theory.

Bruce D. McCullough, PhD (*University of Texas Austin*). Professor. Applied Econometrics, Data Mining, Econometric Techniques, Reliability of Statistical and Econometric Software.

Irina Murtazashvili, PhD (*Michigan State University*). Assistant Professor. Applied econometrics.

Maria Olivero, PhD (*Duke University*). Associate Professor. Macroeconomics, international finance.

Eydis Olsen, MA (*American University*). Clinical Associate Professor. Macroeconomics, political economy.

Tristan Potter, PhD (*Boston College*). Assistant Professor. Macroeconomics, labor.

Konstantinos Serfes, PhD (*University of Illinois at Champaign-Urbana*). Professor. Industrial organization; microeconomics.

Ricardo Serrano-Padial, PhD (*University of California at San Diego*). Assistant Professor. Microeconomics theory, information economics with applications in finance, macroeconomics and industrial organization.

Mark Stehr, PhD (*University of California at Berkeley*) Assistant Director School of Economics. Associate Professor. Health economics, health behaviors, public finance, public policy.

Constantinos Syropoulos, PhD (*Yale University*) Trustee Professor of International Economics. Professor. International trade, political economy, applied microeconomics.

Matthew Weinberg, PhD (*Princeton University*). Associate Professor. Antitrust and regulation, applied econometrics, industrial organization.

Yoto Yotov, PhD (*Boston College*). Associate Professor. International trade, applied microeconomics, political economy.

Emeritus Faculty

Edward C. Koziara, PhD (*University of Wisconsin*). Professor Emeritus. Applied micro and macro economics.

Bijou Yang Lester, PhD (*University of Pennsylvania*). Professor Emeritus. Behavioral characteristics of shopping on-line, economic issues of electronic commerce, contingent employment and part-time work, the economy and suicide.

Andrew G. Verzilli, PhD (*Boston College*). Professor Emeritus. Teaching effectiveness in economics; economics and financial history.

Chiou-shuang Yan, PhD (*Purdue University*). Professor Emeritus. International economics, input-output analysis.

Business Economics

Major: Business Economics

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 184.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No

Co-op (Four years)

Classification of Instructional Programs (CIP) code: 45.0601

Standard Occupational Classification (SOC) code: 11-9199; 19-3011

The Business Economics program is a "co-major."

About the Program

Economics is the study of allocating scarce resources among competing needs. The program places particular emphasis on the application of theory toward the solution of particular problems in such areas as international trade, money and finance, consumer activities, economic development, and other areas.

Drexel's Business Economics co-major is designed for students who wish to receive a sound education within a specific functional area of business (Primary major) while supplementing that knowledge with an overview of economics.

Prepares students to apply the rigorous methods of modern quantitative economics in a business context. This program combines coursework in economics and the functional fields of business administration within the context of a general scientific and humanities curriculum.

More information can be found on the School of Economics webpage (<http://www.lebow.drexel.edu/faculty-and-research/disciplines/economics>).

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication (WI)	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
English literature elective: (ENGL 200 through ENGL 399)		3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
Fine arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0
BIO 100	Applied Cells, Genetics & Physiology	
	or BIO 101 Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	

General Education (Category) Electives * 21.0

Business Requirements

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
BUSN 101	Foundations of Business I	4.0

BUSN 102	Foundations of Business II	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
MGMT 450	Strategy and Competitive Advantage	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
ORGB 300 [WI]	Organizational Behavior (WI)	4.0
STAT 201	Introduction to Business Statistics	4.0
Select one of the following:		4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	
Primary Major Courses		32.0
Students completing the business economics co-major must do so in conjunction with a primary business major. Students must select a primary major from the following list: accounting, entrepreneurship, finance, legal studies, management information systems, marketing, or operations & supply chain management.		
Business Economics Requirements		
ECON 301	Microeconomics	4.0
ECON 321	Macroeconomics	4.0
ECON 322 [WI]	Economics Seminar (WI)	4.0
Select three of the following:		12.0
ECON 250	Game Theory and Applications	
ECON 326 [WI]	Economic Ideas (WI)	
ECON 330	Managerial Economics	
ECON 334	Public Finance	
ECON 336	Labor Economics	
ECON 338	Industrial Organization	
ECON 342	Economic Development	
ECON 348	Mathematical Economics	
ECON 350 [WI]	Applied Econometrics (WI)	
ECON 351	Resource and Environmental Economics	
ECON 360	Time Series Econometrics	
INTB 332	Multinational Corporations	
INTB 334	International Trade	
INTB 336	International Money and Finance	
INTB 338	Regional Studies in Economic Policies and International Business	
Total Credits		186.0

- * Students select seven (21.0 credits) of additional general education electives with a minimum of one course in each of the following categories:
- Society and Culture (Communication, English, Fine Arts, International Area Studies, Language, Philosophy)
 - Social Science (Anthropology, History, Sociology, Political Science, Psychology)
 - Math and Science (Computer Science, Information Systems, Math, Science).

Sample Plan of Study

Term 1	Credits	
BUSN 101	Foundations of Business I	4.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0

UNIV B101 [WI]	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
BUSN 102	Foundations of Business II	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
Term Credits		16.0
Term 3		
ACCT 115	Financial Accounting Foundations	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
Select one of the following:		3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
General education elective		3.0
Term Credits		16.0
Term 4		
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
COM 270 [WI]	Business Communication	3.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		15.0
Term 5		
INTB 200	International Business	4.0
MIS 200	Management Information Systems	4.0
Select one of the following:		3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
Social Science elective		3.0
Term Credits		14.0
Term 6		
FIN 301	Introduction to Finance	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
English literature elective (ENGL 200 through 399)		3.0
Term Credits		15.0
Term 7		
ECON 301	Microeconomics	4.0
ORGB 300 [WI]	Organizational Behavior (WI)	4.0
PHIL 105	Critical Reasoning	3.0
Primary Major course*		4.0
Term Credits		15.0
Term 8		
ECON 321	Macroeconomics	4.0
Primary Major courses*		8.0
History (HIST) elective		4.0
Term Credits		16.0
Term 9		
ECON Co-Major course (See co-major requirements for list)		4.0
Primary Major courses*		8.0
Society and culture elective		3.0
Term Credits		15.0
Term 10		
UNIV B201	Career Management	1.0
Primary Major course 6*		4.0

ECON Co-Major course (See co-major requirements for list)	4.0
General education elective	3.0
Fine arts elective	3.0
Term Credits	15.0
Term 11	
MGMT 450 Strategy and Competitive Advantage	4.0
Science or computer science elective	3.0
ECON Co-Major course (See co-major requirements for list)	4.0
Primary Major course*	4.0
Term Credits	15.0
Term 12	
ECON 322 [WI] Economics Seminar	4.0
Primary Major course*	4.0
Select one of the following:	4.0
MGMT 260 Introduction to Entrepreneurship	
MGMT 370 Business Consulting	
MGMT 371 Business Consulting for Nonprofits	
MGMT 451 Management Simulation	
STAT 202 Business Statistics II	
General education electives	6.0
Term Credits	18.0

Total Credit: 186.0

* Students completing the Business Economics Co-major must do so in conjunction with a primary business major. Students must select a primary major from the following list: Accounting, Entrepreneurship, Finance, Legal Studies, Management Information Systems, Marketing, or Operations & Supply Chain Management.

School of Economics Faculty

Marco Airaud, PhD (*University of Pennsylvania Philadelphia*). Associate Professor. Computational economics, international economics, macroeconomics and monetary economics.

Patricia Awerbuch, MBA (*Drexel University*). Assistant Clinical Professor. Performance of on-campus students in an online classroom designed for distance learners; business professors.

Richard Barnett, PhD (*University of Minnesota*). Clinical Professor. Economic theory, macroeconomics.

Sebastien Bradley, PhD (*University of Michigan*). Assistant Professor. Public finance, international economics.

Mian Dai, PhD (*Northwestern University*). Assistant Professor. Managerial economics and strategy.

Pia DiGirolamo, PhD (*Purdue University*). Assistant Clinical Professor. Macroeconomics, international finance.

Matthew Freedman, PhD (*University of Maryland*). Associate Professor. Labor economics, public economics.

Shawkat M. Hammoudeh, PhD (*University of Kansas*). Professor. Applied econometrics, financial economics, international economics, and natural resource economics.

Teresa D. Harrison, PhD (*University of Texas Austin*) *Associate Dean, Academic Affairs*. Associate Professor. School of Economics Econometrics, public finance, industrial organization, empirical microeconomics including health and nonprofit organizations.

Paul E. Jensen, PhD (*Penn State University*) *Associate Dean, College of Business*. Associate Professor. International trade. Primary research interest is international trade, particularly in empirical studies of international trade patterns.

Bang Nam Jeon, PhD (*Indiana University*) *Department of Economics and International Business*. Professor. Financial economics, world financial market linkages, foreign direct investment flows in the Asia-Pacific economies, the Korean economy: currency crisis, FDI, and macroeconomic issues, regional economic integration and newly industrializing economies: the

Stephen Joyce, MA (*Temple University*). Assistant Clinical Professor. Education and human capital.

Andre Kurmann, PhD (*University of Virginia*). Associate Professor. Computational economics, financial economics, labor economics, macroeconomics and monetary economics.

Christopher A. Laincz, PhD (*Duke University*). Associate Professor. Economic development, technological change, and growth, industrial organization, macroeconomics and monetary economics.

Philip Luck, PhD (*University of California, Davis*). Assistant Professor. International economics, international trade.

Vibhas Madan, PhD (*Michigan State University*). Professor. International trade theory, applied microeconomics.

Roger A. McCain, PhD (*Louisiana State University*). Professor. Computational economics, game theory.

Bruce D. McCullough, PhD (*University of Texas Austin*). Professor. Applied Econometrics, Data Mining, Econometric Techniques, Reliability of Statistical and Econometric Software.

Irina Murtazashvili, PhD (*Michigan State University*). Assistant Professor. Applied econometrics.

Maria Olivero, PhD (*Duke University*). Associate Professor. Macroeconomics, international finance.

Eydis Olsen, MA (*American University*). Clinical Associate Professor. Macroeconomics, political economy.

Tristan Potter, PhD (*Boston College*). Assistant Professor. Macroeconomics, labor.

Konstantinos Serfes, PhD (*University of Illinois at Champaign-Urbana*). Professor. Industrial organization; microeconomics.

Ricardo Serrano-Padial, PhD (*University of California at San Diego*). Assistant Professor. Microeconomics theory, information economics with applications in finance, macroeconomics and industrial organization.

Mark Stehr, PhD (*University of California at Berkeley*) *Assistant Director School of Economics*. Associate Professor. Health economics, health behaviors, public finance, public policy.

Constantinos Syropoulos, PhD (*Yale University*) *Trustee Professor of International Economics*. Professor. International trade, political economy, applied microeconomics.

Matthew Weinberg, PhD (*Princeton University*). Associate Professor. Antitrust and regulation, applied econometrics, industrial organization.

Yoto Yotov, PhD (*Boston College*). Associate Professor. International trade, applied microeconomics, political economy.

Emeritus Faculty

Edward C. Koziara, PhD (*University of Wisconsin*). Professor Emeritus. Applied micro and macro economics.

Bijou Yang Lester, PhD (*University of Pennsylvania*). Professor Emeritus. Behavioral characteristics of shopping on-line, economic issues of electronic commerce, contingent employment and part-time work, the economy and suicide.

Andrew G. Verzilli, PhD (*Boston College*). Professor Emeritus. Teaching effectiveness in economics; economics and financial history.

Chiou-shuang Yan, PhD (*Purdue University*). Professor Emeritus. International economics, input-output analysis.

International Business

Major: International Business

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.1101

Standard Occupational Classification (SOC) code: 11-1021

About the Program

The international business major explores the international business environment as well as the internal workings of international corporations and the impact of international considerations on the various functional areas of business.

International business focuses on business activities that cross national borders. The plan of study explores the international business environment as well as the internal workings of international corporations and the impact of international considerations on the various functional areas of business.

This major allows students to choose from a menu of courses. The curriculum is interdisciplinary, with courses drawn from across business disciplines and anthropology. Specialized operational courses are offered, along with more general theoretical and comparative ones.

For more information about this program, contact the School of Economics (<http://www.lebow.drexel.edu/academics/disciplines/economics>).

Degree Requirements

Students completing the major in international business are required to complete six courses in the same language (a language other than the student's native language) at Drexel University. It is recommended that students also take a 351 language course, focusing on the language of business. This requires a minimum of 6 language courses (24.0 credits) at the college level or up to level 6 (e.g., ITAL 203) placement, including proficiency in at least one language. Some of these courses may count toward the student's general education electives.

Students may satisfy the language requirement through foreign language course replacement by studying overseas. All study abroad programs

must be approved by the Study Abroad Office (<http://www.drexel.edu/studyabroad>).

Bachelor of Science in Business Administration (BSBA) Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
English literature elective ENGL 200 through ENGL 399		3.0
Fine Arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0

BIO 100 Applied Cells, Genetics & Physiology
or BIO 101 Applied Biological Diversity, Ecology & Evolution

CHEM 151 Applied Chemistry

PHYS 151 Applied Physics

General Education Electives

Students select seven (21.0 credits) general education electives, with a minimum of one course in each of the following three categories. Students take the remaining 12.0 credits from any of the topics listed under Additional General Education Electives.

Society and Culture		
Communication, English, Fine Arts, Global Studies, Language or Philosophy		3.0
Social Science		
Anthropology, History, Sociology, Political Science, Psychology		3.0
Science		
Computer Science, Information Systems, Science		3.0

Additional General Education Electives

Twelve (12.0) credits must be earned by taking 4 courses from the following topics: Communication, English, Fine Arts, Global Studies, Language, Philosophy, Anthropology, History, Sociology, Political Science, Psychology, Computer Science, Information Systems, Math, Science

Business Requirements

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
BUSN 101	Foundations of Business I (Online students take BUSN 111)	4.0
BUSN 102	Foundations of Business II (Online students take BUSN 112)	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
MGMT 450	Strategy and Competitive Advantage	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0
Select one of the following:		4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	

STAT 202	Business Statistics II	
Major Requirements		
Eight required courses (See Major Requirements list below)		32.0
Free Electives		18.0
Total Credits		180.0

Required International Business Major Courses *

INTB 440	Seminar in International Business	4.0
Category A, select a maximum of three of the following		
INTB 334	International Trade	
INTB 336	International Money and Finance	
INTB 338	Regional Studies in Economic Policies and International Business	
ECON 342	Economic Development	
ECON 344	Comparative Economic Systems	
ANTH 312	Approaches to Intercultural Behavior	
Category B, select a minimum of four of the following		
INTB 332	Multinational Corporations	16.0
BLAW 340	International Business Law	
FIN 346	Global Financial Management	
MKTG 357	Global Marketing	
MIS 347	Domestic and Global Outsourcing Management	
Total Credits		32.0

* Students majoring in international business must also complete a minimum of 6 language courses (24.0 credits) at the college level.

Recommended Plan of Study

		Credits
Term 1		
BUSN 101	Foundations of Business I	4.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV B101 [WI]	The Drexel Experience	1.0
	Term Credits	16.0
Term 2		
BUSN 102	Foundations of Business II	4.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
	Term Credits	15.0
Term 3		
ACCT 115	Financial Accounting Foundations	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Select one of the following:		
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
Modern Language 101/General Education elective		4.0
	Term Credits	15.0
Term 4		
ACCT 116	Managerial Accounting Foundations	4.0
COM 270 [WI]	Business Communication	3.0
STAT 201	Introduction to Business Statistics	4.0
Modern Language 102/General Education elective		4.0
	Term Credits	15.0
Term 5		
History Elective (HIST)		4.0

INTB 200	International Business	4.0
Select one of the following:		
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
Modern Language 103/General Education elective		4.0
	Term Credits	15.0

Term 6

MIS 200	Management Information Systems	4.0
BLAW 201	Business Law I	4.0
PSY 101	General Psychology I	3.0
Modern Language 201/Free elective		4.0
	Term Credits	15.0

Term 7

FIN 301	Introduction to Finance	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
MKTG 201	Introduction to Marketing Management	4.0
Modern Language 202/General Ed Elective		4.0
	Term Credits	16.0

Term 8

INTB Category A Elective		4.0
INTB Category B Elective		4.0
OPM 200	Operations Management	4.0
Modern Language 203/Free Elective		4.0
	Term Credits	16.0

Term 9

INTB Category B Elective		4.0
INTB Category B Elective		4.0
Science Elective		3.0
PHIL 105	Critical Reasoning	3.0
	Term Credits	14.0

Term 10

INTB Category A Elective		4.0
UNIV B201	Career Management	1.0
Social science elective		3.0
ENGL 200 - ENGL 399 course		3.0
Free elective		3.0
	Term Credits	14.0

Term 11

INTB Category A Elective		4.0
MGMT 450	Strategy and Competitive Advantage	4.0
Select one of the following:		
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	
Free elective		3.0
	Term Credits	15.0

Term 12

INTB 440	Seminar in International Business	4.0
Fine Arts elective		3.0
Free electives		3.0
INTB Category B Elective		4.0
	Term Credits	14.0

Total Credit: 180.0

* See degree requirements.

Co-op/Career Opportunities

International business graduates are employed in a variety of corporate settings, including the pharmaceutical, banking and telecommunication industries. Some students pursue graduate studies or find employment in multilateral governmental organizations.

The concentration has been designed to provide a competitive advantage for those students interested in international business careers. In addition to business coursework, students also take advantage of Drexel's programs in history-politics, sociology, anthropology, and other areas that focus on international topics.

The University offers a foreign language class in Arabic and minors in Chinese, French, German, Italian, Japanese, Russian, and Spanish. Each minor can include study of the vocabulary needed for business transactions within the particular language.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

International Business Faculty

Murugan Anandarajan, PhD (*Drexel University*) *Department Chair, Management; Department Head, Decision Sciences and MIS*. Professor. Cyber crime, strategic management of information technology, unstructured data mining, individual internet usage behavior (specifically abuse and addiction), application of artificial intelligence techniques in forensic accounting and ophthalmology.

Rolph E. Anderson, PhD (*University of Florida*) *Royal H. Gibson Sr. Professor of Marketing*. Professor. Personal selling and sales management; multivariate data analysis; customer relationship management (CRM); customer satisfaction and customer loyalty.

Trina Larsen Andras, PhD (*University of Texas at Austin*) *Head of the Department of Marketing; Academic Director, Center for Corporate Research Management*. Professor. International marketing, marketing channels management, cross-cultural communication.

Orakwue B. Arinze, PhD (*London School of Economics*). Professor. Client/Server computing; Enterprise Application Software (EAS)/ Enterprise Resource Planning Software (ERP); knowledge-based and decision support applications in operations management.

Qizhi Dai, PhD (*University of Minnesota*). Associate Professor. Business Value of Information Technology, eCommerce, Economics of Information Technology, Information System Management.

Lawrence Duke, MBA (*Harvard Business School*). Associate Clinical Professor. International marketing and strategy, new product development, business-to-business marketing, marketing of financial services.

David Gefen, PhD (*Georgia State University*) *Provost Distinguished Research Professor*. Professor. Strategic IT management; IT development and implementation management; research methodology; managing the adoption of large IT systems, such as MRP II, ERP, and expert systems; research methodology, eCommerce; Online Auctions; Outsourcing; SAS; Technology Adoption.

Shawkat M. Hammoudeh, PhD (*University of Kansas*). Professor. Applied econometrics, financial economics, international economics, and natural resource economics.

Yanliu Huang, PhD (*The Wharton School, University of Pennsylvania*). Assistant Professor. Consumer in-store decision making, consumer planning, health marketing, memory and learning.

Bang Nam Jeon, PhD (*Indiana University*) *Department of Economics and International Business*. Professor. Financial economics, world financial market linkages, foreign direct investment flows in the Asia-Pacific economies, the Korean economy: currency crisis, FDI, and macroeconomic issues, regional economic integration and newly industrializing economies: the

Daniel Korschun, PhD (*Boston University*). Assistant Professor. Brand and corporate reputation management, corporate social responsibility, internal marketing, marketing strategy, relationship marketing.

Hyokjin Kwak, PhD (*University of Georgia*) *Department of Marketing*. Associate Professor. Advertising effects, consumer behaviors and e-commerce.

Dali Ma, PhD (*University of Chicago*). Assistant Professor. Social hierarchy; Social networks; Sociology of entrepreneurship; Sociology of transitional China

Vibhas Madan, PhD (*Michigan State University*). Professor. International trade theory, applied microeconomics.

Maria Olivero, PhD (*Duke University*). Associate Professor. Macroeconomics, international finance.

Stanley Ridgley, PhD (*Duke University*). Assistant Clinical Professor. Business communication; Cognition and strategy; Competitive intelligence; Determinants of Firm Performance; Global Management; New Markets in Emerging Countries; Russian Business Culture.

Bert Rosenbloom, PhD (*Temple University*) *Rauth Chair of Electronic Commerce*. Professor. Marketing channels and distribution systems, electronic commerce, inter-organizational marketing management, wholesale and retail distribution, marketing strategy and planning.

Samir Shah, DPS (*Pace University*). Associate Clinical Professor. Drexel University's Provost Fellow India Partnerships

Srinivasan Swaminathan, PhD (*University of Texas-Austin*). Professor. Marketing research and strategy, pricing and promotions, loyalty and satisfaction.

Constantinos Syropoulos, PhD (*Yale University*) *Trustee Professor of International Economics*. Professor. International trade, political economy, applied microeconomics.

Yoto Yotov, PhD (*Boston College*). Associate Professor. International trade, applied microeconomics, political economy.

International Business Co-Major

Major: International Business

Degree Awarded: Bachelor of Science in Business Administration (BSBA)

Calendar Type: Quarter

Total Credit Hours: 184.0

Co-op Options: Three Co-op (Five years); One Co-op (Four years); No

Co-op (Four years)

Classification of Instructional Programs (CIP) code: 52.1101
Standard Occupational Classification (SOC) code: 11-1021

About the Program

The International Business Co-Major explores the international business environment as well as the internal workings of international corporations and the impact of international considerations on the various functional areas of business.

The International Business Co-Major allows students to choose from a menu of courses. The curriculum is interdisciplinary, with courses drawn from across business disciplines and anthropology. Specialized operational courses are offered, along with more general theoretical and comparative ones. The co-major option substitutes further training in a relevant business discipline or functional field in the form of a Primary Major instead of the language courses.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 270 [WI]	Business Communication (WI)	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 105	Critical Reasoning	3.0
PSY 101	General Psychology I	3.0
UNIV B101 [WI]	The Drexel Experience	1.0
UNIV B201	Career Management	1.0
English literature elective: (ENGL 200 through ENGL 399)		3.0
Fine arts elective		3.0
History (HIST) elective		4.0
Select two of the following:		6.0
BIO 100	Applied Cells, Genetics & Physiology	
or BIO 101 Applied Biological Diversity, Ecology & Evolution		
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	

General Education (Category) Electives 21.0

Business Requirements

ACCT 115	Financial Accounting Foundations	4.0
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
BUSN 101	Foundations of Business I	4.0
BUSN 102	Foundations of Business II	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
INTB 200	International Business	4.0
MGMT 450	Strategy and Competitive Advantage	4.0
MIS 200	Management Information Systems	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
STAT 201	Introduction to Business Statistics	4.0
Select one of the following:		4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	

STAT 202	Business Statistics II	
Primary Major Courses		32.0
Students completing the International Business co-major (requirements listed below) must do so in conjunction with a primary business major. Students must select a primary major from the following list (Accounting, Entrepreneurship, Finance, Legal Studies, Management Information Systems, Marketing, or Operations & Supply Chain Management.)		
International Business Co-Major Requirements **		
The International Business Major offers two options: Option (A), which includes study for competency in a language other than English (and other than the student's native language). For more information, please see the International Business (Stand-Alone Option) listed under Majors. Option (B) is the Co-Major option highlighted below. The co-major option substitutes further training in a relevant business discipline or functional field in the form of a Primary Major instead of the language courses.		
Select six of the following:		24.0
ANTH 312	Approaches to Intercultural Behavior	
BLAW 340	International Business Law	
ECON 342	Economic Development	
ECON 344	Comparative Economic Systems	
FIN 346	Global Financial Management	
INTB 332	Multinational Corporations	
INTB 334	International Trade	
INTB 336	International Money and Finance	
INTB 338	Regional Studies in Economic Policies and International Business	
INTB 440	Seminar in International Business	
MIS 347	Domestic and Global Outsourcing Management	
MKTG 357	Global Marketing	
Total Credits		186.0

* Students select 21.0 credits of additional general education electives with a minimum of one course in each of the following categories:

- Society and Culture (Communication, English, Fine Arts, International Area Studies, Language, Philosophy)
- Social Science (Anthropology, History, Sociology, Political Science, Psychology)
- Math and Science (Computer Science, Information Systems, Math, Science)

** Students completing the International Business co-major must do so in conjunction with a primary business major. Students must select a primary major from the following list:

- Accounting
- Finance
- Legal Studies
- Management Information Systems
- Marketing
- Operations & Supply Chain Management

Sample Plan of Study

Term 1		Credits
BUSN 101	Foundations of Business I	4.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV B101 [WI]	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
BUSN 102	Foundations of Business II	4.0
CIVC 101	Introduction to Civic Engagement	1.0
ECON 202	Principles of Macroeconomics	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0

MATH 102	Introduction to Analysis II	4.0
	Term Credits	16.0
Term 3		
ACCT 115	Financial Accounting Foundations	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PSY 101	General Psychology I	3.0
	Select one of the following:	3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
	General education elective	3.0
	Term Credits	16.0
Term 4		
ACCT 116	Managerial Accounting Foundations	4.0
BLAW 201	Business Law I	4.0
COM 270 [WI]	Business Communication	3.0
STAT 201	Introduction to Business Statistics	4.0
	Term Credits	15.0
Term 5		
INTB 200	International Business	4.0
MIS 200	Management Information Systems	4.0
	Select one of the following:	4.0
MGMT 260	Introduction to Entrepreneurship	
MGMT 370	Business Consulting	
MGMT 371	Business Consulting for Nonprofits	
MGMT 451	Management Simulation	
STAT 202	Business Statistics II	
	Select one of the following:	3.0
BIO 100	Applied Cells, Genetics & Physiology	
or 101	Applied Biological Diversity, Ecology & Evolution	
CHEM 151	Applied Chemistry	
PHYS 151	Applied Physics	
	Term Credits	15.0
Term 6		
FIN 301	Introduction to Finance	4.0
MKTG 201	Introduction to Marketing Management	4.0
OPM 200	Operations Management	4.0
	English literature elective - ENGL 200 through 399	3.0
	Term Credits	15.0
Term 7		
ORGB 300 [WI]	Organizational Behavior (WI)	4.0
PHIL 105	Critical Reasoning	3.0
	Primary Major course *	4.0
	International Business Co-Major Course (See co-major requirements for list)	4.0
	Term Credits	15.0
Term 8		
	Primary Major course *	4.0
	International Business Co-Major Course (See co-major requirements for list)	4.0
	History (HIST) elective	4.0
	Science or computer science elective	3.0
	Term Credits	15.0
Term 9		
	Primary Major courses *	8.0
	Society and culture elective	3.0
	International Business Co-Major Course (See co-major requirements for list)	4.0
	Term Credits	15.0
Term 10		
UNIV B201	Career Management	1.0
	Fine Arts elective	3.0
	General education elective	3.0
	Primary Major course *	4.0

	International Business Co-Major Course (See co-major requirements for list)	4.0
	Term Credits	15.0
Term 11		
MGMT 450	Strategy and Competitive Advantage	4.0
	Primary Major courses *	8.0
	International Business Co-Major Course (See co-major requirements for list)	4.0
	Term Credits	16.0
Term 12		
	Primary Major course *	4.0
	General education electives	6.0
	Social science elective	3.0
	International Business Co-Major Course (See co-major requirements for list)	4.0
	Term Credits	17.0
Total Credit: 186.0		

* See catalog for a list of Business majors that may be completed in conjunction with the International Business Co-Major.

International Business Faculty

Murugan Anandarajan, PhD (*Drexel University*) *Department Chair, Management; Department Head, Decision Sciences and MIS*. Professor. Cyber crime, strategic management of information technology, unstructured data mining, individual internet usage behavior (specifically abuse and addiction), application of artificial intelligence techniques in forensic accounting and ophthalmology.

Rolph E. Anderson, PhD (*University of Florida*) *Royal H. Gibson Sr. Professor of Marketing*. Professor. Personal selling and sales management; multivariate data analysis; customer relationship management (CRM); customer satisfaction and customer loyalty.

Trina Larsen Andras, PhD (*University of Texas at Austin*) *Head of the Department of Marketing; Academic Director, Center for Corporate Research Management*. Professor. International marketing, marketing channels management, cross-cultural communication.

Orakwue B. Arinze, PhD (*London School of Economics*). Professor. Client/Server computing; Enterprise Application Software (EAS)/ Enterprise Resource Planning Software (ERP); knowledge-based and decision support applications in operations management.

Qizhi Dai, PhD (*University of Minnesota*). Associate Professor. Business Value of Information Technology, eCommerce, Economics of Information Technology, Information System Management.

Lawrence Duke, MBA (*Harvard Business School*). Associate Clinical Professor. International marketing and strategy, new product development, business-to-business marketing, marketing of financial services.

David Gefen, PhD (*Georgia State University*) *Provost Distinguished Research Professor*. Professor. Strategic IT management; IT development and implementation management; research methodology; managing the adoption of large IT systems, such as MRP II, ERP, and expert systems; research methodology, eCommerce; Online Auctions; Outsourcing; SAS; Technology Adoption.

Shawkat M. Hammoudeh, PhD (*University of Kansas*). Professor. Applied econometrics, financial economics, international economics, and natural resource economics.

Yanliu Huang, PhD (*The Wharton School, University of Pennsylvania*). Assistant Professor. Consumer n-store decision making, consumer planning, health marketing, memory and learning.

Bang Nam Jeon, PhD (*Indiana University*) *Department of Economics and International Business*. Professor. Financial economics, world financial market linkages, foreign direct investment flows in the Asia-Pacific economies, the Korean economy: currency crisis, FDI, and macroeconomic issues, regional economic integration and newly industrializing economies: the

Daniel Korschun, PhD (*Boston University*). Assistant Professor. Brand and corporate reputation management, corporate social responsibility, internal marketing, marketing strategy, relationship marketing.

Hyokjin Kwak, PhD (*University of Georgia*) *Department of Marketing*. Associate Professor. Advertising effects, consumer behaviors and e-commerce.

Dali Ma, PhD (*University of Chicago*). Assistant Professor. Social hierarchy; Social networks; Sociology of entrepreneurship; Sociology of transitional China

Vibhas Madan, PhD (*Michigan State University*). Professor. International trade theory, applied microeconomics.

Maria Olivero, PhD (*Duke University*). Associate Professor. Macroeconomics, international finance.

Stanley Ridgley, PhD (*Duke University*). Assistant Clinical Professor. Business communication; Cognition and strategy; Competitive intelligence; Determinants of Firm Performance; Global Management; New Markets in Emerging Countries; Russian Business Culture.

Bert Rosenbloom, PhD (*Temple University*) *Rauth Chair of Electronic Commerce*. Professor. Marketing channels and distribution systems, electronic commerce, inter-organizational marketing management, wholesale and retail distribution, marketing strategy and planning.

Samir Shah, DPS (*Pace University*). Associate Clinical Professor. Drexel University's Provost Fellow India Partnerships

Srinivasan Swaminathan, PhD (*University of Texas-Austin*). Professor. Marketing research and strategy, pricing and promotions, loyalty and satisfaction.

Constantinos Syropoulos, PhD (*Yale University*) *Trustee Professor of International Economics*. Professor. International trade, political economy, applied microeconomics.

Yoto Yotov, PhD (*Boston College*). Associate Professor. International trade, applied microeconomics, political economy.

Minor in International Economics

This minor is designed for students with varied backgrounds who have a particular interest in learning more about the international economic environment. The curriculum provides the students a basic understanding of economics and exposes them to advanced topics dealing with international trade, multinational corporations, and other aspects of international economics. The minor complements a variety of degrees, particularly for students interested in applying their major discipline within an international context or within a multinational corporation.

Requirements

- No more than 2 courses or 8.0 credits required by a student's major may be counted towards this minor.
- A grade of "C" (2.0) or better must be earned for each course in this minor for it to be counted.
- No more than two transfer courses may be used to complete this minor. Transfer credits must be taken before matriculated at Drexel.
- Students should check the pre-requisites of all classes when selecting electives. It is the responsibility of the student to know pre-requisites.
- **Cannot do a major and a minor in the same field of study.**

All prospective students should meet with an advisor from the College as soon as possible. Call 215.895.2110 to set up an appointment.

Required Courses

ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
INTB 200	International Business	4.0
INTB 334	International Trade	4.0
or INTB 336	International Money and Finance	
Select two of the following (at least one from the following list):		8.0
INTB 332	Multinational Corporations	
INTB 334	International Trade	
INTB 336	International Money and Finance	
INTB 338	Regional Studies in Economic Policies and International Business	
ECON 342	Economic Development	
Other Options		
ECON 301	Microeconomics	
ECON 321	Macroeconomics	
ECON 322	Economics Seminar [W]	
ECON 336	Labor Economics	
ECON 338	Industrial Organization	
ECON 348	Mathematical Economics	
ECON 350	Applied Econometrics [W]	
ECON 351	Resource and Environmental Economics	
BLAW 340	International Business Law	
FIN 346	Global Financial Management	
MKTG 357	Global Marketing	
Total Credits		24.0

The Pennoni Honors College

About the College

The mission of Drexel University's Pennoni Honors College is to enrich the University experience for talented and ambitious students from all majors. The College has five units: the Honors Program, the Center for Interdisciplinary Inquiry (which includes the Great Works Symposium and the Custom-Designed Major), the Office of Undergraduate Research (which includes the STAR and SuperNova Programs), the Drexel Fellowships Office, and the Center for Cultural Outreach (which includes *TheSmartSet.com* and *The Drexel InterView*). Students have the opportunity to apply to the Pennoni Honors Program as late as the spring term of their second year. The other programs in the College are open to all students at the University with the appropriate interests and record of achievement. The College also administers the High School Scholars Program for exceptional high-school students.

The Pennoni Honors College was endowed by Annette and C.R. "Chuck" Pennoni, CEO of Pennoni Associates. Mr. Pennoni, a Drexel graduate, was a two-time interim president of the University. He embodies the qualities of leadership, integrity, intellectual curiosity, and commitment to Drexel and the larger world that the College seeks to imbue in its students.

Major

- Custom-Designed Major (p. 376)
(within the Center for Interdisciplinary Inquiry)

Custom-Designed Major

Major: Custom-Designed Major

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Classification of Instructional Programs (CIP) code: 24.0101

Standard Occupational Classification (SOC) code: 11-9199

About the Program

The Custom-Designed Major enables students to pursue an individualized course of study at Drexel University not readily available through an existing major, or a combination of existing majors and/or minors. The program is designed for highly motivated students whose interdisciplinary curiosity and career ambitions cannot be satisfied by a traditional major.

The major offers students an opportunity for an early intensive research experience, incorporates cooperative education as part of its degree requirements, and culminates in an original, interdisciplinary senior-year project.

Each student accepted into the program will be advised by the Program Director and closely mentored by one or more Drexel faculty members expert in at least one of the disciplines comprising the student's proposed course of study. Students may be admitted as entering freshmen or by transfer. For additional information about applying to this program, contact the Program Director or the The Pennoni Honors College (<http://drexel.edu/pennoni>).

Admission Requirements

Admission to the custom-designed major will be determined on the basis of an application portfolio. In addition to the standard Admissions application, the portfolio will contain:

- a **vision statement** describing in detail what the student hopes to accomplish during his or her time in the program, as well as explaining why the student's educational goals cannot be met by pursuing a regular Drexel major, a double major, or a major combined with minors. The vision statement should also contain a plausible plan of study for achieving the student's aims by drawing upon two or more existing Drexel programs.
- **student transcript**
- **SAT scores**
- **two letters of support** from individuals who can speak to the student's desire and ability to embark on an unconventional, individualized course of study.
- **examples** of projects completed independently by the student, in either a school or an extracurricular setting.

Degree Requirements

Foundation Requirements

CSDN 101 [WI]	Introduction to Multi-Disciplinary Methods	1.0
CSDN 102	Knowledge by Design Seminar	1.0
WEST 210	Innovative Problem Solving	4.0
WEST 220	Multimodal Research	4.0
COOP 101	Career Management and Professional Development	0.0
HNRS 200	Introduction to Honors Program	1.0
UNIV X101	The Drexel Experience	2.0
Humanities courses		9.0
Social sciences courses		9.0
Mathematics courses		6.0
Science courses		8.0

Written Evaluation

At the conclusion of the spring term of the freshman year (or after 3 terms of study for transfers) the student will receive a written evaluation and personal consultation regarding his or her progress. At this point each student will either be allowed to continue in the Custom-Designed Major or will be advised to transfer to another major at Drexel University.

Additional Program Requirements

CSDN 203	Custom-Designed Major Seminar (two terms) *	2.0
Three 300- or 400-level courses in each discipline comprising a significant component of the custom-designed curriculum **		9.0
Three terms of (CSDN) self-directed major project sequence courses		9.0

Guided Course Selection

Students will complete the courses in their agreed-upon customized programs of study under the guidance of the Program Director and other faculty as appropriate. Each student will receive sustained guidance on course selection and sequencing. In addition, at the completion of each academic year, each student will meet with the Program Director to refine and update their vision statement as needed.	115.0
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Total Credits	180.0
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* Taken for one credit each in the sophomore and junior years.

** All prerequisite courses for these selected courses must also be satisfied.

Co-op and Career Services

Students in the program have the option of two co-op cycles: one is a 5-year program with 3 co-op cycles (5COP), and the second option is 4-year program with one co-op cycle (4COP). Students will meet with their career

services adviser during their time in the program to closely match career objectives with curriculum design and co-op/research opportunities.

The School of Biomedical Engineering, Science and Health Systems

Mission Statement

The mission of the School of Biomedical Engineering, Science and Health Systems is to promote health and quality of life through education, research and innovation that integrates engineering and life sciences in a global context.

The School of Biomedical Engineering, Science, and Health Systems (<http://drexel.edu/biomed>) is a nationally recognized center for research in biomedical engineering and science offering multi-disciplinary instruction on a full- and part-time basis at the graduate and undergraduate levels.

The School of Biomedical Engineering, Science, and Health Systems offers a bachelor of science program in biomedical engineering with a choice of five concentration areas: biomaterials and tissue engineering, biomechanics and human performance engineering, biomedical informatics, biomedical devices and imaging, and neuroengineering.

Major

- Biomedical Engineering (BS) (p. 379)

Concentrations

- Biomaterials and Tissue Engineering (p. 382)
- Biomechanics and Human Performance Engineering (p. 385)
- Biomedical Informatics (p. 389)
- Biomedical Devices and Imaging (p. 392)
- Neuroengineering (p. 396)

About the School

The School of Biomedical Engineering, Science, and Health Systems (<http://drexel.edu/biomed>) (formerly the Biomedical Engineering and Science Institute, founded in 1961) is a leader in biomedical engineering and biomedical science research and education. The undergraduate program was inaugurated in September 1998 and has steadily grown to attract the highest ability students at the University. The undergraduate biomedical engineering curriculum is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

The School's academic thrust areas, both in research and education, are at the forefront of biosensing, bioimaging, bioinformation engineering and integrated bioinformatics, drug delivery, biomedical ultrasound & optics, bionanotechnology, cellular tissue engineering, neuroengineering and human performance. Emerging initiatives include skin bioengineering, pediatric engineering and homeland security technologies. Various departments at Drexel University offer courses that are suited for students in biomedical engineering and biomedical science. The School's curriculum complements the strengths of the Colleges of Arts & Sciences, Business, Engineering, Computing & Informatics, Law and Medicine. As a whole, the curriculum offers the advanced knowledge needed for industrial careers, health professions, graduate research or careers in

highly specialized fields such as pre-professional health (medical, dental, and veterinary) and pre-law.

The marriage of technology with biology and medicine drives the 21st Century industrial enterprise. Consistent with this mission, the School strives for clinical and industrial relevance in our academic pursuits. The School maintains a strong entrepreneurship program in biomedical technologies. The School's alliance with regional economic development agencies and corporations together with advisors from business development, legal, and investment communities sustains the growth of this program. The students and faculty of the School are committed to move their discoveries from laboratories to clinical practice or home use. The success of the Translational Research in Biomedical Technologies program has been recognized and funded regionally as well as nationally.

The School has experienced remarkable growth in recent years thanks to our outstanding research portfolio, high quality and innovative undergraduate program, and our multidisciplinary approach to education and research. Another competitive advantage is the unique free-standing university-level administrative structure with its own tenure-track faculty lines, budget and space. This helps transcend the traditional organizational boundaries of engineering, sciences and medicine. The School's independence allows the pursuit of growth and collaborations in various disciplines. The School's small size provides agility to reconfigure and reorganize in response to emerging opportunities. The University Strategic Plan recognizes our School of Biomedical Engineering, Science and Health Systems as "Drexel's prototype of academic integration."

Metropolitan Philadelphia has one of the nation's highest concentrations of medical institutions and pharmaceutical, biotechnology, medical device and systems industry. The School has forged strategic partnerships with select universities, research institutes, health care institutions and industries in the region. The School enjoys a close working relationship with our Drexel College of Medicine as well as alliances with prominent medical institutions in the region to develop joint research and educational programs. These include University of Pennsylvania, Thomas Jefferson University, the Fox Chase Cancer Center and the Wistar Institute. These collaborative initiatives provide students with ample opportunities in basic and clinical research as well as innovative academic programs.

Applicants to the graduate program must meet the requirements for admission to graduate studies at Drexel University. Candidates for degrees in the School of Biomedical Engineering, Science and Health Systems are required to maintain academics standards applicable to all graduate students at Drexel University.

Co-operative Education

Co-op and career opportunities available to students include employment in the medical device, equipment, and systems industry; the biomaterial and implant industry; the pharmaceutical industry; the biotechnology and agricultural industry; the telemedicine and tele-health industry; health care; medical and clinical information and management systems; and biomedical technology transfer. Preprofessional options available in the academic programs of the School prepare students for admission to schools of medicine, dentistry, and veterinary medicine. Students may also choose to continue their education at the graduate level to prepare for careers in research and development in biomedical engineering and science.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Special Programs

Accelerated Bachelor's/Master's Dual Degree Program

The Accelerated BS/MS degree program provides opportunities for strongly motivated students with high ability to progress toward their educational goals at an accelerated pace. The program makes it possible for top engineering students to obtain both degrees in the same time period that it takes most students to obtain a bachelor's degree.

Preprofessional Programs

Students who want to prepare for admission to schools of medicine, dentistry, or veterinary medicine, including the BA/BS/MD and early assurance programs at the Drexel College of Medicine, may obtain professional counseling and assistance from the Office of Preprofessional Programs, 215-895-2437.

University Honors

Program Students in the Biomedical Engineering program may apply for admission to the University Honors Program. Admission depends on superior academic performance at Drexel and may be approved after a personal interview with the Honors Committee.

University Leadership Program

Drexel graduates in Biomedical Engineering will be the leaders of their profession--and their communities--in the twenty-first century. The University Leadership Program helps cultivate leadership skills and engages students in exploring the complex aspects of successful leadership by offering multi-dimensional courses featuring service learning.

Biomedical Engineering

Major: Biomedical Engineering

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 196.5 - 203.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0501

Standard Occupational Classification (SOC) code: 17-2031

About the Program

Biomedical Engineering is an innovative Bachelor of Science degree program developed and delivered in collaboration with the College of Engineering, the College of Arts and Sciences and the College of Computing & Informatics. It prepares students to conceive, design, and develop devices and systems that improve human health and quality of life. Biomedical engineering is the convergence of life sciences with engineering. From child car seats and football helmets to drug-delivery systems, minimally invasive surgery, and noninvasive imaging technology, the work of the biomedical engineer makes a difference in everyone's life.

The undergraduate biomedical engineering curriculum is designed to strike a balance between academic breadth in biomedical engineering and specialization in one of five concentration areas: biomaterials and tissue engineering, biomechanics and human performance engineering, biomedical bioinformatics, biomedical devices and imaging, and neuroengineering.

This program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org (<http://www.abet.org>).

Concentrations

The undergraduate biomedical engineering curriculum is designed to strike a balance between academic breadth in biomedical engineering and specialization in an area of concentration. Each concentration has its own degree requirements for graduation, and its own plan of study:

- Biomaterials and Tissue Engineering (p. 382)
- Biomechanics and Human Performance Engineering (p. 385)
- Biomedical Informatics (p. 389)
- Biomedical Devices and Imaging (p. 392)
- Neuroengineering (p. 396)

The degree program provides innovative experiences in hands-on experimentation and engineering design as well as opportunities for personal growth and development of leadership and communication skills.

Working with a faculty advisor, students can select their core and elective courses from the curricula offered by the School of Biomedical Engineering, Science, and Health Systems and the Departments of Biology, Chemistry, Physics, Mathematics, Chemical Engineering, Mechanical Engineering, Materials Science and Engineering, Electrical and Computer Engineering, and the College of Computing & Informatics.

Additional Information

More information about the School's undergraduate program can be found at the School of Biomedical Engineering, Sciences and Health Systems' Academic Program (<http://drexel.edu/biomed/academics/undergraduate-programs>) web page.

Students are also encouraged to contact the School's Director for Student Services:

Caryn Glaser

Director of Student Services

School of Biomedical Engineering, Science and Health Systems

215.895.2237

glasercb@drexel.edu

Career and professional counseling is provided independently by the student's staff and faculty advisors. Information regarding undergraduate faculty advisors is available on the School's Undergraduate Advising (<http://drexel.edu/biomed/resources/current-students/undergraduate-advising>) page.

Program Educational Objectives

Graduates from the School's undergraduate biomedical engineering program are expected to achieve success in their professional lives and contribute to the good of the global community. The School's specific objectives for its alumni include the following:

Objective 1: Professional Presence

As a result, within a few years, the graduate has established an Internet presence, either through professional organizations, social networking and/or other activities which demonstrate an appreciation and use of modern technological capabilities.

Objective 2: Workforce Skilled in Integrating Engineering, Design, and Life Sciences

As a result, graduates will identify opportunities to contribute to society from a variety of positions, ranging from biomedical engineering, biotechnology design and development to practicing physicians, lawyers, innovators, entrepreneurs and business managers. The graduate may also pursue further education in the form of graduate and professional degrees.

Objective 3: Leadership in Research, Innovation and Design

As a result, within a few years of graduation, the graduate will have made significant or meaningful contributions in his or her chosen field, either thorough research publications and/or presentations, the development of a product or process, obtaining patents for new products and/or processes, or other evidence of contributing to the advancement of knowledge, particularly in fields integrating engineering and the life sciences.

Objective 4: Ethical Reasoning, Behavior and Professionalism

As a result, within a few years of graduation, the graduate will demonstrate adherence to the professional codes of conduct appropriate to his or her field of study and/or practice, as well as exhibit behavior consistent with accepted standards of fiduciary responsibility, risk/benefit analysis and professional accountability.

Objective 5: Communication

As a result, graduates will have outstanding communication skills as evidenced by their professional presentations, and in their productive interactions with co-workers. The graduates may also use their communication skills to foster collaborative effort among co-workers and/or may represent his or her company, institution and/or laboratory to other interested parties.

Objective 6: Personal Engagement

As a result, within a few years, the graduate will be working independently and in diverse groups to effectively and efficiently achieve personal and organizational goals, engage in community or public service, create a product or process that fills a social need, and/or participate in educating individuals about an issue of societal concern.

Student Learning Outcomes

To support our graduates in achieving success in the program educational objectives, the biomedical engineering program is designed to facilitate student learning and achievement on the following Student Learning Outcomes, which indicate our students' skills sets at the time of graduation.

Outcome 1: Communication

The graduate employs an understanding of audience, purpose and context to communicate effectively in a range of situations using appropriate media while displaying a significant aptitude for presenting scientific and technical materials to diverse audiences.

Outcome 2: Engagement

The graduate uses his or her knowledge and skills, including those associated with engineering and life science, to make a positive difference on issues of public concern.

Outcome 3: Ethical Reasoning, Behavior, and Professionalism

The graduate recognizes ethical issues, considers multiple points of view, and uses critical ethical reasoning to determine the appropriate behavior to follow. The graduate thus demonstrates a high level of integrity and a positive work ethic combined with a thorough understanding of the ethical implications and obligations associated with the practice of biomedical engineering.

Outcome 4: Innovation and Design

The graduate often asks questions and makes observations that lead to new ideas or hypotheses. He or she formulates highly original solutions while moving beyond the conventional to new methods blending creative and practical approaches, methods and designs which may involve pioneering applications along the interface of engineering and biology. The graduate has the ability to create quality products and processes that are state-of-the-practice in his or her field.

Outcome 5: Leadership

The graduate is able to articulate a vision or goal in such a manner as to promote collaboration and successful implementation. The graduate displays a willingness to overcome adversity and work diligently in pursuit of goals, thus serving as a role model for others.

Outcome 6: Problem-Solving Abilities

The graduate is able to creatively solve problems from both analytic and synthetic perspectives using multiple approaches, integrating the life sciences, engineering, and the humanities. The graduate is able to recognize, incorporate and adapt to the limitations and consequences of applying various problem solutions.

Outcome 7: Research Abilities

The graduate is able to collect and process data, information and knowledge to answer specific questions or generate new conceptual models and hypotheses. The graduate evaluates these models and hypotheses using the appropriate experimental, mathematical and statistical approaches.

Outcome 8: Human Resources and Interactions

The graduate is able to work either independently or in diverse groups to effectively and efficiently respond to academic and work requirements.

Outcome 9: Technological Skills

The graduate makes appropriate use of technologies to communicate, collaborate, solve problems, make decisions, and conduct research, as well as foster creativity and life-long learning. The graduate is able to use state-of-the-art technological resources and tools and keeps up on advancements in her or her field of study and/or practice.

Biomedical Engineering, Science and Health Systems Faculty

Fred D. Allen, PhD (*University of Pennsylvania*) Associate Director, Undergraduate Education. Assistant Professor. Tissue engineering, cell engineering, orthopedics, bone remodeling, wound healing, mechanotransduction, signal transduction, adhesion, migration.

Hasan Ayaz, PhD (*Drexel University*) School of Biomedical Engineering, Science and Health Systems. Research Associate Professor. Optical

brain imaging, cognitive neuroengineering, brain computer interface (BCI), functional near infrared (fNIR), and near infrared spectroscopy (NIRS).

Sriram Balasubramanian, PhD (*Wayne State University*). Assistant Professor. Structural characteristics of the pediatric thoracic cage using CT scans and developing an age-equivalent animal model for pediatric long bones.

Kenneth A. Barbee, PhD (*University of Pennsylvania*). Professor. Cellular biomechanics of neural and vascular injury, mechanotransduction in the cardiovascular system, mechanical control of growth and development for wound healing and tissue engineering.

Donald Buerk, PhD (*Northwestern University*). Research Professor. Biotechnology, physiology, systems biology, blood flow, microcirculation, nitric oxide, oxygen transport

Jamie Dougherty, PhD (*Drexel University*). Assistant Teaching Professor. Brain-computer interface, neural encoding, electrophysiological signal acquisition and processing.

Lin Han, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Nanoscale structure-property relationships of biological materials, genetic and molecular origins soft joint tissue diseases, biomaterials under extreme conditions, coupling between stimulus-responsiveness and geometry.

Uri Hershberg, PhD (*Hebrew University of Jerusalem, Israel*). Assistant Professor. Bioinformatics, immunology, neural computation, system biology, somatic selection, autoimmunity, genetic stability, germline diversity, dendritic cell, transcription elements, pathogens, computational and mathematical modeling, complex systems, cognition and inflammation.

Kurtulus Izzetoglu, PhD (*Drexel University*) Associate Research Professor. Cognitive neuroengineering, functional brain imaging, near infrared spectroscopy, medical sensor development, biomedical signal processing, human performance assessment, and cognitive aging

Meltem Izzetoglu, PhD (*Drexel University*). Associate Research Professor. Cognitive neuroengineering, biomedical signal processing, statistical signal analysis, optimal artifact removal, information processing, optical brain imaging, functional near infrared spectroscopy, working memory, attention, learning, reading and mathematical disabilities, cognitive aging, anesthesia awareness, and social anxiety disorders.

Dov Jaron, PhD (*University of Pennsylvania*) *Calhoun Distinguished Professor of Engineering in Medicine*. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Andres Kriete, PhD (*University in Bremen Germany*) Associate Director for Graduate Studies and Academic Operations. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Steven Kurtz, PhD (*Cornell University*). Associate Research Professor. Computational biomechanics of bone-implant systems and impact-related injuries, orthopaedic biomechanics, contact mechanics, orthopaedic biomaterials, large-deformation mechanical behavior and wear of polymers, and degradation and crosslinking of polyolefins in implant applications.

Ryszard Lec, PhD (*University of Warsaw Engineering College*). Professor. Biomedical applications of viscoelastic, acousto-optic and ultrasonic properties of liquid and solid media.

Peter Lewin, PhD (*University of Denmark, Copenhagen-Lyngby*) *Richard B. Beard Professor, School Of Biomedical Engineering, Science & Health Systems*. Professor. Biomedical ultrasonics, piezoelectric and polymer transducers and hydrophones; shock wave sensors.

Hualou Liang, PhD (*Chinese Academy of Sciences*). Professor. Neuroengineering, neuroinformatics, cognitive and computational neuroscience, neural data analysis and computational modeling, biomedical signal processing.

Donald L. McEachron, PhD (*University of California at San Diego*) *Coordinator, Academic Assessment and Improvement*. Teaching Professor. Animal behavior, autoradiography, biological rhythms, cerebral metabolism, evolutionary theory, image processing, neuroendocrinology.

Karen Moxon, PhD (*University of Colorado*) *Associate Director for Research*. Professor. Cortico-thalamic interactions; neurobiological perspectives on design of humanoid robots.

Michael Neidrauer, PhD (*Drexel University*). Assistant Research Professor. Wound healing, near infrared, spectroscopy, cell culture, data analysis, optical coherence tomography (OCT), matlab, life sciences assay development, confocal microscopy, biomaterials, in-vivo, medical devices

Banu Onaral, PhD (*University of Pennsylvania*) *H.H. Sun Professor; Senior Advisor to the President, Global Partnerships*. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (*Rensselaer Polytechnic University*). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.

Ahmet Sacan, PhD (*Middle East Technical University*). Assistant Professor. Indexing and data mining in biological databases; protein sequence and structure; similarity search; protein structure modeling; protein-protein interaction; automated cell tracking.

Joseph J. Sarver, PhD (*Drexel University*). Associate Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

Rahamim Seliktar, PhD (*University of Strathclyde, Glasgow*) *Vice Director, School of Biomedical Engineering, Science & Health Systems*. Professor. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Patricia A. Shewokis, PhD (*University of Georgia*). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy (fNIR) and electroencephalography (EEG) and methodology and research design.

Adrian C. Shieh, PhD (*Rice University*). Assistant Professor. Contribution of mechanical forces to tumor invasion and metastasis, with a particular emphasis on how biomechanical signals may drive the invasive switch, and how the biomechanical microenvironment interacts with cytokine signaling and the extracellular matrix to influence tumor and stromal cell behavior.

Wan Y. Shih, PhD (*Ohio State University*). Associate Professor. Piezoelectric microcantilever biosensors development, piezoelectric

finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (*Drexel University*). Assistant Professor. Macrophage-biomaterial interactions, drug delivery systems, and chronic wound healing. Cell-biomaterial interactions, biomaterial design, and international engineering education.

Marek Swoboda, PhD (*Drexel University*). Assistant Teaching Professor. Cardiovascular engineering, cardiovascular system, diagnostic devices in cardiology, piezoelectric biosensors, and pathogen detection.

Amy Throckmorton, PhD (*University of Virginia*). Associate Professor. Computational and experimental fluid dynamics; cardiovascular modeling, including transient, fluid-structure interaction, and patient-specific anatomical studies; bench-to-bedside development of medical devices; artificial organs research; prediction and quantification of blood trauma and thrombosis in medical devices; design of therapeutic alternatives for patients with dysfunctional single ventricle physiology; human factors engineering of mechanical circulatory assist devices

Margaret Wheatley, PhD (*University of Toronto*) *John M. Reid Professor*. Ultrasound contrast agent development (tumor targeting and triggered drug delivery), controlled release technology (bioactive compounds), microencapsulated allografts (ex vivo gene therapy) for spinal cord repair.

Ming Xiao, PhD (*Baylor University*). Associate Professor. Nanotechnology, single molecule detection, single molecule fluorescent imaging, genomics, genetics, genome mapping, DNA sequencing, DNA biochemistry, and biophysics.

Yinghui Zhong, PhD (*Georgia Institute of Technology*). Assistant Professor. Spinal cord repair, and engineering neural prosthesis/brain interface using biomaterials, drug delivery, and stem cell therapy.

Leonid Zubkov, PhD, DSc (*St. Petersburg State University, Russia*). Research Professor. Physiology, wound healing, physiologic neovascularization, near-infrared spectroscopy, optical tomography, histological techniques, computer-assisted diagnosis, infrared spectrophotometry, physiologic monitoring, experimental diabetes mellitus, penetrating wounds, diabetes complications, skin, animal models, radiation scattering, failure analysis

Catherin von Reyn, PhD (*University of Pennsylvania*). Assistant Professor. Cell type-specific genetic engineering, whole-cell patch clamp in behaving animals, modeling, and detailed behavioral analysis to identify and characterize sensorimotor circuits.

Emeritus Faculty

Hun H. Sun, PhD (*Cornell University*). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Biomaterials and Tissue Engineering Concentration

Major: Biomedical Engineering: Biomaterials and Tissue Engineering Concentration

Degree Awarded: Bachelor of Science

Calendar Type: Quarter

Total Credit Hours: 198.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0501

Standard Occupational Classification (SOC) code: 17-2031

About the Program

The biomaterials and tissue engineering concentration focuses on the fundamental knowledge of natural and synthetic biomaterials and cellular biology and educates students in the emerging field of cellular and tissue engineering.

The concentration in biomaterials and tissue engineering includes courses from the Departments of Biology, Chemistry, and Mechanical Engineering & Mechanics. The program builds on the fundamental knowledge of natural and synthetic biomaterials and cellular biology and educates students in the emerging field of cellular and tissue engineering.

Biomaterials research has recently expanded to include fibrous materials and various prosthetic devices requiring the use of both synthetic and natural fibers. The emphasis is on improved materials and design of biological replacement tissues through cellular tissue engineering. Upon graduation, students will be able to:

- select and evaluate biomaterials for use in biomedical applications *in vivo*;
- develop *in vitro* models for drug delivery, drug toxicity and drug discovery choosing the appropriate biomaterials;
- create high-fidelity tissue models *in vitro*;
- develop and evaluate tissue engineering approaches to initiate and promote regenerative processes *in vivo*.

The School maintains extensive facilities and laboratories devoted to areas of research. Visit the School's BIOMED Research Facilities and Laboratory Map (<http://drexel.edu/biomed/research/facilities>) web page for more details about the laboratories and equipment available.

For more information about this concentration, see Drexel's School of Biomedical Engineering, Science, and Health Systems (<http://drexel.edu/biomed>) web site.

Degree Requirements

General Education Requirements

HIST 285	Technology in Historical Perspective	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV R101	The Drexel Experience	1.0
General Studies Electives (5) *		15.0

Engineering Core Courses

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
BIO 122	Cells and Genetics	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0

ENGR 122	Computation Lab II	1.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0
Required Biomedical Engineering Courses		
BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BMES 124	Biomedical Engineering Freshman Seminar I	1.0
BMES 126	Biomedical Engineering Freshman Seminar II	1.0
BMES 130	Problem Solving in Biomedical Engineering	2.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 326	Principles of Biomedical Engineering II	3.0
BMES 338	Biomedical Ethics and Law	3.0
BMES 372	Biosimulation	3.0
BMES 381	Junior Design Seminar I	2.0
BMES 382	Junior Design Seminar II	2.0
BMES 491 [WI]	Senior Design Project I	3.0
BMES 492	Senior Design Project II	2.0
BMES 493	Senior Design Project III	3.0
ECE 201	Foundations of Electric Circuits	3.0
Biomaterials and Tissue Engineering Concentration Courses		
BIO 218	Principles of Molecular Biology	4.0
BIO 219 [WI]	Techniques in Molecular Biology	3.0
BMES 345	Mechanics of Biological Systems	3.0
BMES 375	Computational Bioengineering	4.0
BMES 451	Transport Phenomena in Living Systems	4.0
BMES 460	Biomaterials I	4.0
BMES 461	Biomaterials II	4.0
BMES 471	Cellular and Molecular Foundations of Tissue Engineering	4.0
BMES 472	Developmental and Evolutionary Foundations of Tissue Engineering	4.0
BMES 475	Biomaterials and Tissue Engineering III	4.0
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
Laboratory Requirement: Choose 2 of		4.0
BMES 301	Laboratory I: Experimental Biomechanics (2cr)	
BMES 304	Laboratory IV: Ultrasound Images (2cr)	
BIO 202	Human Physiology Laboratory (2cr)	
CHEM 244	Organic Chemistry Laboratory I (3cr)	
CHEM 245	Organic Chemistry Laboratory II (3cr)	
Total Credits		198.5

* General studies electives include all liberal arts electives plus additional subjects, such as business, which do not fall under the subject areas of science, math or engineering. See the Biomedical Engineering General and Liberal Studies List (http://www.biomed.drexel.edu/new04/Content/ug_prog/gen_lib_studies_courses) for approved courses. A certain number of General Studies credits are required for graduation with this major.

Sample Plan of Study

Term 1		Credits
BMES 124	Biomedical Engineering Freshman Seminar I	1.0

CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV R101	The Drexel Experience	1.0
Term Credits		18.5
Term 2		
BMES 126	Biomedical Engineering Freshman Seminar II	1.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		19.5
Term 3		
BIO 122	Cells and Genetics	4.5
BMES 130	Problem Solving in Biomedical Engineering	2.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		19.5
Term 4		
BIO 201	Human Physiology I	4.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		18.0
Term 5		
BIO 203	Human Physiology II	4.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0
Term Credits		19.0
Term 6		
BMES 301	Laboratory I: Experimental Biomechanics (Laboratory Requirement)	2.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 372	Biosimulation	3.0
ECE 201	Foundations of Electric Circuits	3.0
HIST 285	Technology in Historical Perspective	4.0
Term Credits		17.0
Term 7		
BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 326	Principles of Biomedical Engineering II	3.0
BMES 345	Mechanics of Biological Systems	3.0
General Studies Elective		3.0
Term Credits		15.0
Term 8		
BIO 218	Principles of Molecular Biology	4.0
BIO 219 [WI]	Techniques in Molecular Biology	3.0
BMES 338	Biomedical Ethics and Law	3.0
BMES 381	Junior Design Seminar I	2.0

CHEM 241	Organic Chemistry I	4.0
Term Credits		16.0
Term 9		
BMES 375	Computational Bioengineering	4.0
BMES 382	Junior Design Seminar II	2.0
BMES 451	Transport Phenomena in Living Systems	4.0
CHEM 242	Organic Chemistry II	4.0
CHEM 244	Organic Chemistry Laboratory I (Laboratory Requirement)	3.0
Term Credits		17.0
Term 10		
BMES 460	Biomaterials I	4.0
BMES 471	Cellular and Molecular Foundations of Tissue Engineering	4.0
BMES 491 [WI]	Senior Design Project I	3.0
General Studies Elective		3.0
Term Credits		14.0
Term 11		
BMES 461	Biomaterials II	4.0
BMES 472	Developmental and Evolutionary Foundations of Tissue Engineering	4.0
BMES 492	Senior Design Project II	2.0
General Studies Elective		3.0
Term Credits		13.0
Term 12		
BMES 475	Biomaterials and Tissue Engineering III	4.0
BMES 493	Senior Design Project III	3.0
General Studies Electives (2)		6.0
Term Credits		13.0

Total Credit: 199.5

Opportunities

Metropolitan Philadelphia has one of the highest concentrations of medical institutions and pharmaceutical and biotechnology industries in the nation. The bachelor of science degree in biomedical engineering gives students access to a broad spectrum of career opportunities in medical device and equipment industry; prosthetics and assist devices industry; biomaterials and implants industry; and the telemedicine, pharmaceutical, biotechnology, and agricultural sectors.

Biomedical engineering graduates are also ideally prepared for professional education in medicine, dentistry, veterinary medicine, and law. Those who choose to pursue graduate education can aim for careers in research and development, biomedical technology innovation and transfer, as well as health care technology management.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Biomedical Engineering, Science and Health Systems Faculty

Fred D. Allen, PhD (*University of Pennsylvania*) *Associate Director, Undergraduate Education*. Assistant Professor. Tissue engineering, cell engineering, orthopedics, bone remodeling, wound healing, mechanotransduction, signal transduction, adhesion, migration.

Hasan Ayaz, PhD (*Drexel University*) *School of Biomedical Engineering, Science and Health Systems*. Research Associate Professor. Optical brain imaging, cognitive neuroengineering, brain computer interface (BCI), functional near infrared (fNIR), and near infrared spectroscopy (NIRS).

Sriram Balasubramanian, PhD (*Wayne State University*). Assistant Professor. Structural characteristics of the pediatric thoracic cage using

CT scans and developing an age-equivalent animal model for pediatric long bones.

Kenneth A. Barbee, PhD (*University of Pennsylvania*). Professor. Cellular biomechanics of neural and vascular injury, mechanotransduction in the cardiovascular system, mechanical control of growth and development for wound healing and tissue engineering.

Donald Buerk, PhD (*Northwestern University*). Research Professor. Biotechnology, physiology, systems biology, blood flow, microcirculation, nitric oxide, oxygen transport

Jamie Dougherty, PhD (*Drexel University*). Assistant Teaching Professor. Brain-computer interface, neural encoding, electrophysiological signal acquisition and processing.

Lin Han, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Nanoscale structure-property relationships of biological materials, genetic and molecular origins soft joint tissue diseases, biomaterials under extreme conditions, coupling between stimulus-responsiveness and geometry.

Uri Hershberg, PhD (*Hebrew University of Jerusalem, Israel*). Assistant Professor. Bioinformatics, immunology, neural computation, system biology, somatic selection, autoimmunity, genetic stability, germline diversity, dendritic cell, transcription elements, pathogens, computational and mathematical modeling, complex systems, cognition and inflammation.

Kurtulus Izzetoglu, PhD (*Drexel University*) *Associate Research Professor*. Cognitive neuroengineering, functional brain imaging, near infrared spectroscopy, medical sensor development, biomedical signal processing, human performance assessment, and cognitive aging

Meltem Izzetoglu, PhD (*Drexel University*). Associate Research Professor. Cognitive neuroengineering, biomedical signal processing, statistical signal analysis, optimal artifact removal, information processing, optical brain imaging, functional near infrared spectroscopy, working memory, attention, learning, reading and mathematical disabilities, cognitive aging, anesthesia awareness, and social anxiety disorders.

Dov Jaron, PhD (*University of Pennsylvania*) *Calhoun Distinguished Professor of Engineering in Medicine*. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Andres Kriete, PhD (*University in Bremen Germany*) *Associate Director for Graduate Studies and Academic Operations*. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Steven Kurtz, PhD (*Cornell University*). Associate Research Professor. Computational biomechanics of bone-implant systems and impact-related injuries, orthopaedic biomechanics, contact mechanics, orthopaedic biomaterials, large-deformation mechanical behavior and wear of polymers, and degradation and crosslinking of polyolefins in implant applications.

Ryszard Lec, PhD (*University of Warsaw Engineering College*). Professor. Biomedical applications of viscoelastic, acoustoptic and ultrasonic properties of liquid and solid media.

Peter Lewin, PhD (*University of Denmark, Copenhagen-Lyngby*) *Richard B. Beard Professor, School Of Biomedical Engineering, Science & Health Systems*. Professor. Biomedical ultrasonics, piezoelectric and polymer transducers and hydrophones; shock wave sensors.

Hualou Liang, PhD (*Chinese Academy of Sciences*). Professor. Neuroengineering, neuroinformatics, cognitive and computational neuroscience, neural data analysis and computational modeling, biomedical signal processing.

Donald L. McEachron, PhD (*University of California at San Diego*) *Coordinator, Academic Assessment and Improvement*. Teaching Professor. Animal behavior, autoradiography, biological rhythms, cerebral metabolism, evolutionary theory, image processing, neuroendocrinology.

Karen Moxon, PhD (*University of Colorado*) *Associate Director for Research*. Professor. Cortico-thalamic interactions; neurobiological perspectives on design of humanoid robots.

Michael Neidrauer, PhD (*Drexel University*). Assistant Research Professor. Wound healing, near infrared, spectroscopy, cell culture, data analysis, optical coherence tomography (OCT), matlab, life sciences assay development, confocal microscopy, biomaterials, in-vivo, medical devices

Banu Onaral, PhD (*University of Pennsylvania*) *H.H. Sun Professor; Senior Advisor to the President, Global Partnerships*. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (*Rensselaer Polytechnic University*). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.

Ahmet Sacan, PhD (*Middle East Technical University*). Assistant Professor. Indexing and data mining in biological databases; protein sequence and structure; similarity search; protein structure modeling; protein-protein interaction; automated cell tracking.

Joseph J. Sarver, PhD (*Drexel University*). Associate Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

Rahamim Seliktar, PhD (*University of Strathclyde, Glasgow*) *Vice Director, School of Biomedical Engineering, Science & Health Systems*. Professor. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Patricia A. Shewokis, PhD (*University of Georgia*). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy (fNIR) and electroencephalography (EEG) and methodology and research design.

Adrian C. Shieh, PhD (*Rice University*). Assistant Professor. Contribution of mechanical forces to tumor invasion and metastasis, with a particular emphasis on how biomechanical signals may drive the invasive switch, and how the biomechanical microenvironment interacts with cytokine signaling and the extracellular matrix to influence tumor and stromal cell behavior.

Wan Y. Shih, PhD (*Ohio State University*). Associate Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (*Drexel University*). Assistant Professor. Macrophage-biomaterial interactions, drug delivery systems, and chronic wound

healing. Cell-biomaterial interactions, biomaterial design, and international engineering education.

Marek Swoboda, PhD (*Drexel University*). Assistant Teaching Professor. Cardiovascular engineering, cardiovascular system, diagnostic devices in cardiology, piezoelectric biosensors, and pathogen detection.

Amy Throckmorton, PhD (*University of Virginia*). Associate Professor. Computational and experimental fluid dynamics; cardiovascular modeling, including transient, fluid-structure interaction, and patient-specific anatomical studies; bench-to-bedside development of medical devices; artificial organs research; prediction and quantification of blood trauma and thrombosis in medical devices; design of therapeutic alternatives for patients with dysfunctional single ventricle physiology; human factors engineering of mechanical circulatory assist devices

Margaret Wheatley, PhD (*University of Toronto*) *John M. Reid Professor*. Ultrasound contrast agent development (tumor targeting and triggered drug delivery), controlled release technology (bioactive compounds), microencapsulated allografts (ex vivo gene therapy) for spinal cord repair.

Ming Xiao, PhD (*Baylor University*). Associate Professor. Nanotechnology, single molecule detection, single molecule fluorescent imaging, genomics, genetics, genome mapping, DNA sequencing, DNA biochemistry, and biophysics.

Yinghui Zhong, PhD (*Georgia Institute of Technology*). Assistant Professor. Spinal cord repair, and engineering neural prosthesis/brain interface using biomaterials, drug delivery, and stem cell therapy.

Leonid Zubkov, PhD, DSc (*St. Petersburg State University, Russia*). Research Professor. Physiology, wound healing, physiologic neovascularization, near-infrared spectroscopy, optical tomography, histological techniques, computer-assisted diagnosis, infrared spectrophotometry, physiologic monitoring, experimental diabetes mellitus, penetrating wounds, diabetes complications, skin, animal models, radiation scattering, failure analysis

Catherin von Reyn, PhD (*University of Pennsylvania*). Assistant Professor. Cell type-specific genetic engineering, whole-cell patch clamp in behaving animals, modeling, and detailed behavioral analysis to identify and characterize sensorimotor circuits.

Emeritus Faculty

Hun H. Sun, PhD (*Cornell University*). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Biomechanics and Human Performance Engineering Concentration

Major: Biomedical Engineering: Biomechanics and Human Performance Engineering Concentration

Degree Awarded: Bachelor of Science

Calendar Type: Quarter

Total Credit Hours: 199.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0501

Standard Occupational Classification (SOC) code: 17-2031

About the Program

The concentration in biomechanics and human performance engineering provides students with the background and skills needed to create work and living environments which improve human health and enhance performance.

The biomechanics concentration applies engineering principles to study the interactions between humans and various machine systems in both working and living environments. Courses in this area of specialization cover such topics as the mechanics of materials, chronobiology, biomechanics, and human factors and cognitive engineering.

Upon graduation, students will be able to:

- model the effects of external forces on the human body and its tissues;
- design implanted prosthetic devices through an understanding of the interaction between biological tissues and engineering material;
- understand neural control of posture and locomotion;
- apply system approaches to the interaction of humans with their environment in order to optimize performance;
- design devices to aid people with disabilities by capitalizing on their engineering skills and human performance criteria.

The School maintains extensive facilities and laboratories devoted to areas of research. Visit the School's BIOMED Research Facilities and Laboratory Map (<http://drexel.edu/biomed/research/facilities>) web page for more details about the laboratories and equipment available.

For more information about this concentration, see the Drexel School of Biomedical Engineering, Science, and Health System (<http://drexel.edu/biomed/s>) (<http://www.biomed.drexel.edu/new04>) web site.

Degree Requirements

General Education Requirements

HIST 285	Technology in Historical Perspective	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
CIVC 101	Introduction to Civic Engagement	1.0
PSY 101	General Psychology I (required General Studies course)	3.0
UNIV R101	The Drexel Experience	1.0
General Studies Electives (4)		12.0

Engineering Core Courses

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
BIO 122	Cells and Genetics	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 210	Introduction to Thermodynamics	3.0

ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0

Required Biomedical Engineering Courses

BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BMES 124	Biomedical Engineering Freshman Seminar I	1.0
BMES 126	Biomedical Engineering Freshman Seminar II	1.0
BMES 130	Problem Solving in Biomedical Engineering	2.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 326	Principles of Biomedical Engineering II	3.0
BMES 338	Biomedical Ethics and Law	3.0
BMES 372	Biosimulation	3.0
BMES 381	Junior Design Seminar I	2.0
BMES 382	Junior Design Seminar II	2.0
BMES 491 [WI]	Senior Design Project I	3.0
BMES 492	Senior Design Project II	2.0
BMES 493	Senior Design Project III	3.0
ECE 201	Foundations of Electric Circuits	3.0

Biomechanics and Human Performance Engineering Concentration Courses

BMES 345	Mechanics of Biological Systems	3.0
BMES 375	Computational Bioengineering	4.0
	or BMES 401 Biosensors I	
BMES 411	Chronoengineering I: Biological Rhythms in Health and Performance	3.0
BMES 412	Chronoengineering II: Sleep Functions in Health and Performance	3.0
BMES 430	Neural Aspects of Posture and Locomotion	3.0
BMES 440	Introduction to Biodynamics	3.0
BMES 441	Biomechanics I: Introduction to Biomechanics	4.0
BMES 442	Biomechanics II: Musculoskeletal Modeling and Human Performance	4.0
BMES 444	Biofluid Mechanics	3.0
BMES 451	Transport Phenomena in Living Systems	4.0
MEM 201	Foundations of Computer Aided Design	3.0
MEM 238	Dynamics	4.0
Laboratory Requirement: Choose 2 of		4.0
BMES 301	Laboratory I: Experimental Biomechanics	
BMES 304	Laboratory IV: Ultrasound Images	
BMES 305	Laboratory V: Musculoskeletal Anatomy for Biomedical Engineers	
BIO 219 [WI]	Techniques in Molecular Biology	
CHEM 244	Organic Chemistry Laboratory I	
CHEM 245	Organic Chemistry Laboratory II	
Biomechanics and Human Performance Electives (2)		6.0
Suggested Biomechanics and Human Performance concentration electives (Choose 2)		
PSY 213	Sensation and Perception	
PSY 332	Human Factors and Cognitive Engineering	
PSY 410	Neuropsychology	

Total Credits 199.5

Sample Plan of Study

Term 1	Credits	
BMES 124	Biomedical Engineering Freshman Seminar I	1.0

CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV R101	The Drexel Experience	1.0
Term Credits		18.5

Term 2

BMES 126	Biomedical Engineering Freshman Seminar II	1.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		19.5

Term 3

BIO 122	Cells and Genetics	4.5
BMES 130	Problem Solving in Biomedical Engineering	2.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		19.5

Term 4

BIO 201	Human Physiology I	4.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		18.0

Term 5

BIO 203	Human Physiology II	4.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0
Term Credits		19.0

Term 6

BMES 301	Laboratory I: Experimental Biomechanics (Laboratory Requirement)	2.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 372	Biosimulation	3.0
ECE 201	Foundations of Electric Circuits	3.0
MEM 201	Foundations of Computer Aided Design	3.0
Term Credits		16.0

Term 7

BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 326	Principles of Biomedical Engineering II	3.0
BMES 345	Mechanics of Biological Systems	3.0
PSY 101	General Psychology I	3.0
Term Credits		15.0

Term 8

BMES 305	Laboratory V: Musculoskeletal Anatomy for Biomedical Engineers (Laboratory Requirement)	2.0
BMES 381	Junior Design Seminar I	2.0
BMES 411	Chronoengineering I: Biological Rhythms in Health and Performance	3.0

BMES 430	Neural Aspects of Posture and Locomotion	3.0
Biomechanics & Human Performance Concentration Elective *		3.0

Term Credits		13.0
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Term 9

BMES 382	Junior Design Seminar II	2.0
BMES 412	Chronoengineering II: Sleep Functions in Health and Performance	3.0
MEM 238	Dynamics	4.0
BMES 401	Biosensors I	4.0
or 375	Computational Bioengineering	
General Studies Elective		3.0

Term Credits		16.0
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Term 10

BMES 440	Introduction to Biodynamics	3.0
BMES 441	Biomechanics I: Introduction to Biomechanics	4.0
BMES 451	Transport Phenomena in Living Systems	4.0
BMES 491 [WI]	Senior Design Project I	3.0
General Studies Elective		3.0

Term Credits		17.0
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Term 11

HIST 285	Technology in Historical Perspective	4.0
BMES 442	Biomechanics II: Musculoskeletal Modeling and Human Performance	4.0
BMES 492	Senior Design Project II	2.0
Biomechanics & Human Performance Concentration Elective *		3.0
General Studies Elective		3.0

Term Credits		16.0
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Term 12

BMES 338	Biomedical Ethics and Law	3.0
BMES 444	Biofluid Mechanics	3.0
BMES 493	Senior Design Project III	3.0
General Studies Elective		3.0

Term Credits		12.0
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Total Credit: 199.5

* See degree requirements (p. 386).

Opportunities

Metropolitan Philadelphia has one of the highest concentrations of medical institutions and pharmaceutical and biotechnology industries in the nation. The bachelor of science degree in biomedical engineering gives students access to a broad spectrum of career opportunities in medical device and equipment industry; prosthetics and assist devices industry; biomaterials and implants industry; and the telemedicine, pharmaceutical, biotechnology, and agricultural sectors.

Biomedical engineering graduates are also ideally prepared for professional education in medicine, dentistry, veterinary medicine, and law. Those who choose to pursue graduate education can aim for careers in research and development, biomedical technology innovation and transfer, as well as health care technology management.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Biomedical Engineering, Science and Health Systems Faculty

Fred D. Allen, PhD (*University of Pennsylvania*) Associate Director, Undergraduate Education. Assistant Professor. Tissue engineering,

cell engineering, orthopedics, bone remodeling, wound healing, mechanotransduction, signal transduction, adhesion, migration.

Hasan Ayaz, PhD (*Drexel University*) *School of Biomedical Engineering, Science and Health Systems*. Research Associate Professor. Optical brain imaging, cognitive neuroengineering, brain computer interface (BCI), functional near infrared (fNIR), and near infrared spectroscopy (NIRS).

Sriram Balasubramanian, PhD (*Wayne State University*). Assistant Professor. Structural characteristics of the pediatric thoracic cage using CT scans and developing an age-equivalent animal model for pediatric long bones.

Kenneth A. Barbee, PhD (*University of Pennsylvania*). Professor. Cellular biomechanics of neural and vascular injury, mechanotransduction in the cardiovascular system, mechanical control of growth and development for wound healing and tissue engineering.

Donald Buerk, PhD (*Northwestern University*). Research Professor. Biotechnology, physiology, systems biology, blood flow, microcirculation, nitric oxide, oxygen transport

Jamie Dougherty, PhD (*Drexel University*). Assistant Teaching Professor. Brain-computer interface, neural encoding, electrophysiological signal acquisition and processing.

Lin Han, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Nanoscale structure-property relationships of biological materials, genetic and molecular origins soft joint tissue diseases, biomaterials under extreme conditions, coupling between stimulus-responsiveness and geometry.

Uri Hershberg, PhD (*Hebrew University of Jerusalem, Israel*). Assistant Professor. Bioinformatics, immunology, neural computation, system biology, somatic selection, autoimmunity, genetic stability, germline diversity, dendritic cell, transcription elements, pathogens, computational and mathematical modeling, complex systems, cognition and inflammation.

Kurtulus Izzetoglu, PhD (*Drexel University*) *Associate Research Professor*. Cognitive neuroengineering, functional brain imaging, near infrared spectroscopy, medical sensor development, biomedical signal processing, human performance assessment, and cognitive aging

Meltem Izzetoglu, PhD (*Drexel University*). Associate Research Professor. Cognitive neuroengineering, biomedical signal processing, statistical signal analysis, optimal artifact removal, information processing, optical brain imaging, functional near infrared spectroscopy, working memory, attention, learning, reading and mathematical disabilities, cognitive aging, anesthesia awareness, and social anxiety disorders.

Dov Jaron, PhD (*University of Pennsylvania*) *Calhoun Distinguished Professor of Engineering in Medicine*. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Andres Kriete, PhD (*University in Bremen Germany*) *Associate Director for Graduate Studies and Academic Operations*. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Steven Kurtz, PhD (*Cornell University*). Associate Research Professor. Computational biomechanics of bone-implant systems and impact-related injuries, orthopaedic biomechanics, contact mechanics, orthopaedic biomaterials, large-deformation mechanical behavior and wear of

polymers, and degradation and crosslinking of polyolefins in implant applications.

Ryszard Lec, PhD (*University of Warsaw Engineering College*). Professor. Biomedical applications of viscoelastic, acoustoptic and ultrasonic properties of liquid and solid media.

Peter Lewin, PhD (*University of Denmark, Copenhagen-Lyngby*) *Richard B. Beard Professor, School Of Biomedical Engineering, Science & Health Systems*. Professor. Biomedical ultrasonics, piezoelectric and polymer transducers and hydrophones; shock wave sensors.

Hualou Liang, PhD (*Chinese Academy of Sciences*). Professor. Neuroengineering, neuroinformatics, cognitive and computational neuroscience, neural data analysis and computational modeling, biomedical signal processing.

Donald L. McEachron, PhD (*University of California at San Diego*) *Coordinator, Academic Assessment and Improvement*. Teaching Professor. Animal behavior, autoradiography, biological rhythms, cerebral metabolism, evolutionary theory, image processing, neuroendocrinology.

Karen Moxon, PhD (*University of Colorado*) *Associate Director for Research*. Professor. Cortico-thalamic interactions; neurobiological perspectives on design of humanoid robots.

Michael Neidrauer, PhD (*Drexel University*). Assistant Research Professor. Wound healing, near infrared, spectroscopy, cell culture, data analysis, optical coherence tomography (OCT), matlab, life sciences assay development, confocal microscopy, biomaterials, in-vivo, medical devices

Banu Onaral, PhD (*University of Pennsylvania*) *H.H. Sun Professor; Senior Advisor to the President, Global Partnerships*. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (*Rensselaer Polytechnic University*). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.

Ahmet Sacan, PhD (*Middle East Technical University*). Assistant Professor. Indexing and data mining in biological databases; protein sequence and structure; similarity search; protein structure modeling; protein-protein interaction; automated cell tracking.

Joseph J. Sarver, PhD (*Drexel University*). Associate Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

Rahamim Seliktar, PhD (*University of Strathclyde, Glasgow*) *Vice Director, School of Biomedical Engineering, Science & Health Systems*. Professor. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Patricia A. Shewokis, PhD (*University of Georgia*). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy (fNIR) and electroencephalography (EEG) and methodology and research design.

Adrian C. Shieh, PhD (*Rice University*). Assistant Professor. Contribution of mechanical forces to tumor invasion and metastasis, with a particular emphasis on how biomechanical signals may drive the invasive switch, and how the biomechanical microenvironment interacts with cytokine

signaling and the extracellular matrix to influence tumor and stromal cell behavior.

Wan Y. Shih, PhD (*Ohio State University*). Associate Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (*Drexel University*). Assistant Professor. Macrophage-biomaterial interactions, drug delivery systems, and chronic wound healing. Cell-biomaterial interactions, biomaterial design, and international engineering education.

Marek Swoboda, PhD (*Drexel University*). Assistant Teaching Professor. Cardiovascular engineering, cardiovascular system, diagnostic devices in cardiology, piezoelectric biosensors, and pathogen detection.

Amy Throckmorton, PhD (*University of Virginia*). Associate Professor. Computational and experimental fluid dynamics; cardiovascular modeling, including transient, fluid-structure interaction, and patient-specific anatomical studies; bench-to-bedside development of medical devices; artificial organs research; prediction and quantification of blood trauma and thrombosis in medical devices; design of therapeutic alternatives for patients with dysfunctional single ventricle physiology; human factors engineering of mechanical circulatory assist devices

Margaret Wheatley, PhD (*University of Toronto*) *John M. Reid Professor*. Ultrasound contrast agent development (tumor targeting and triggered drug delivery), controlled release technology (bioactive compounds), microencapsulated allografts (ex vivo gene therapy) for spinal cord repair.

Ming Xiao, PhD (*Baylor University*). Associate Professor. Nanotechnology, single molecule detection, single molecule fluorescent imaging, genomics, genetics, genome mapping, DNA sequencing, DNA biochemistry, and biophysics.

Yinghui Zhong, PhD (*Georgia Institute of Technology*). Assistant Professor. Spinal cord repair, and engineering neural prosthesis/brain interface using biomaterials, drug delivery, and stem cell therapy.

Leonid Zubkov, PhD, DSc (*St. Petersburg State University, Russia*). Research Professor. Physiology, wound healing, physiologic neovascularization, near-infrared spectroscopy, optical tomography, histological techniques, computer-assisted diagnosis, infrared spectrophotometry, physiologic monitoring, experimental diabetes mellitus, penetrating wounds, diabetes complications, skin, animal models, radiation scattering, failure analysis

Catherin von Reyn, PhD (*University of Pennsylvania*). Assistant Professor. Cell type-specific genetic engineering, whole-cell patch clamp in behaving animals, modeling, and detailed behavioral analysis to identify and characterize sensorimotor circuits.

Emeritus Faculty

Hun H. Sun, PhD (*Cornell University*). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Biomedical Informatics Concentration

Major: Biomedical Engineering: Biomechanics Informatics Concentration
Degree Awarded: Bachelor of Science

Calendar Type: Quarter

Total Credit Hours: 197.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0501

Standard Occupational Classification (SOC) code: 17-2031

About the Program

The biomedical informatics concentration focuses on the management, analysis and visualization of data that is generated in molecular and cellular biology, genomics and other areas of biology and biomedicine. Students are trained in the development of useful computational models of living systems and novel informatics technologies in life sciences.

Bioinformatics is an emerging field of science that is concerned with the management, analysis and visualization of the flood of data being generated in molecular and cellular biology, genomics and other areas of biology and biomedicine. The field of bioinformatics enables information at the gene, protein, cell, tissue, organ, and system level to be integrated and interpreted for early detection, accurate diagnosis, and effective treatment of complex diseases such as cancer.

The biomedical informatics concentration includes courses in biology, computer science, and information technology. The concentration introduces information handling systems for people in the allied health professions, with specific examples drawn from health care and covers locating, manipulating, and displaying information in the health system setting. Students are also introduced to the mathematical and computational analysis of biological systems. The systems analyzed include the genome, protein and gene networks, cell division cycles, and cellular level disease. Mathematical tools include matrix algebra, differential equations, cellular automata, and cluster analysis.

Upon graduation, students will be able to:

- select, access and integrate bioinformatics related databases for applications in genomics and proteomics;
- apply biostatistical techniques to analyze high-throughput data for genotyping, gene expression and proteomics data;
- develop and evaluate computational models to describe and simulate gene regulatory, protein and metabolic networks.

The School maintains extensive facilities and laboratories devoted to areas of research. Visit the School's BIOMED Research Facilities and Laboratory Map (<http://drexel.edu/biomed/research/facilities>) page for more details about the laboratories and equipment available.

For more information about this concentration, see Drexel's School of Biomedical Engineering, Science, and Health Systems (<http://www.biomed.drexel.edu>) website.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 285	Technology in Historical Perspective	4.0
UNIV R101	The Drexel Experience	1.0
General Studies Electives (5)		15.0

Engineering Core Courses

BIO 122	Cells and Genetics	4.5
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CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
MEM 202	Statics	3.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
Required Biomedical Engineering Courses		
BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BMES 124	Biomedical Engineering Freshman Seminar I	1.0
BMES 126	Biomedical Engineering Freshman Seminar II	1.0
BMES 130	Problem Solving in Biomedical Engineering	2.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 326	Principles of Biomedical Engineering II	3.0
BMES 338	Biomedical Ethics and Law	3.0
BMES 372	Biosimulation	3.0
BMES 381	Junior Design Seminar I	2.0
BMES 382	Junior Design Seminar II	2.0
BMES 491 [WI]	Senior Design Project I	3.0
BMES 492	Senior Design Project II	2.0
BMES 493	Senior Design Project III	3.0
ECE 201	Foundations of Electric Circuits	3.0
Biomedical Informatics Concentration Courses		
BIO 218	Principles of Molecular Biology	4.0
BMES 315	Experimental Design in Biomedical Research	4.0
BMES 375	Computational Bioengineering	4.0
BMES 401	Biosensors I	4.0
BMES 483	Quantitative Systems Biology	4.0
BMES 484	Genome Information Engineering	4.0
CS 171	Computer Programming I	3.0
CS 172	Computer Programming II	3.0
CS 260	Data Structures	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
INFO 210	Database Management Systems	3.0
Laboratory Requirement: Choose 2 of		4.0
BMES 301	Laboratory I: Experimental Biomechanics (2 cr)	
BMES 304	Laboratory IV: Ultrasound Images (2 cr)	
BIO 202	Human Physiology Laboratory (2 cr)	
BIO 219 [WI]	Techniques in Molecular Biology (3 cr)	
CHEM 244	Organic Chemistry Laboratory I (3 cr)	
CHEM 245	Organic Chemistry Laboratory II (3 cr)	
Bioinformatics concentration electives (2)		6.0
Suggested Bioinformatics Electives		

INFO 110	Human-Computer Interaction I	
INFO 200	Systems Analysis I	
Total Credits		197.5

Sample Plan of Study

Term 1		Credits
BMES 124	Biomedical Engineering Freshman Seminar I	1.0
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV R101	The Drexel Experience	1.0
Term Credits		18.5
Term 2		
BMES 126	Biomedical Engineering Freshman Seminar II	1.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		19.5
Term 3		
BIO 122	Cells and Genetics	4.5
BMES 130	Problem Solving in Biomedical Engineering	2.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		19.5
Term 4		
BIO 201	Human Physiology I	4.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		18.0
Term 5		
BIO 203	Human Physiology II	4.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0
Term Credits		19.0
Term 6		
BIO 218	Principles of Molecular Biology	4.0
BIO 219 [WI]	Techniques in Molecular Biology (Lab Requirement)	3.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 372	Biosimulation	3.0
CS 171	Computer Programming I	3.0
ECE 201	Foundations of Electric Circuits	3.0
Term Credits		19.0
Term 7		
BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 326	Principles of Biomedical Engineering II	3.0

CS 172	Computer Programming II	3.0
Term Credits		12.0
Term 8		
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 304	Laboratory IV: Ultrasound Images (Laboratory Requirement)	2.0
BMES 315	Experimental Design in Biomedical Research	4.0
BMES 338	Biomedical Ethics and Law	3.0
BMES 381	Junior Design Seminar I	2.0
CS 265	Advanced Programming Tools and Techniques	3.0
Term Credits		16.0
Term 9		
BMES 375	Computational Bioengineering	4.0
BMES 382	Junior Design Seminar II	2.0
CS 260	Data Structures	3.0
INFO 210	Database Management Systems	3.0
General Studies Elective		3.0
Term Credits		15.0
Term 10		
BMES 401	Biosensors I	4.0
BMES 491 [WI]	Senior Design Project I	3.0
HIST 285	Technology in Historical Perspective	4.0
Biomedical Informatics Concentration Elective (See degree requirements)		3.0
General Studies Elective		3.0
Term Credits		17.0
Term 11		
BMES 484	Genome Information Engineering	4.0
BMES 492	Senior Design Project II	2.0
Biomedical Informatics Concentration Elective (See degree requirements)		3.0
General Studies Elective		3.0
Term Credits		12.0
Term 12		
BMES 483	Quantitative Systems Biology	4.0
BMES 493	Senior Design Project III	3.0
General Studies Electives (2)		6.0
Term Credits		13.0

Total Credit: 198.5

Opportunities

Metropolitan Philadelphia has one of the highest concentrations of medical institutions and pharmaceutical and biotechnology industries in the nation. The bachelor of science degree in biomedical engineering gives students access to a broad spectrum of career opportunities in medical device and equipment industry; prosthetics and assist devices industry; biomaterials and implants industry; and the telemedicine, pharmaceutical, biotechnology, and agricultural sectors.

Biomedical engineering graduates are also ideally prepared for professional education in medicine, dentistry, veterinary medicine, and law. Those who choose to pursue graduate education can aim for careers in research and development, biomedical technology innovation and transfer, as well as health care technology management.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Biomedical Engineering, Science and Health Systems Faculty

Fred D. Allen, PhD (*University of Pennsylvania*) Associate Director, Undergraduate Education. Assistant Professor. Tissue engineering,

cell engineering, orthopedics, bone remodeling, wound healing, mechanotransduction, signal transduction, adhesion, migration.

Hasan Ayaz, PhD (*Drexel University*) School of Biomedical Engineering, Science and Health Systems. Research Associate Professor. Optical brain imaging, cognitive neuroengineering, brain computer interface (BCI), functional near infrared (fNIR), and near infrared spectroscopy (NIRS).

Sriram Balasubramanian, PhD (*Wayne State University*). Assistant Professor. Structural characteristics of the pediatric thoracic cage using CT scans and developing an age-equivalent animal model for pediatric long bones.

Kenneth A. Barbee, PhD (*University of Pennsylvania*). Professor. Cellular biomechanics of neural and vascular injury, mechanotransduction in the cardiovascular system, mechanical control of growth and development for wound healing and tissue engineering.

Donald Buerk, PhD (*Northwestern University*). Research Professor. Biotechnology, physiology, systems biology, blood flow, microcirculation, nitric oxide, oxygen transport

Jamie Dougherty, PhD (*Drexel University*). Assistant Teaching Professor. Brain-computer interface, neural encoding, electrophysiological signal acquisition and processing.

Lin Han, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Nanoscale structure-property relationships of biological materials, genetic and molecular origins soft joint tissue diseases, biomaterials under extreme conditions, coupling between stimulus-responsiveness and geometry.

Uri Hershberg, PhD (*Hebrew University of Jerusalem, Israel*). Assistant Professor. Bioinformatics, immunology, neural computation, system biology, somatic selection, autoimmunity, genetic stability, germline diversity, dendritic cell, transcription elements, pathogens, computational and mathematical modeling, complex systems, cognition and inflammation.

Kurtulus Izzetoglu, PhD (*Drexel University*) Associate Research Professor. Cognitive neuroengineering, functional brain imaging, near infrared spectroscopy, medical sensor development, biomedical signal processing, human performance assessment, and cognitive aging

Meltem Izzetoglu, PhD (*Drexel University*). Associate Research Professor. Cognitive neuroengineering, biomedical signal processing, statistical signal analysis, optimal artifact removal, information processing, optical brain imaging, functional near infrared spectroscopy, working memory, attention, learning, reading and mathematical disabilities, cognitive aging, anesthesia awareness, and social anxiety disorders.

Dov Jaron, PhD (*University of Pennsylvania*) Calhoun Distinguished Professor of Engineering in Medicine. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Andres Kriete, PhD (*University in Bremen Germany*) Associate Director for Graduate Studies and Academic Operations. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Steven Kurtz, PhD (*Cornell University*). Associate Research Professor. Computational biomechanics of bone-implant systems and impact-related injuries, orthopaedic biomechanics, contact mechanics, orthopaedic biomaterials, large-deformation mechanical behavior and wear of

polymers, and degradation and crosslinking of polyolefins in implant applications.

Ryszard Lec, PhD (*University of Warsaw Engineering College*). Professor. Biomedical applications of viscoelastic, acoustoptic and ultrasonic properties of liquid and solid media.

Peter Lewin, PhD (*University of Denmark, Copenhagen-Lyngby*) *Richard B. Beard Professor, School Of Biomedical Engineering, Science & Health Systems*. Professor. Biomedical ultrasonics, piezoelectric and polymer transducers and hydrophones; shock wave sensors.

Hualou Liang, PhD (*Chinese Academy of Sciences*). Professor. Neuroengineering, neuroinformatics, cognitive and computational neuroscience, neural data analysis and computational modeling, biomedical signal processing.

Donald L. McEachron, PhD (*University of California at San Diego*) *Coordinator, Academic Assessment and Improvement*. Teaching Professor. Animal behavior, autoradiography, biological rhythms, cerebral metabolism, evolutionary theory, image processing, neuroendocrinology.

Karen Moxon, PhD (*University of Colorado*) *Associate Director for Research*. Professor. Cortico-thalamic interactions; neurobiological perspectives on design of humanoid robots.

Michael Neidrauer, PhD (*Drexel University*). Assistant Research Professor. Wound healing, near infrared, spectroscopy, cell culture, data analysis, optical coherence tomography (OCT), matlab, life sciences assay development, confocal microscopy, biomaterials, in-vivo, medical devices

Banu Onaral, PhD (*University of Pennsylvania*) *H.H. Sun Professor; Senior Advisor to the President, Global Partnerships*. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (*Rensselaer Polytechnic University*). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.

Ahmet Sacan, PhD (*Middle East Technical University*). Assistant Professor. Indexing and data mining in biological databases; protein sequence and structure; similarity search; protein structure modeling; protein-protein interaction; automated cell tracking.

Joseph J. Sarver, PhD (*Drexel University*). Associate Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

Rahamim Seliktar, PhD (*University of Strathclyde, Glasgow*) *Vice Director, School of Biomedical Engineering, Science & Health Systems*. Professor. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Patricia A. Shewokis, PhD (*University of Georgia*). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy (fNIR) and electroencephalography (EEG) and methodology and research design.

Adrian C. Shieh, PhD (*Rice University*). Assistant Professor. Contribution of mechanical forces to tumor invasion and metastasis, with a particular emphasis on how biomechanical signals may drive the invasive switch, and how the biomechanical microenvironment interacts with cytokine

signaling and the extracellular matrix to influence tumor and stromal cell behavior.

Wan Y. Shih, PhD (*Ohio State University*). Associate Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (*Drexel University*). Assistant Professor. Macrophage-biomaterial interactions, drug delivery systems, and chronic wound healing. Cell-biomaterial interactions, biomaterial design, and international engineering education.

Marek Swoboda, PhD (*Drexel University*). Assistant Teaching Professor. Cardiovascular engineering, cardiovascular system, diagnostic devices in cardiology, piezoelectric biosensors, and pathogen detection.

Amy Throckmorton, PhD (*University of Virginia*). Associate Professor. Computational and experimental fluid dynamics; cardiovascular modeling, including transient, fluid-structure interaction, and patient-specific anatomical studies; bench-to-bedside development of medical devices; artificial organs research; prediction and quantification of blood trauma and thrombosis in medical devices; design of therapeutic alternatives for patients with dysfunctional single ventricle physiology; human factors engineering of mechanical circulatory assist devices

Margaret Wheatley, PhD (*University of Toronto*) *John M. Reid Professor*. Ultrasound contrast agent development (tumor targeting and triggered drug delivery), controlled release technology (bioactive compounds), microencapsulated allografts (ex vivo gene therapy) for spinal cord repair.

Ming Xiao, PhD (*Baylor University*). Associate Professor. Nanotechnology, single molecule detection, single molecule fluorescent imaging, genomics, genetics, genome mapping, DNA sequencing, DNA biochemistry, and biophysics.

Yinghui Zhong, PhD (*Georgia Institute of Technology*). Assistant Professor. Spinal cord repair, and engineering neural prosthesis/brain interface using biomaterials, drug delivery, and stem cell therapy.

Leonid Zubkov, PhD, DSc (*St. Petersburg State University, Russia*). Research Professor. Physiology, wound healing, physiologic neovascularization, near-infrared spectroscopy, optical tomography, histological techniques, computer-assisted diagnosis, infrared spectrophotometry, physiologic monitoring, experimental diabetes mellitus, penetrating wounds, diabetes complications, skin, animal models, radiation scattering, failure analysis

Catherin von Reyn, PhD (*University of Pennsylvania*). Assistant Professor. Cell type-specific genetic engineering, whole-cell patch clamp in behaving animals, modeling, and detailed behavioral analysis to identify and characterize sensorimotor circuits.

Emeritus Faculty

Hun H. Sun, PhD (*Cornell University*). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Biomedical Devices and Imaging Concentration

Major: Biomedical Engineering: Biomedical Devices and Imaging Concentration

Degree Awarded: Bachelor of Science

Calendar Type: Quarter

Total Credit Hours: 199.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0501

Standard Occupational Classification (SOC) code: 17-2031

About the Program

Biomedical imaging focuses on the theoretical and practical issues related to machine vision, image processing and analysis, and signal processing associated with such medical applications as ultrasound, optics, magnetic resonance, and autoradiographic imaging.

The concentration in biomedical devices and imaging is for those individuals interested in careers in medical imaging, medical device development, and clinical engineering. The concentration covers the fundamentals of modern imaging methodologies, covering aspects of light imaging, ultrasound imaging, and volumetric and functional imaging systems, and the principles of magnetic resonance imaging (MRI).

Upon graduation, students will be able to:

- understand the multi-disciplinary background and limitations of current and emerging instrumentation, imaging and internet technologies used in clinical, pharmaceutical and research environments;
- select and evaluate sensors and imaging modalities for specific biomedical research, diagnostic and therapeutic applications;
- analyze the performance of different systems including microscopical and medical imaging methodologies in terms of safety, resolution and the trade-offs important for a given application;
- optimize digital acquisition, enhancement, visualization and analysis of signals from biomedical instruments in multidimensions;
- understand the impact of compliance with the standards and guidelines of regulatory agencies such as FDA on the design and application of devices in clinical practice and knowledge of basic quality assurance tools.

The School maintains extensive facilities and laboratories devoted to areas of research. Visit the School's BIOMED Research Facilities and Laboratory Map (<http://drexel.edu/biomed/research/facilities>) page for more details about the laboratories and equipment available.

For more information about this concentration, see Drexel's School of Biomedical Engineering, Science, and Health Systems (<http://www.biomed.drexel.edu>) website.

Degree Requirements

General Education Requirements

HIST 285	Technology in Historical Perspective	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV R101	The Drexel Experience	1.0
General Studies Electives (5)		15.0
Engineering Core Courses		
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0

PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
BIO 122	Cells and Genetics	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0

Required Biomedical Engineering Courses

BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BMES 124	Biomedical Engineering Freshman Seminar I	1.0
BMES 126	Biomedical Engineering Freshman Seminar II	1.0
BMES 130	Problem Solving in Biomedical Engineering	2.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 326	Principles of Biomedical Engineering II	3.0
BMES 338	Biomedical Ethics and Law	3.0
BMES 372	Biosimulation	3.0
BMES 381	Junior Design Seminar I	2.0
BMES 382	Junior Design Seminar II	2.0
BMES 491 [WI]	Senior Design Project I	3.0
BMES 492	Senior Design Project II	2.0
BMES 493	Senior Design Project III	3.0
ECE 201	Foundations of Electric Circuits	3.0

Biomedical Devices and Imaging Concentration Courses

BMES 315	Experimental Design in Biomedical Research	4.0
BMES 391	Biomedical Instrumentation I	3.0
BMES 392	Biomedical Instrumentation II	3.0
BMES 375	Computational Bioengineering	4.0
BMES 401	Biosensors I	4.0
BMES 421	Biomedical Imaging Systems I: Images	4.0
BMES 422	Biomedical Imaging Systems II: Ultrasound	4.0
BMES 423	Biomedical Imaging Systems III	4.0
ECES 301	Transform Methods and Filtering	4.0
ECES 303	Transform Methods II	3.0
ECES 304	Dynamic Systems and Stability	4.0
ECES 352	Introduction to Digital Signal Process	3.0
or BMES 432	Biomedical Systems and Signals	
Laboratory Requirement: Choose 2 of		4.0
BMES 301	Laboratory I: Experimental Biomechanics	
BMES 304	Laboratory IV: Ultrasound Images	
BIO 202	Human Physiology Laboratory	
BIO 219 [WI]	Techniques in Molecular Biology	
CHEM 244	Organic Chemistry Laboratory I	
CHEM 245	Organic Chemistry Laboratory II	
Biomedical Systems and Imaging Elective		3.0
Select one of the following:		
BMES 488	Medical Device Development	

BMES 494	Clinical Practicum I	
BMES 495	Clinical Practicum II	
BMES 496	Clinical Practicum III	
Total Credits		199.5

Sample Plan of Study

Term 1		Credits
BMES 124	Biomedical Engineering Freshman Seminar I	1.0
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV R101	The Drexel Experience	1.0
Term Credits		18.5
Term 2		
BMES 126	Biomedical Engineering Freshman Seminar II	1.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		19.5
Term 3		
BIO 122	Cells and Genetics	4.5
BMES 130	Problem Solving in Biomedical Engineering	2.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		19.5
Term 4		
BIO 201	Human Physiology I	4.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		18.0
Term 5		
BIO 203	Human Physiology II	4.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0
Term Credits		19.0
Term 6		
BMES 301	Laboratory I: Experimental Biomechanics (Laboratory Requirement)	2.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 372	Biosimulation	3.0
ECE 201	Foundations of Electric Circuits	3.0
HIST 285	Technology in Historical Perspective	4.0
Term Credits		17.0
Term 7		
BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0

BMES 326	Principles of Biomedical Engineering II	3.0
ECES 301	Transform Methods and Filtering	4.0
General Studies Elective		3.0
Term Credits		16.0

Term 8		Credits
BMES 304	Laboratory IV: Ultrasound Images (Laboratory Requirement)	2.0
BMES 315	Experimental Design in Biomedical Research	4.0
BMES 338	Biomedical Ethics and Law	3.0
BMES 381	Junior Design Seminar I	2.0
ECES 303	Transform Methods II	3.0
Term Credits		14.0

Term 9		Credits
BMES 375	Computational Bioengineering	4.0
BMES 382	Junior Design Seminar II	2.0
ECES 304	Dynamic Systems and Stability	4.0
ECES 352	Introduction to Digital Signal Process	3.0
or BMES 432	Biomedical Systems and Signals	
General Studies Elective		3.0
Term Credits		16.0

Term 10		Credits
BMES 391	Biomedical Instrumentation I	3.0
BMES 401	Biosensors I	4.0
BMES 421	Biomedical Imaging Systems I: Images	4.0
BMES 491 [WI]	Senior Design Project I	3.0
Term Credits		14.0

Term 11		Credits
BMES 392	Biomedical Instrumentation II	3.0
BMES 422	Biomedical Imaging Systems II: Ultrasound	4.0
BMES 492	Senior Design Project II	2.0
General Studies Electives (2)		6.0
Term Credits		15.0

Term 12		Credits
BMES 423	Biomedical Imaging Systems III	4.0
BMES 493	Senior Design Project III	3.0
Biomedical Devices and Imaging Concentration Elective *		3.0
General Studies Elective		3.0
Term Credits		13.0

Total Credit: 199.5

* See degree requirements (p. 393).

Opportunities

Metropolitan Philadelphia has one of the highest concentrations of medical institutions and pharmaceutical and biotechnology industries in the nation. The bachelor of science degree in biomedical engineering gives students access to a broad spectrum of career opportunities in medical device and equipment industry; prosthetics and assist devices industry; biomaterials and implants industry; and the telemedicine, pharmaceutical, biotechnology, and agricultural sectors.

Biomedical engineering graduates are also ideally prepared for professional education in medicine, dentistry, veterinary medicine, and law. Those who choose to pursue graduate education can aim for careers in research and development, biomedical technology innovation and transfer, as well as health care technology management.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Biomedical Engineering, Science and Health Systems Faculty

Fred D. Allen, PhD (*University of Pennsylvania*) Associate Director, Undergraduate Education. Assistant Professor. Tissue engineering, cell engineering, orthopedics, bone remodeling, wound healing, mechanotransduction, signal transduction, adhesion, migration.

Hasan Ayaz, PhD (*Drexel University*) School of Biomedical Engineering, Science and Health Systems. Research Associate Professor. Optical brain imaging, cognitive neuroengineering, brain computer interface (BCI), functional near infrared (fNIR), and near infrared spectroscopy (NIRS).

Sriram Balasubramanian, PhD (*Wayne State University*). Assistant Professor. Structural characteristics of the pediatric thoracic cage using CT scans and developing an age-equivalent animal model for pediatric long bones.

Kenneth A. Barbee, PhD (*University of Pennsylvania*). Professor. Cellular biomechanics of neural and vascular injury, mechanotransduction in the cardiovascular system, mechanical control of growth and development for wound healing and tissue engineering.

Donald Buerk, PhD (*Northwestern University*). Research Professor. Biotechnology, physiology, systems biology, blood flow, microcirculation, nitric oxide, oxygen transport

Jamie Dougherty, PhD (*Drexel University*). Assistant Teaching Professor. Brain-computer interface, neural encoding, electrophysiological signal acquisition and processing.

Lin Han, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Nanoscale structure-property relationships of biological materials, genetic and molecular origins soft joint tissue diseases, biomaterials under extreme conditions, coupling between stimulus-responsiveness and geometry.

Uri Hershberg, PhD (*Hebrew University of Jerusalem, Israel*). Assistant Professor. Bioinformatics, immunology, neural computation, system biology, somatic selection, autoimmunity, genetic stability, germline diversity, dendritic cell, transcription elements, pathogens, computational and mathematical modeling, complex systems, cognition and inflammation.

Kurtulus Izzetoglu, PhD (*Drexel University*) Associate Research Professor. Cognitive neuroengineering, functional brain imaging, near infrared spectroscopy, medical sensor development, biomedical signal processing, human performance assessment, and cognitive aging

Meltem Izzetoglu, PhD (*Drexel University*). Associate Research Professor. Cognitive neuroengineering, biomedical signal processing, statistical signal analysis, optimal artifact removal, information processing, optical brain imaging, functional near infrared spectroscopy, working memory, attention, learning, reading and mathematical disabilities, cognitive aging, anesthesia awareness, and social anxiety disorders.

Dov Jaron, PhD (*University of Pennsylvania*) Calhoun Distinguished Professor of Engineering in Medicine. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Andres Kriete, PhD (*University in Bremen Germany*) Associate Director for Graduate Studies and Academic Operations. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Steven Kurtz, PhD (*Cornell University*). Associate Research Professor. Computational biomechanics of bone-implant systems and impact-related injuries, orthopaedic biomechanics, contact mechanics, orthopaedic biomaterials, large-deformation mechanical behavior and wear of polymers, and degradation and crosslinking of polyolefins in implant applications.

Ryszard Lec, PhD (*University of Warsaw Engineering College*). Professor. Biomedical applications of viscoelastic, acoustoptic and ultrasonic properties of liquid and solid media.

Peter Lewin, PhD (*University of Denmark, Copenhagen-Lyngby*) Richard B. Beard Professor, School Of Biomedical Engineering, Science & Health Systems. Professor. Biomedical ultrasonics, piezoelectric and polymer transducers and hydrophones; shock wave sensors.

Hualou Liang, PhD (*Chinese Academy of Sciences*). Professor. Neuroengineering, neuroinformatics, cognitive and computational neuroscience, neural data analysis and computational modeling, biomedical signal processing.

Donald L. McEachron, PhD (*University of California at San Diego*) Coordinator, Academic Assessment and Improvement. Teaching Professor. Animal behavior, autoradiography, biological rhythms, cerebral metabolism, evolutionary theory, image processing, neuroendocrinology.

Karen Moxon, PhD (*University of Colorado*) Associate Director for Research. Professor. Cortico-thalamic interactions; neurobiological perspectives on design of humanoid robots.

Michael Neidrauer, PhD (*Drexel University*). Assistant Research Professor. Wound healing, near infrared, spectroscopy, cell culture, data analysis, optical coherence tomography (OCT), matlab, life sciences assay development, confocal microscopy, biomaterials, in-vivo, medical devices

Banu Onaral, PhD (*University of Pennsylvania*) H.H. Sun Professor; Senior Advisor to the President, Global Partnerships. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (*Rensselaer Polytechnic University*). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.

Ahmet Sacan, PhD (*Middle East Technical University*). Assistant Professor. Indexing and data mining in biological databases; protein sequence and structure; similarity search; protein structure modeling; protein-protein interaction; automated cell tracking.

Joseph J. Sarver, PhD (*Drexel University*). Associate Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

Rahamim Seliktar, PhD (*University of Strathclyde, Glasgow*) Vice Director, School of Biomedical Engineering, Science & Health Systems. Professor. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Patricia A. Shewokis, PhD (*University of Georgia*). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy (fNIR) and electroencephalography (EEG) and methodology and research design.

Adrian C. Shieh, PhD (*Rice University*). Assistant Professor. Contribution of mechanical forces to tumor invasion and metastasis, with a particular emphasis on how biomechanical signals may drive the invasive switch, and how the biomechanical microenvironment interacts with cytokine signaling and the extracellular matrix to influence tumor and stromal cell behavior.

Wan Y. Shih, PhD (*Ohio State University*). Associate Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (*Drexel University*). Assistant Professor. Macrophage-biomaterial interactions, drug delivery systems, and chronic wound healing. Cell-biomaterial interactions, biomaterial design, and international engineering education.

Marek Swoboda, PhD (*Drexel University*). Assistant Teaching Professor. Cardiovascular engineering, cardiovascular system, diagnostic devices in cardiology, piezoelectric biosensors, and pathogen detection.

Amy Throckmorton, PhD (*University of Virginia*). Associate Professor. Computational and experimental fluid dynamics; cardiovascular modeling, including transient, fluid-structure interaction, and patient-specific anatomical studies; bench-to-bedside development of medical devices; artificial organs research; prediction and quantification of blood trauma and thrombosis in medical devices; design of therapeutic alternatives for patients with dysfunctional single ventricle physiology; human factors engineering of mechanical circulatory assist devices

Margaret Wheatley, PhD (*University of Toronto*) *John M. Reid Professor*. Ultrasound contrast agent development (tumor targeting and triggered drug delivery), controlled release technology (bioactive compounds), microencapsulated allografts (ex vivo gene therapy) for spinal cord repair.

Ming Xiao, PhD (*Baylor University*). Associate Professor. Nanotechnology, single molecule detection, single molecule fluorescent imaging, genomics, genetics, genome mapping, DNA sequencing, DNA biochemistry, and biophysics.

Yinghui Zhong, PhD (*Georgia Institute of Technology*). Assistant Professor. Spinal cord repair, and engineering neural prosthesis/brain interface using biomaterials, drug delivery, and stem cell therapy.

Leonid Zubkov, PhD, DSc (*St. Petersburg State University, Russia*). Research Professor. Physiology, wound healing, physiologic neovascularization, near-infrared spectroscopy, optical tomography, histological techniques, computer-assisted diagnosis, infrared spectrophotometry, physiologic monitoring, experimental diabetes mellitus, penetrating wounds, diabetes complications, skin, animal models, radiation scattering, failure analysis

Catherin von Reyn, PhD (*University of Pennsylvania*). Assistant Professor. Cell type-specific genetic engineering, whole-cell patch clamp in behaving animals, modeling, and detailed behavioral analysis to identify and characterize sensorimotor circuits.

Emeritus Faculty

Hun H. Sun, PhD (*Cornell University*). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Neuroengineering Concentration

Major: Biomedical Engineering: Neuroengineering Concentration

Degree Awarded: Bachelor of Science

Calendar Type: Quarter

Total Credit Hours: 196.5 - 198.5

Co-op Options: Three Co-op (Five years); One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 14.0501

Standard Occupational Classification (SOC) code: 17-2031

About the Program

Bachelor of Science in Biomedical Engineering (BMES) 197.0 credits

Neuroengineering is broadly defined to include the modeling of neural and endocrine systems, neural networks, complexity in physiological systems, evolutionary influences in biological control systems, neurocontrol, neurorobotics, and neuroprosthetics.

This concentration focuses on the theory of neural signaling, as well as addressing issues that have a neuroscientific basis, such as locomotion and pattern generation, central control of movement, and the processing of sensory information. Students pursuing this concentration will learn the fundamental theory of cellular potentials and chemical signaling, the Hodgkin Huxley description of action potential generation, circuit representations of neurons and be able to derive and integrate equations describing the circuit as well as design computer models.

Upon graduation, students will be able to:

- model specific aspects of neural systems;
- understand control system theory as applied to neural systems;
- understand how neuroengineering can be applied in clinical situations.

The School maintains extensive facilities and laboratories devoted to areas of research. Visit the School's BIOMED Research Facilities and Laboratory Map (<http://www.biomed.drexel.edu/new04/Content/research/facilities>) page for more details about the laboratories and equipment available.

For more information about this concentration, see Drexel's School of Biomedical Engineering, Science, and Health Systems (<http://www.biomed.drexel.edu/new04>) web page.

Degree Requirements

General education requirements

HIST 285	Technology in Historical Perspective	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV R101	The Drexel Experience	1.0
PSY 101	General Psychology I (required General Studies course)	3.0
General Studies Electives (4)		12.0

Engineering core courses

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 200	Multivariate Calculus	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0
CHEM 101	General Chemistry I	3.5

CHEM 102	General Chemistry II	4.5
BIO 122	Cells and Genetics	4.5
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR 121	Computation Lab I	2.0
ENGR 122	Computation Lab II	1.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0

Required Biomedical Engineering courses

BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BMES 124	Biomedical Engineering Freshman Seminar I	1.0
BMES 126	Biomedical Engineering Freshman Seminar II	1.0
BMES 130	Problem Solving in Biomedical Engineering	2.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 326	Principles of Biomedical Engineering II	3.0
BMES 338	Biomedical Ethics and Law	3.0
BMES 372	Biosimulation	3.0
BMES 381	Junior Design Seminar I	2.0
BMES 382	Junior Design Seminar II	2.0
BMES 491 [WI]	Senior Design Project I	3.0
BMES 492	Senior Design Project II	2.0
BMES 493	Senior Design Project III	3.0
ECE 201	Foundations of Electric Circuits	3.0

Neuroengineering concentration courses

BIO 462	Biology of Neuron Function	3.0
BMES 375	Computational Bioengineering	4.0
BMES 401	Biosensors I	4.0
BMES 405	Physiological Control Systems	3.0
BMES 411	Chronoengineering I: Biological Rhythms in Health and Performance	3.0
BMES 430	Neural Aspects of Posture and Locomotion	3.0
BMES 451	Transport Phenomena in Living Systems	4.0
BMES 477	Neuroengineering I: Neural Signals	3.0
BMES 478	Neuroengineering II: Principles of Neuroengineering	3.0
ECES 301	Transform Methods and Filtering	4.0
ECES 304	Dynamic Systems and Stability	4.0
ECES 356	Theory of Control	4.0
PSY 213	Sensation and Perception	3.0
Laboratory Requirement: Choose 2 of		4.0
BMES 301	Laboratory I: Experimental Biomechanics (2cr)	
BMES 304	Laboratory IV: Ultrasound Images (2cr)	
BMES 305	Laboratory V: Musculoskeletal Anatomy for Biomedical Engineers (2cr)	
BIO 202	Human Physiology Laboratory (2cr)	
BIO 219 [WI]	Techniques in Molecular Biology (3cr)	
CHEM 244	Organic Chemistry Laboratory I (3cr)	
CHEM 245	Organic Chemistry Laboratory II (3cr)	

Total Credits

197.5

Sample Plan of Study

		Credits
Term 1		
BMES 124	Biomedical Engineering Freshman Seminar I	1.0
CHEM 101	General Chemistry I	3.5
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGR 100	Beginning Computer Aided Drafting for Design	1.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
MATH 121	Calculus I	4.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV R101	The Drexel Experience	1.0
Term Credits		18.5
Term 2		
BMES 126	Biomedical Engineering Freshman Seminar II	1.0
CHEM 102	General Chemistry II	4.5
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
MATH 122	Calculus II	4.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		19.5
Term 3		
BIO 122	Cells and Genetics	4.5
BMES 130	Problem Solving in Biomedical Engineering	2.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGR 103	Engineering Design Laboratory III	2.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		19.5
Term 4		
BIO 201	Human Physiology I	4.0
BMES 201	Programming and Modeling for Biomedical Engineers I	3.0
ENGR 220	Fundamentals of Materials	4.0
ENGR 231	Linear Engineering Systems	3.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		18.0
Term 5		
BIO 203	Human Physiology II	4.0
BMES 202	Programming and Modeling for Biomedical Engineers II	3.0
BMES 212	The Body Synthetic	3.0
ENGR 210	Introduction to Thermodynamics	3.0
ENGR 232	Dynamic Engineering Systems	3.0
MEM 202	Statics	3.0
Term Credits		19.0
Term 6		
BMES 301	Laboratory I: Experimental Biomechanics (Laboratory Requirement)	2.0
BMES 302	Laboratory II: Biomeasurements	2.0
BMES 325	Principles of Biomedical Engineering I	3.0
BMES 372	Biosimulation	3.0
ECE 201	Foundations of Electric Circuits	3.0
Term Credits		13.0
Term 7		
BMES 303	Laboratory III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 326	Principles of Biomedical Engineering II	3.0
ECES 301	Transform Methods and Filtering	4.0
General Studies Elective		3.0
Term Credits		16.0
Term 8		
BMES 338	Biomedical Ethics and Law	3.0

BMES 381	Junior Design Seminar I	2.0
BMES 411	Chronoengineering I: Biological Rhythms in Health and Performance	3.0
PSY 101	General Psychology I	3.0
HIST 285	Technology in Historical Perspective	4.0
Term Credits		15.0
Term 9		
BMES 375	Computational Bioengineering	4.0
BMES 382	Junior Design Seminar II	2.0
BMES 451	Transport Phenomena in Living Systems	4.0
ECES 304	Dynamic Systems and Stability	4.0
PSY 213	Sensation and Perception	3.0
Term Credits		17.0
Term 10		
BIO 462	Biology of Neuron Function	3.0
BMES 401	Biosensors I	4.0
BMES 430	Neural Aspects of Posture and Locomotion	3.0
BMES 491 [WI]	Senior Design Project I	3.0
ECES 356	Theory of Control	4.0
Term Credits		17.0
Term 11		
BMES 305	Laboratory V: Musculoskeletal Anatomy for Biomedical Engineers (Laboratory Requirement)	2.0
BMES 405	Physiological Control Systems	3.0
BMES 477	Neuroengineering I: Neural Signals	3.0
BMES 492	Senior Design Project II	2.0
General Studies Elective		3.0
Term Credits		13.0
Term 12		
BMES 478	Neuroengineering II: Principles of Neuroengineering	3.0
BMES 493	Senior Design Project III	3.0
General Studies Electives (2)		6.0
Term Credits		12.0

Total Credit: 197.5

Opportunities

Metropolitan Philadelphia has one of the highest concentrations of medical institutions and pharmaceutical and biotechnology industries in the nation. The bachelor of science degree in biomedical engineering gives students access to a broad spectrum of career opportunities in medical device and equipment industry; prosthetics and assist devices industry; biomaterials and implants industry; and the telemedicine, pharmaceutical, biotechnology, and agricultural sectors.

Biomedical engineering graduates are also ideally prepared for professional education in medicine, dentistry, veterinary medicine, and law. Those who choose to pursue graduate education can aim for careers in research and development, biomedical technology innovation and transfer, as well as health care technology management.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

The School of Education

The School of Education offers Pennsylvania Department of Education-approved programs to certify students who want to become teachers. Undergraduate students have the option to choose from a variety of traditional full-time and non-traditional part-time on-campus and online programs. These programs are designed to meet the needs of a variety of diverse learners who wish to pursue a bachelor's degree and Pennsylvania State Certification in elementary (grades PreK-4), middle level (grades 4-8) and/or secondary (grades 7-9).

School of Education undergraduate students have the option to choose from the following program options: BS on-campus (full or part-time) taking day or evening courses, or the part-time Online BS Degree completion program. In addition, any Drexel non-education undergraduate student who is interested in becoming a teacher has the option to enroll in either the BS/MS or BA/MS Dual Degree programs (4 or 5 year options) regardless of their major.

The School of Education (<http://www.drexel.edu/soe>) seeks to enrich knowledge and practice related to lifespan learning, based on the most current and appropriate research and practice. Our goal is to improve human understanding through programs and activities that emphasize creative uses of human effort, technology, leadership, and problem solving.

Majors

- Elementary Education (BS) (p. 401)
 - PK-4 (p. 403)
 - PK-4 and Special Education (p. 406)
 - Middle Level Math and English (p. 410)
 - Middle Level Science and Math (p. 413)
 - Middle Level Science and English (p. 416)
- Learning, Culture and Technology (BS) (p. 419)
- Teacher Education (BS) (p. 423)
 - Biology (p. 425)
 - Chemistry (p. 428)
 - Earth and Space Science (p. 431)
 - English (p. 435)
 - General Science (p. 438)
 - Mathematics (p. 441)
 - Physics (p. 444)
 - Social Studies (p. 447)

Minor

- Education (p. 450)
- STEM Education (p. 451)

Certificates

- Creativity and Innovation (p. 451)

About the Curriculum

The School of Education's programs apply the most updated trends in theory, instruction, and leadership, with an emphasis on effective teaching integrating the sciences, enhancing teaching by using technology, two central components of every Drexel Education. In addition, this is the only

such program in the country to incorporate a six-month paid internship in industry related to the student's area of certification or individual interest.

Certification for classroom instruction is organized according to the two majors, the BS in Elementary Education and the BS in Secondary Education. Below is a list of all certification areas currently offered by the School of Education.

- Elementary education
 - Elementary: PK-4
 - Elementary: PK-4 and Special Education
 - Middle Level Math and English
 - Middle Level Science and English
 - Middle Level Science and Math
- Secondary education (grades 7-12)
 - Biology
 - Chemistry
 - Earth and Space Science
 - English
 - General Science
 - Mathematics
 - Physics
 - Social Studies
 - Environmental Education (grades K-12)

Students may acquire certification in more than one subject area.

The School of Education uses university-wide resources to prepare fully qualified teachers at both the elementary and secondary levels. The Teacher Education Program at Drexel University is closely aligned with National INTASC Teaching Standards as well as the Pennsylvania Department of Education's Four Domains for Professional Teaching. In addition, the Teacher Ed Program has identified seven **Program Outcomes**, which identify the specific qualities that set the Drexel Teacher Candidate apart from other candidates in the field. These program outcomes are directly aligned with the Drexel University Student Learning Priorities (DSLIP). It is expected that students exiting the Teacher Education Program at Drexel University will exhibit these seven standards in his/her professional teaching practice.

Program Outcomes:

1. The teacher candidate demonstrates independent and creative academic leadership skills that can be applied in the classroom, school community and the profession.
2. The teacher candidate understands the changing role of the educator in an increasingly diverse society, and applies this understanding in the classroom, school community and profession.
3. The teacher candidate holds a global perspective on current issues in education, understands best pedagogical practices, and utilizes this knowledge in the classroom, school community and profession.
4. The teacher candidate recognizes the importance of the application of educational research as a tool to explore critical aspects of teaching and learning in PK-12 setting.
5. The teacher candidate demonstrates a strong academic background in all subject areas that meet PDE content requirements, with strong emphasis on mathematics and science.

6. The teacher candidate can effectively integrate tools of technology in curriculum, assessment and instruction to enhance PK-12 student learning.

7. The teacher candidate demonstrates the ability to reflect upon one's professional practice through the successful completion of course work and engagement in experiential learning to promote positive, transformative change within the profession.

Pennsylvania Instructional I Teaching Certifications

There are multiple ways for Drexel University students to obtain their initial and add-on teaching certifications in Pennsylvania while pursuing their current major at Drexel. Education majors have the opportunity to achieve these certifications through the Bachelors of Science Education program, the BS/MS dual degree, the graduate level Post-baccalaureate (PBC) and Masters (MS) in Teaching Learning and Curriculum programs.

Non-teaching education majors may have the opportunity to build teacher certification into their program of study as electives, depending on their major. Those students who cannot manage the whole certification program may opt to participate in the (non-certification) education minor. Undergraduate students also have the option to enroll in as many content courses as can be managed in their undergraduate degree and then finish their teaching certification requirements through the Post-baccalaureate Teaching Certification or Masters in Teaching Learning and Curriculum programs. Additionally, undergraduate non-education majors can pursue a Master's degree in Teaching, Learning, and Curriculum with Teaching Certification through the BA/MS or BS/MS dual degree route while in their current major provided they meet and maintain the program's minimum criteria of a 3.0 cumulative GPA requirement and have completed no more than 90-120 credits at Drexel at the time of applying for the dual degree program.

*Please note that during a Drexel student's senior year, undergraduate students have the option to take up to and including 9 graduate credits in core pedagogy education courses that can be applied to a future graduate level Post-baccalaureate Teacher Certification or MS degree program at Drexel provided that these graduate credits are not required for UG degree completion and the student received a minimum grade of a "B" in those graduate courses.

Please be advised that the Pennsylvania Department of Education requires that all teacher certification candidates must maintain a 3.0 GPA in their degree or certification program in order to be recommended for state certification.

Combination certifications are available from the School of Education. Sample combinations include:

- Grades PreK-4 certification, with certification in Special Education.
- Biology certification, with courses for additional certification in chemistry.
- Chemistry certification, with courses for additional certification in biology.
- Earth and space science certification, with courses for additional certification in chemistry.
- Earth and space science certification, with courses for additional certification in physics.
- Mathematics certification, with courses for additional certification in physics.

- Physics certification, with courses for additional certification in mathematics.

Students pursuing the appropriate majors in the College of Arts and Sciences may also complete the requirements for certification within their area of study.

For more information, please contact the Program Manager or the School of Education at 215.895.6770.

Post-Graduate Opportunities

Students obtain employment in the School District of Philadelphia and neighboring school districts in Pennsylvania and such surrounding states as New Jersey, Delaware, Ohio, and New York. Often, students begin a graduate degree program in combination with their employment.

Writing-Intensive Course Requirements

In order to graduate, all students must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog may indicate that this course can fulfill a writing-intensive requirement. For the most up-to-date list of writing-intensive courses being offered, students should check the Writing Intensive Course List on the Drexel University Writing Center web page. Students scheduling their courses in Banner/DrexelOne can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term.

Cooperative Education

Drexel University has long been known for its co-operative education program, through which students combine periods of full-time, career-related employment with their studies. Internship employment is a requirement for all teacher education majors.

The BS degree is completed in four years. In addition to the Pennsylvania Department of Education's (PDE) state mandated field experiences and 12 week student teaching, this program includes one six-month internship period of full-time employment related to the student's initial area of teacher certification. The goal of the co-op program in teacher education is to provide real-world experiences for future teachers to use in their classrooms.

Students typically participate in co-ops during their fall and winter terms of their sophomore year and pursue varied positions geared directly to their area(s) of certification. Candidates are asked to pursue a position that would allow them to see other areas of education that reach beyond K-12 teaching. This caveat to the requirement allows candidates to understand the broadness and extensive nature of the field of education both nationally and internationally.

Students have interned in a variety of institutions or museums such as the Philadelphia School District, the Philadelphia's Please Touch Museum, Drexel's Academy of Natural Science (<http://www.ansp.org>) Museum (<http://www.ansp.org>), the Philadelphia Dream Academy, Children's Hospital of Philadelphia, and the Franklin Institute Science Museum just to name a few.

While the BS/MS 5 year dual degree program offers both a co-op, PA state mandated field experiences and student teaching, the BS/MS 4 year dual degree program only requires the PA state mandated field experiences and student teaching, not a co-op experience.

Facilities

The Drexel Center for the Prevention of School-aged Violence is located within the School of Education at Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104. The mission of the center is to create public awareness around the need for youth-focused, evidence-based efforts aimed at preventing youth violence from occurring in environments where youth grow, learn, and recreate.

Our vision is to help ensure that all youth possess the requisite social and cognitive skills to prevent violence on their own, which includes developing conflict resolution and mediation skills. We also strive to inform policy leaders and stakeholders of the various types of evidence-based activities that prevent school-aged violence.

The Math Forum is a leading center for mathematics and mathematics education on the Internet. Operating under Drexel's School of Education, our mission is to provide resources, materials, activities, person-to-person interactions, and educational products and services that enrich and support teaching and learning in an increasingly technological world.

For more information about these and other School of Education centers, visit the School of Education (<http://www.drexel.edu/soe>) website.

Elementary Education

Major: Elementary Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0 - 188.5

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1202; 13.1311; 13.1316

Standard Occupational Classification (SOC) code: 25-2022

About the Program

Elementary school teachers instruct classes of children in several subjects. Often they work as part of a team with other teachers who are jointly responsible for a group of students in at least one subject.

The BS in Elementary Education uses university-wide resources to prepare fully qualified teachers at the primary education levels. Students in the School of Education participate in one six-month cooperative education (co-op) experience in a professional position related to their area of certification.

Primary teacher certification options include:

- Pre-Kindergarten - Grade 4 (p. 403)
- Pre-Kindergarten - Grade 4 & Special Education (p. 406)
- Middle Level (grades 4-8) Mathematics and English (p. 410)
- Middle Level (grades 4-8) Science and English (p. 416)
- Middle Level (grades 4-8) Science and Mathematics (p. 413)

Students may acquire certification in more than one subject area.

The program requires that students have a B average (3.0 GPA) in content courses needed for teacher certification in addition to the grade

of B or better in each EDUC course throughout their time in the program. These requirements must be satisfied in order for Drexel to recommend the student for teacher certification upon graduation and/or be considered to have completed the program.

A benchmark to assist students in meeting the GPA and B grade requirements is the formal review of each student's content and pedagogy coursework at the end of the sophomore year. Students who meet these requirements, as well as pass the *Pre-Professional Skills Test* (PPST Reading, PPST Writing, PPST Mathematics) of the *ETS Praxis Exams* according to Pennsylvania standards at that time, are officially accepted into Drexel's Teacher Preparation Program. Students who do not meet the requirements work with their academic advisor to develop a plan of action to work toward meeting the requirements, continue in the program to work toward the BS degree without being recommended for a teaching certificate, or explore another major.

Students participate in classroom observations and limited direct teaching experiences as a component of many of their pedagogy courses beginning in their freshman year. Students have the option of the following teacher certification/concentration tracks within their major which determines their individual program of study:

Elementary Education, Pre-Kindergarten through Grade 4: Focused study to work with children in pre-kindergarten, kindergarten, and grades 1-4 across subject areas (ages 3-9). The competencies for this concentration include child development (birth through age 5), language development, early literacy and math foundations for preschool years, early intervention, integrating the arts for the developing child and family and community partnerships.

Elementary Education, Pre-Kindergarten through Grade 4 and Special Education: Focused study to work with children in pre-kindergarten, kindergarten, and grades 1-4 across subject areas (ages 3-9) within the competencies listed previously as well as working with students with disabilities in pre-kindergarten, kindergarten and grades 1-8 (ages 3-14). The special education competencies emphasize the Response to Intervention process, working with students at risk for and with/without disabilities, progress monitoring techniques, research-based instructional practices and interventions.

Elementary Education, Middle Level: Focused study to work with students in grades 4-6 across subjects and with students in grades 7-8 in two core academic subject(s) the teacher education candidate chooses to pursue:

- Middle School Mathematics & English
- Middle School Science & English
- Middle School Science & Math

In the senior year, students who are officially accepted into the Teacher Preparation Program and maintain the GPA and grade requirements, enroll and complete the 12-week, full-time, student-teaching experience in their primary area of certification. Students must receive a grade of at least B in (and if applicable) and in all pedagogy (EDUC) coursework, as well as maintain an overall 3.0 GPA to be recommended for teacher certification.

Students who were not officially accepted into the Teacher Preparation Program and/or do not maintain the GPA and grade requirements but who are working towards the BS degree without being recommended for teacher certification take other courses as assigned by the Teacher

Education Program Director and/or academic advisor to fulfill needed credits for the degree in lieu of student teaching.

Students pursuing the appropriate majors in the College of Arts and Sciences may also complete the requirements for certification within their area of study. For more information, contact the Program Coordinator for the School of Education at 215-895-6770.

Additional information is available at the School of Education's (<http://www.drexel.edu/soe>) web site.

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Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Elementary Education: PK-4

Major: Elementary Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: One Co-op (Four years)

Classification of Instructional (CIP) code: 13.1202

Standard Occupational Classification (SOC) code: 25-2021

About the Concentration

This certification option within the BS in Elementary Education (p. 401) enables teachers to work with children in pre-kindergarten, kindergarten, and grades 1 through 4 (ages 3-9) across subject areas. Required competencies are covered in areas such as child development, language development, early literacy and math foundations for preschool years, early intervention, integrating the arts for the developing child, and family and community partnerships.

Additional Information

For more information about the program, visit the School of Education (<http://drexel.edu/soe>) website.

Degree Requirements

General Education/Content Requirements

BIO 100	Applied Cells, Genetics & Physiology	3.0
BIO 101	Applied Biological Diversity, Ecology & Evolution	3.0
CHEM 111	General Chemistry I	4.0
COM 111	Principles of Communication	3.0
COOP 101	Career Management and Professional Development	0.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0

ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENVS 260	Environmental Science and Society	3.0
HIST 275	History of Pennsylvania	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	3.0
NFS 100	Nutrition, Foods, and Health	2.0
PHYS 151	Applied Physics	3.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
PSY 330	Cognitive Psychology	3.0
SOC 335	Sociology of Education	3.0
UNIV T101	The Drexel Experience	2.0
English (Literature) elective course between 200-329		3.0
Free electives		15.0
Pedagogy Requirements		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar (enroll 3 times)	3.0
EDUC 120	Child Development I: Typical Development	3.0
EDUC 121	Child Development II: Atypical Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 210	Early Language Development	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 236	Early Literacy I	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 306	Assessment of Young Children I	3.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 314	Science Teaching Methods	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 326 [WI]	Language Arts Processes	3.0
EDUC 335	Engaging the Learner	3.0
EDUC 336	Early Literacy II	3.0
EDUC 338	Expressive Arts for PK-4	3.0
EDUC 355	Social Studies Teaching Methods	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
EDUC 411	Family and Community Partnerships	3.0
MTED 417	Mathematics Methods and Content: Early Childhood	3.0
MTED 418	Mathematics Methods and Content	3.0
Student Teaching Experience		
EDUC 409	Student Teaching Seminar I	9.0
EDUC 410 [WI]	Student Teaching	9.0
Total Credits		180.0

Elementary PK-4 Concentration: Plan of Study

4 YR UG Co-op Concentration

Term 1		Credits
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 120	Child Development I: Typical Development	3.0

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 181	Mathematical Analysis I	3.0
PSY 101	General Psychology I	3.0
UNIV T101	The Drexel Experience	1.0
Term Credits		17.0

Term 2		
BIO 100	Applied Cells, Genetics & Physiology	3.0
COM 111	Principles of Communication	3.0
COOP 001	Co-op Essentials	0.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 121	Child Development II: Atypical Development	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 182	Mathematical Analysis II	3.0
UNIV T101	The Drexel Experience	1.0
Term Credits		17.0

Term 3		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 314	Science Teaching Methods	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	3.0
Term Credits		16.0

Term 4		
BIO 101	Applied Biological Diversity, Ecology & Evolution	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 236	Early Literacy I	3.0
NFS 100	Nutrition, Foods, and Health	2.0
ENGL 200 Through ENGL 329		3.0
Term Credits		15.0

Term 5		
EDUC 265	Instructing English Language Learners	3.0
EDUC 326 [WI]	Language Arts Processes	3.0
HIST 275	History of Pennsylvania	3.0
PHYS 151	Applied Physics	3.0
Free Elective		3.0
Term Credits		15.0

Term 6		
ECON 201	Principles of Microeconomics	4.0
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0
EDUC 210	Early Language Development	3.0
EDUC 216	Diversity and Today's Teacher	3.0
Term Credits		13.0

Term 7		
CHEM 111	General Chemistry I	4.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
PSY 320 [WI]	Educational Psychology	3.0
SOC 335	Sociology of Education	3.0
Term Credits		17.0

Term 8		
EDUC 306	Assessment of Young Children I	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 335	Engaging the Learner	3.0
EDUC 355	Social Studies Teaching Methods	3.0
ENVS 260	Environmental Science and Society	3.0
MTED 418	Mathematics Methods and Content	3.0
Term Credits		18.0

Term 9		
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EDUC 336	Early Literacy II	3.0
EDUC 338	Expressive Arts for PK-4	3.0
MTED 417	Mathematics Methods and Content: Early Childhood	3.0
PSY 330	Cognitive Psychology	3.0
Free Elective		3.0
Term Credits		15.0
Term 10		
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 409	Student Teaching Seminar I	9.0
Term Credits		12.0
Term 11		
EDUC 410 [WI]	Student Teaching	9.0
EDUC 411	Family and Community Partnerships	3.0
Term Credits		12.0
Term 12		
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
Free Electives		9.0
Term Credits		13.0

Total Credit: 180.0

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Elementary Education: PK-4 and Special Education

Major: Elementary Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 183.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1202

Standard Occupational Classification (SOC) code: 25-2052

About the Concentration

This certification option within the BS in Elementary Education (p. 401) enables teachers to work with children in pre-kindergarten, kindergarten, and grades 1 through 4 (ages 3-9) across subject areas, with the addition of being specialized to work with students at risk for disabilities or with disabilities. As with the Elementary PK-4 certification, the program covers required competencies such as child development, language development, early literacy and math foundations for preschool years, early intervention, integration of the arts for the developing child, and family and community partnerships.

Improvements in the diagnosis of learning disabilities at earlier ages have resulted in an increase in the number of students requiring special

education. This program is designed to provide the information necessary to: understand the complexities of the disabled learner's needs; modify a curriculum appropriately; provide remedial instruction; use technology to address the learner's needs/progress; manage instruction for students with special needs in the inclusive classroom; as well as additional approaches to assessment and special education teaching techniques.

Additional Information

For more information about the program, visit the School of Education (<http://drexel.edu/soe>) website.

Degree Requirements

General Education/Content Requirements

BIO 100	Applied Cells, Genetics & Physiology	3.0
BIO 101	Applied Biological Diversity, Ecology & Evolution	3.0
CHEM 111	General Chemistry I	4.0
COM 111	Principles of Communication	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENVS 260	Environmental Science and Society	3.0
HIST 275	History of Pennsylvania	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	3.0
NFS 100	Nutrition, Foods, and Health	2.0
PHYS 151	Applied Physics	3.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
PSY 330	Cognitive Psychology	3.0
SOC 335	Sociology of Education	3.0
UNIV T101	The Drexel Experience	2.0
English (Literature) Elective: select course between ENGL 200-329		3.0
Free Electives		3.0

Pedagogy Requirements

EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 120	Child Development I: Typical Development	3.0
EDUC 121	Child Development II: Atypical Development	3.0
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 236	Early Literacy I	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 306	Assessment of Young Children I	3.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 314	Science Teaching Methods	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 326 [WI]	Language Arts Processes	3.0
EDUC 335	Engaging the Learner	3.0
EDUC 336	Early Literacy II	3.0
EDUC 338	Expressive Arts for PK-4	3.0

EDUC 355	Social Studies Teaching Methods	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
EDUC 411	Family and Community Partnerships	3.0
MTED 417	Mathematics Methods and Content: Early Childhood	3.0
MTED 418	Mathematics Methods and Content	3.0

Special Education Core Courses

EDEX 347	Special Education Processes PreK-8	3.0
EDEX 348	Emotional and Behavioral Support of Individuals with Disabilities	3.0
EDEX 349	High Incident Disabilities	3.0
EDEX 350	Teaching Individuals with Low Incident Disabilities	3.0
EDEX 351	Pervasive Developmental Disorders	3.0
EDEX 352	Integrating Technology for Learning & Achievement	3.0
EDEX 353	Special Education: Methods & Practices PreK-8	3.0

Student Teaching Experience

EDUC 409	Student Teaching Seminar I	9.0
EDEX 414 [WI]	Special Education Field Placement Seminar	9.0
Total Credits		183.0

Elementary PK-4 and Special Education Concentration: Plan of Study

4 YR UG Co-op

Term 1		Credits
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 120	Child Development I: Typical Development	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 181	Mathematical Analysis I	3.0
PSY 101	General Psychology I	3.0
UNIV T101	The Drexel Experience	1.0
	Term Credits	17.0

Term 2		Credits
BIO 100	Applied Cells, Genetics & Physiology	3.0
COM 111	Principles of Communication	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 121	Child Development II: Atypical Development	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 182	Mathematical Analysis II	3.0
UNIV T101	The Drexel Experience	1.0
	Term Credits	17.0

Term 3		Credits
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 314	Science Teaching Methods	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	3.0
	Term Credits	16.0

Term 4		Credits
NFS 100	Nutrition, Foods, and Health	2.0
BIO 101	Applied Biological Diversity, Ecology & Evolution	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 236	Early Literacy I	3.0
ENGL 200 through ENGL 329		3.0
	Term Credits	15.0

Term 5		Credits
EDUC 265	Instructing English Language Learners	3.0

EDUC 326 [WI]	Language Arts Processes	3.0
HIST 275	History of Pennsylvania	3.0
PHYS 151	Applied Physics	3.0
Term Credits		12.0
Term 6		
ECON 201	Principles of Microeconomics	4.0
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0
EDEX 347	Special Education Processes PreK-8	3.0
EDEX 349	High Incident Disabilities	3.0
EDUC 216	Diversity and Today's Teacher	3.0
Term Credits		16.0
Term 7		
CHEM 111	General Chemistry I	4.0
EDEX 352	Integrating Technology for Learning & Achievement	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
PSY 320 [WI]	Educational Psychology	3.0
SOC 335	Sociology of Education	3.0
Term Credits		17.0
Term 8		
EDEX 348	Emotional and Behavioral Support of Individuals with Disabilities	3.0
EDUC 306	Assessment of Young Children I	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 335	Engaging the Learner	3.0
EDUC 355	Social Studies Teaching Methods	3.0
MTED 418	Mathematics Methods and Content	3.0
Term Credits		18.0
Term 9		
EDEX 351	Pervasive Developmental Disorders	3.0
EDUC 336	Early Literacy II	3.0
EDUC 338	Expressive Arts for PK-4	3.0
MTED 417	Mathematics Methods and Content: Early Childhood	3.0
Free Elective		3.0
Term Credits		15.0
Term 10		
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 409	Student Teaching Seminar I	9.0
Term Credits		12.0
Term 11		
EDEX 350	Teaching Individuals with Low Incident Disabilities	3.0
EDEX 414 [WI]	Special Education Field Placement Seminar	9.0
EDUC 411	Family and Community Partnerships	3.0
Term Credits		15.0
Term 12		
EDEX 353	Special Education: Methods & Practices PreK-8	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
ENVS 260	Environmental Science and Society	3.0
PSY 330	Cognitive Psychology	3.0
Term Credits		13.0

Total Credit: 183.0

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William Lynch, PhD (*University of Maryland*). Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.

Constance Lyttle, PhD, JD (*University of Pittsburgh, Duquesne University*). Associate Clinical Professor. Legal rights of gifted and talented children and children with disabilities; inclusive education of exceptional children; special education mediation; special education IEP/IFSP facilitation; resolution session facilitation

Kenneth Mawritz, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Educational administration

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). Associate Clinical Professor. Curriculum and instruction K-16; teaching English as a foreign language (TEFL); instructional design business education and administration; industrial and career technology; oral and written communication; research methodology; instructional and assistive technology assessment; online learning pedagogy

Kathleen Provinzano, PhD (*Marywood University*). Associate Clinical Professor. Educational administration.

Fredricka K. Reisman, PhD (*Syracuse University*) Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Lori Severino, EdD (*Neumann University*). Assistant Clinical Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). Associate Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

Brian Smith, PhD (*Northwestern University*). Professor. Design of computer-based learning environments; Human-computer interaction; Design sciences.

Toni A. Sondergeld, PhD (*University of Toledo*). Associate Professor. Cognitive and affective assessment development; program/grant evaluation; high stakes testing measurement; STEM education; urban education

Nancy Butler Songer, PhD (*University of California, Davis*) Dean, School of Education. Distinguished Professor. STEM education, urban education, educational assistance

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*). Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Elementary Education: Middle Level Math and English

Major: Elementary Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: One Co-op (Four years)

Classification of Instructional (CIP) code: 13.1202

Standard Occupational Classification (SOC) code: 25-2022

About the Concentration

This certification option within the BS in Elementary Education (p. 401) enables to teachers to work with students in grades 4-6 across subjects, and with students in grades 7-8 in the core academic subjects of mathematics and English.

This program addresses the complexities of adolescent development, through discussion of theories. It explores the middle school environment, developmentally appropriate middle school programs, strategies for supporting students through the transition to middle school, and the impact of peer pressure on the middle school child.

In addition, this certification area provides: (1) training in how to effectively deliver standards-based academic math content, based on age-appropriate understanding, individual and groups needs; (2) courses devoted to teaching; age-appropriate; reading skills, how to teach and assess writing effectively, as well as a specialized course in the genre of young adult fiction.

Additional Information

For more information about the program, visit the School of Education (<http://drexel.edu/soe>) website.

Degree Requirements

General Education/Content Requirements

ARTH 101	History of Art I: Ancient to Medieval	3.0
BIO 161	General Biology I	3.0
BIO 162	General Biology II	3.0
CHEM 111	General Chemistry I	4.0
COM 111	Principles of Communication	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGL 304	Young Adult Fiction	3.0
ENVS 260	Environmental Science and Society	3.0
Select one of the following		4.0
HIST 201	United States History to 1815	

	or HIST 202 United States History, 1815-1900 or HIST 203 United States History since 1900	
HIST 275	History of Pennsylvania	3.0
LING 101	Introduction to Linguistics	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	3.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
PHYS 151	Applied Physics	3.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
PSY 330	Cognitive Psychology	3.0
SOC 335	Sociology of Education	4.0
UNIV T101	The Drexel Experience	2.0
Free electives		5.0
Pedagogy Requirements		
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 115	Reasoning about Numbers and Quantity (4-8)	3.0
EDUC 123	Adolescent Development	3.0
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 240	Proportional Reasoning in Middle School	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0
EDUC 256	Teaching Writing Grades 4-8	3.0
EDUC 257	Content Area Reading (Grades 4-8)	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 285	Teaching Physical Science in the Middle School	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 306	Assessment of Young Children I	3.0
EDUC 307	Assessment of Young Children II	4.0
EDUC 310	Computer Applications in Teaching	3.0
EDUC 314	Science Teaching Methods	3.0
EDUC 318	Math Methods & Content: Elementary	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 326 [WI]	Language Arts Processes	3.0
EDUC 328	Language Arts Processes 4-8	3.0
EDUC 355	Social Studies Teaching Methods	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
EDUC 416	Introduction to Math Teaching Methods (4-8)	3.0
EDUC 417	Advanced Math Teaching Methods (4-8)	3.0
EDUC 432	Algebraic Reasoning	3.0
EDUC 433	Functions in Middle School Math	3.0
Student Teaching Experience		
EDUC 410 [WI]	Student Teaching	9.0
Total Credits		180.0

Middle Level Math and English: Plan of Study

4 YR UG Co-op Concentration /Middle Level Math & English

Term 1		Credits
BIO 161	General Biology I	3.0

EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0	EDUC 307	Assessment of Young Children II	4.0
EDUC 105	Freshman Pedagogy Seminar	1.0	EDUC 310	Computer Applications in Teaching	3.0
EDUC 123	Adolescent Development	3.0	EDUC 326 [WI]	Language Arts Processes	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0	EDUC 416	Introduction to Math Teaching Methods (4-8)	3.0
MATH 181	Mathematical Analysis I	3.0	EDUC 432	Algebraic Reasoning	3.0
UNIV T101	The Drexel Experience	1.0		Term Credits	16.0
	Term Credits	17.0	Term 10		
Term 2			EDUC 417	Advanced Math Teaching Methods (4-8)	3.0
COM 111	Principles of Communication	3.0	EDUC 433	Functions in Middle School Math	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0	MUSC 130	Introduction to Music	3.0
EDUC 115	Reasoning about Numbers and Quantity (4-8)	3.0	NFS 100	Nutrition, Foods, and Health	2.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0	NFS 101	Introduction to Nutrition & Food	1.0
MATH 182	Mathematical Analysis II	3.0	PSY 330	Cognitive Psychology	3.0
UNIV T101	The Drexel Experience	1.0		Term Credits	15.0
	Term Credits	14.0	Term 11		
Term 3			EDUC 405	Senior Pedagogy Seminar	1.0
EDEX 142	Special Education Foundations: Referral and Assessment	3.0	EDUC 410 [WI]	Student Teaching	9.0
EDUC 105	Freshman Pedagogy Seminar	1.0	Free Elective		3.0
EDUC 314	Science Teaching Methods	3.0		Term Credits	13.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0	Term 12		
LING 101	Introduction to Linguistics	3.0	ARTH 101	History of Art I: Ancient to Medieval	3.0
MATH 183	Mathematical Analysis III	3.0	ENGL 304	Young Adult Fiction	3.0
	Term Credits	16.0	Select one of the following:		4.0
Term 4			HIST 201	United States History to 1815	
BIO 162	General Biology II	3.0	HIST 202	United States History, 1815-1900	
EDEX 244	Inclusionary Practices for Exceptional Students	3.0	HIST 203	United States History since 1900	
EDUC 205	Sophomore Pedagogy Seminar	1.0	Free Elective		2.0
EDUC 223	Teaching the Middle School Child	3.0		Term Credits	12.0
EDUC 285	Teaching Physical Science in the Middle School	3.0	Total Credit: 180.0		
PSY 101	General Psychology I	3.0			
	Term Credits	16.0			
Term 5					
EDUC 240	Proportional Reasoning in Middle School	3.0			
EDUC 265	Instructing English Language Learners	3.0			
EDUC 328	Language Arts Processes 4-8	3.0			
PHYS 151	Applied Physics	3.0			
HIST 275	History of Pennsylvania	3.0			
	Term Credits	15.0			
Term 6					
ECON 201	Principles of Microeconomics	4.0			
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0			
EDUC 216	Diversity and Today's Teacher	3.0			
EDUC 257	Content Area Reading (Grades 4-8)	3.0			
	Term Credits	13.0			
Term 7					
CHEM 111	General Chemistry I	4.0			
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0			
EDUC 324	Current Research in Curriculum & Instruction	3.0			
EDUC 325	Multimedia in Instructional Design	3.0			
PSY 320 [WI]	Educational Psychology	3.0			
SOC 335	Sociology of Education	4.0			
	Term Credits	18.0			
Term 8					
EDUC 256	Teaching Writing Grades 4-8	3.0			
EDUC 306	Assessment of Young Children I	3.0			
EDUC 355	Social Studies Teaching Methods	3.0			
ENVS 260	Environmental Science and Society	3.0			
EDUC 318	Math Methods & Content: Elementary	3.0			
	Term Credits	15.0			
Term 9					

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Kristine Lewis-Grant, PhD (*Temple University*). Associate Clinical Professor. Experiences of students of African descent at predominantly white colleges and universities, college access and college student development, youth civic engagement in urban school reform, qualitative research and evaluation.

William Lynch, PhD (*University of Maryland*). Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.

Constance Lyttle, PhD, JD (*University of Pittsburgh, Duquesne University*). Associate Clinical Professor. Legal rights of gifted and talented children and children with disabilities; inclusive education of exceptional children; special education mediation; special education IEP/IFSP facilitation; resolution session facilitation

Kenneth Mawritz, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Educational administration

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). Associate Clinical Professor. Curriculum and instruction K-16; teaching

English as a foreign language (TEFL); instructional design business education and administration; industrial and career technology; oral and written communication; research methodology; instructional and assistive technology assessment; online learning pedagogy

Kathleen Provinzano, PhD (*Marywood University*). Associate Clinical Professor. Educational administration.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Lori Severino, EdD (*Neumann University*). Assistant Clinical Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). Associate Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

Brian Smith, PhD (*Northwestern University*). Professor. Design of computer-based learning environments; Human-computer interaction; Design sciences.

Toni A. Sondergeld, PhD (*University of Toledo*). Associate Professor. Cognitive and affective assessment development; program/grant evaluation; high stakes testing measurement; STEM education; urban education

Nancy Butler Songer, PhD (*University of California, Davis*) *Dean, School of Education*. Distinguished Professor. STEM education, urban education, educational assistance

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*). Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Elementary Education: Middle Level Science and Math

Major: Elementary Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: One Co-op (Four years)

Classification of Instructional (CIP) code: 13.1202

Standard Occupational Classification (SOC) code: 25-2022

About the Concentration

This certification option within the BS in Elementary Education (p. 401) enables to teachers to work with students in grades 4-6 across subjects, and with students in grades 7-8 in the core academic subjects of science and mathematics.

This program addresses the complexities of adolescent development, through discussion of theories. It explores the middle school environment, developmentally appropriate middle school programs, strategies for supporting students through the transition to middle school, and the impact of peer pressure on the middle school child.

In addition, this certification area provides: (1) training in how to effectively deliver standards-based academic math content, based on age-appropriate understanding, individual and groups needs; (2) training and methodology for teaching physical and life sciences (including using an inquiry-based model of learning, developing authentic assessments, drawing upon a variety of tools, creating and maintaining a safe laboratory) as well as other skills necessary to meet the needs of diverse learners in science education.

Additional Information

For more information about the program, visit the School of Education (<http://drexel.edu/soe>) website.

Degree Requirements

General Education/Content Requirements

ARTH 101	History of Art I: Ancient to Medieval	3.0
BIO 161	General Biology I	3.0
BIO 162	General Biology II	3.0
CHEM 111	General Chemistry I	4.0
COM 111	Principles of Communication	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENVS 260	Environmental Science and Society	3.0
Select one of the following		4.0
HIST 201	United States History to 1815	
	or HIST 202 United States History, 1815-1900	
	or HIST 203 United States History since 1900	

HIST 275	History of Pennsylvania	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	3.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
PHYS 151	Applied Physics	3.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
PSY 330	Cognitive Psychology	3.0
SOC 335	Sociology of Education	3.0
UNIV T101	The Drexel Experience	2.0
Free electives		12.0

Pedagogy Requirements

EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0

EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 115	Reasoning about Numbers and Quantity (4-8)	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 240	Proportional Reasoning in Middle School	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 284	Teaching Life Science in the Middle School	3.0
EDUC 285	Teaching Physical Science in the Middle School	3.0
EDUC 286	Teaching Earth & Space Science for Middle School	3.0
EDUC 292	Science Methods for Middle School	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 306	Assessment of Young Children I	3.0
EDUC 307	Assessment of Young Children II	3.0
EDUC 310	Computer Applications in Teaching	3.0
EDUC 314	Science Teaching Methods	3.0
EDUC 315	Secondary Science Teaching Methods	3.0
EDUC 318	Math Methods & Content: Elementary	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 355	Social Studies Teaching Methods	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
EDUC 416	Introduction to Math Teaching Methods (4-8)	3.0
EDUC 417	Advanced Math Teaching Methods (4-8)	3.0
EDUC 432	Algebraic Reasoning	3.0
EDUC 433	Functions in Middle School Math	3.0
Student Teaching Experience		
EDUC 410 [WI]	Student Teaching	9.0
Total Credits		180.0

Middle Level Science and Math Concentration: Plan of Study

4 YR UG Co-op Concentration

		Credits
Term 1		
BIO 161	General Biology I	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 181	Mathematical Analysis I	3.0
UNIV T101	The Drexel Experience	1.0
Term Credits		17.0
Term 2		
COM 111	Principles of Communication	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 182	Mathematical Analysis II	3.0
MUSC 130	Introduction to Music	3.0
UNIV T101	The Drexel Experience	1.0
Term Credits		14.0
Term 3		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 115	Reasoning about Numbers and Quantity (4-8)	3.0
EDUC 314	Science Teaching Methods	3.0

ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 183	Mathematical Analysis III	3.0
Term Credits		16.0
Term 4		
BIO 162	General Biology II	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 223	Teaching the Middle School Child	3.0
HIST 275	History of Pennsylvania	3.0
Free Elective		3.0
Term Credits		16.0
Term 5		
EDUC 240	Proportional Reasoning in Middle School	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 284	Teaching Life Science in the Middle School	3.0
EDUC 285	Teaching Physical Science in the Middle School	3.0
PHYS 151	Applied Physics	3.0
Term Credits		15.0
Term 6		
ECON 201	Principles of Microeconomics	4.0
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0
EDUC 216	Diversity and Today's Teacher	3.0
PSY 101	General Psychology I	3.0
Free Elective		3.0
Term Credits		16.0
Term 7		
CHEM 111	General Chemistry I	4.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
PSY 320 [WI]	Educational Psychology	3.0
SOC 335	Sociology of Education	3.0
Term Credits		17.0
Term 8		
EDUC 306	Assessment of Young Children I	3.0
EDUC 318	Math Methods & Content: Elementary	3.0
EDUC 355	Social Studies Teaching Methods	3.0
EDUC 315	Secondary Science Teaching Methods	3.0
ENVS 260	Environmental Science and Society	3.0
Term Credits		15.0
Term 9		
EDUC 286	Teaching Earth & Space Science for Middle School	3.0
EDUC 307	Assessment of Young Children II	4.0
EDUC 310	Computer Applications in Teaching	3.0
EDUC 416	Introduction to Math Teaching Methods (4-8)	3.0
EDUC 432	Algebraic Reasoning	3.0
Term Credits		16.0
Term 10		
EDUC 292	Science Methods for Middle School	3.0
EDUC 417	Advanced Math Teaching Methods (4-8)	3.0
EDUC 433	Functions in Middle School Math	3.0
PSY 330	Cognitive Psychology	3.0
Term Credits		12.0
Term 11		
EDUC 405	Senior Pedagogy Seminar	1.0
EDUC 410 [WI]	Student Teaching	9.0
Free Elective		3.0
Term Credits		13.0
Term 12		
ARTH 101	History of Art I: Ancient to Medieval	3.0
NFS 100	Nutrition, Foods, and Health	2.0

NFS 101	Introduction to Nutrition & Food	1.0
Select one of the following:		4.0
HIST 201	United States History to 1815	
HIST 202	United States History, 1815-1900	
HIST 203	United States History since 1900	
Free Electives		3.0
Term Credits		13.0

Total Credit: 180.0

Education Faculty

Jennifer Adams, EdD (*Harvard University*). Associate Professor. Comparative and international education; Poverty and education; Child welfare; Educational policy.

Ayana Allen, PhD (*Texas A&M University*). Assistant Professor. Urban education; Identity construction in school contexts; Urban school transformation.

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W. Edward Bureau, PhD (*University of Pennsylvania*). Associate Clinical Professor. Leadership, supervision, and capacity development.

Jamie Callahan, EdD (*George Washington University*). Clinical Professor. Leadership; Sociological explorations of emotions occurring in organizational contexts; Organizational development; Contextual issues confronting organizations, such as organizational leadership, organizational culture, and communities of practice.

Holly Carpenter, PhD (*Arizona State University*). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Assistant Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Clinical Director and Research Fellow, A.J. Drexel Autism Institute*. Associate Professor. Identifying the variables that influence adult behavior change in community settings; autism intervention; widespread dissemination of evidence-based interventions in school and community settings.

D. Brent Edwards, PhD (*University of Maryland*). Assistant Clinical Professor. Global and international education

Salvatore V. Falletta, EdD (*North Carolina State University*). Associate Clinical Professor. Human Resource intelligence (i.e., HR research and analytics practices); HRD assessment, measurement, and evaluation models and taxonomies; organizational diagnostic models; web-based employee and organizational survey methods, and computational modeling.

Arotis N. Foster, PhD (*Michigan State University*). Associate Professor. Educational psychology and educational technology, especially the following: Motivation; Technological Pedagogical Content Knowledge

(TPACK); Immersive Interactive Digital Environments (simulation, games, virtual realities.

Kathy Geller, PhD (*Fielding Graduate University*). Assistant Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*). Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

Roger Geertz Gonzalez, PhD (*Pennsylvania State University*). Associate Clinical Professor. Civic engagement, college student identity development, indigenous higher education, comparative higher education access policies.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Associate Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Mary Jo Grdina, PhD (*Case Western Reserve University*). Associate Clinical Professor. Undergraduate studies, science education, curriculum design.

Dominic F. Gullo, PhD (*Indiana University*) *Associate Dean of Research*. Professor. Studying the relative and long-range effects of early schooling experiences in prekindergarten and kindergarten on children's achievement and social adaptation to school routine.

Penny Hammrich, PhD (*University of Minnesota*) *Associate Dean for Graduate Studies*. Professor. Urban education; science education; genetics; gender equity; science knowledge for conceptual teaching; sport science.

Paul Harrington, PhD (*University of Massachusetts, Boston*) *Director, Center for Labor Markets and Policy*. Professor. Teen and young adult job access; economic outlook, college labor market; workforce development, planning, and development; vocational rehabilitation and job market transition.

Elizabeth Haslam, PhD (*University of Pennsylvania*). Associate Clinical Professor. Educational field coordinator, instructional design, qualitative evaluation, writing across the curriculum.

Michael J. Haslip, PhD (*Old Dominion University*). Assistant Professor. Early childhood education, social and emotional learning, child guidance strategies, effects of public pre-school attendance.

Marlene Hilkwitz, M.Ed (*Temple University*). Assistant Clinical Professor. Science education; Curriculum development; Student engagement

Deanna Hill, JD, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Associate Dean for Academic Affairs*. Professor. Urban education, access and equity, high school dropout, parent involvement/family involvement, community engagement in research.

Jennifer Katz-Buonincontro, PhD (*University of Oregon*). Associate Professor. Educational administration, leadership development, survey & instrument design.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Assistant Clinical Professor. Sociology of gender and development; anthropology of policy;

comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Valerie Klein, PhD (*Amherst College*). Assistant Clinical Professor. Mathematics learning and teaching; teacher's use of formative assessment in mathematics; creating opportunities for rich problem solving in the classroom; examining teachers growth and change; qualitative research methods.

Vera Lee, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Practitioner Research in online courses to explore inservice/preservice teachers' emerging understandings about issues of diversity; the development of information/digital literacies of urban youth; English language learners.

Bruce Levine, JD (*New York University*). Assistant Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). Associate Clinical Professor. Experiences of students of African descent at predominantly white colleges and universities, college access and college student development, youth civic engagement in urban school reform, qualitative research and evaluation.

William Lynch, PhD (*University of Maryland*). Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.

Constance Lyttle, PhD, JD (*University of Pittsburgh, Duquesne University*). Associate Clinical Professor. Legal rights of gifted and talented children and children with disabilities; inclusive education of exceptional children; special education mediation; special education IEP/IFSP facilitation; resolution session facilitation

Kenneth Mawritz, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Educational administration

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). Associate Clinical Professor. Curriculum and instruction K-16; teaching English as a foreign language (TEFL); instructional design business education and administration; industrial and career technology; oral and written communication; research methodology; instructional and assistive technology assessment; online learning pedagogy

Kathleen Provinzano, PhD (*Marywood University*). Associate Clinical Professor. Educational administration.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Lori Severino, EdD (*Neumann University*). Assistant Clinical Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). Associate Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

Brian Smith, PhD (*Northwestern University*). Professor. Design of computer-based learning environments; Human-computer interaction; Design sciences.

Toni A. Sondergeld, PhD (*University of Toledo*). Associate Professor. Cognitive and affective assessment development; program/grant evaluation; high stakes testing measurement; STEM education; urban education

Nancy Butler Songer, PhD (*University of California, Davis*) *Dean, School of Education*. Distinguished Professor. STEM education, urban education, educational assistance

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*). Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Elementary Education: Middle Level Science and English

Major: Elementary Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0

Co-op Options: One Co-op (Four years)

Classification of Instructional (CIP) code: 13.1202

Standard Occupational Classification (SOC) code: 25-2022

About the Concentration

This certification option within the BS in Elementary Education (p. 401) enables to teachers to work with students in grades 4-6 across subjects, and with students in grades 7-8 in the core academic subjects of science and English.

This program addresses the complexities of adolescent development, through discussion of theories. It explores the middle school environment, developmentally appropriate middle school programs, strategies for supporting students through the transition to middle school, and the impact of peer pressure on the middle school child.

In addition, this certification area provides: (1) training and methodology for teaching physical and life sciences (including using an inquiry-based model of learning, developing authentic assessments, drawing upon a variety of tools, creating and maintaining a safe laboratory) as well as other skills necessary to meet the needs of diverse learners in science education; (2) courses devoted to teaching age-appropriate reading skills, how to teach and assess writing effectively, as well as a specialized course in the genre of young adult fiction.

Additional Information

For more information about the program, visit the School of Education (<http://drexel.edu/soe>) website.

Degree Requirements

General Education/Content Requirements

ARTH 101	History of Art I: Ancient to Medieval	3.0
BIO 161	General Biology I	3.0
BIO 162	General Biology II	3.0
CHEM 111	General Chemistry I	4.0
COM 111	Principles of Communication	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGL 304	Young Adult Fiction	3.0
ENVS 260	Environmental Science and Society	3.0
Select one of the following		4.0
HIST 201	United States History to 1815	
or HIST 202	United States History, 1815-1900	
or HIST 203	United States History since 1900	
HIST 275	History of Pennsylvania	3.0
LING 101	Introduction to Linguistics	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	3.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
PHYS 151	Applied Physics	3.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
PSY 330	Cognitive Psychology	3.0
SOC 335	Sociology of Education	3.0
UNIV T101	The Drexel Experience	2.0
Free electives		21.0
Pedagogy Requirements		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 256	Teaching Writing Grades 4-8	3.0
EDUC 257	Content Area Reading (Grades 4-8)	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 284	Teaching Life Science in the Middle School	3.0
EDUC 285	Teaching Physical Science in the Middle School	3.0
EDUC 286	Teaching Earth & Space Science for Middle School	3.0
EDUC 292	Science Methods for Middle School	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 306	Assessment of Young Children I	3.0
EDUC 307	Assessment of Young Children II	4.0
EDUC 310	Computer Applications in Teaching	3.0
EDUC 318	Math Methods & Content: Elementary	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0

EDUC 325	Multimedia in Instructional Design	3.0
EDUC 328	Language Arts Processes 4-8	3.0
EDUC 355	Social Studies Teaching Methods	3.0
EDUC 405	Senior Pedagogy Seminar	1.0

Student Teaching Experience

EDUC 410 [WI]	Student Teaching	9.0
Total Credits		180.0

Middle Level Science and English: Plan of Study

4 YR UG Co-op Concentration

Term 1		Credits
BIO 161	General Biology I	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 181	Mathematical Analysis I	3.0
UNIV T101	The Drexel Experience	1.0
Term Credits		17.0
Term 2		
COM 111	Principles of Communication	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 182	Mathematical Analysis II	3.0
MUSC 130	Introduction to Music	3.0
UNIV T101	The Drexel Experience	1.0
Term Credits		14.0
Term 3		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
LING 101	Introduction to Linguistics	3.0
MATH 183	Mathematical Analysis III	3.0
Term Credits		13.0
Term 4		
BIO 162	General Biology II	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 223	Teaching the Middle School Child	3.0
HIST 275	History of Pennsylvania	3.0
PSY 101	General Psychology I	3.0
Term Credits		16.0
Term 5		
EDUC 265	Instructing English Language Learners	3.0
EDUC 284	Teaching Life Science in the Middle School	3.0
EDUC 285	Teaching Physical Science in the Middle School	3.0
EDUC 328	Language Arts Processes 4-8	3.0
PHYS 151	Applied Physics	3.0
Term Credits		15.0
Term 6		
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 257	Content Area Reading (Grades 4-8)	3.0
ENGL 304	Young Adult Fiction	3.0
Free Elective		3.0
Term Credits		15.0
Term 7		

CHEM 111	General Chemistry I	4.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
PSY 320 [WI]	Educational Psychology	3.0
SOC 335	Sociology of Education	3.0
Term Credits		17.0
Term 8		
EDUC 256	Teaching Writing Grades 4-8	3.0
EDUC 306	Assessment of Young Children I	3.0
EDUC 318	Math Methods & Content: Elementary	3.0
EDUC 355	Social Studies Teaching Methods	3.0
ENVS 260	Environmental Science and Society	3.0
Term Credits		15.0
Term 9		
EDUC 286	Teaching Earth & Space Science for Middle School	3.0
EDUC 307	Assessment of Young Children II	4.0
EDUC 310	Computer Applications in Teaching	3.0
Free Elective		3.0
Term Credits		13.0
Term 10		
ECON 201	Principles of Microeconomics	4.0
EDUC 292	Science Methods for Middle School	3.0
PSY 330	Cognitive Psychology	3.0
Free Elective		6.0
Term Credits		16.0
Term 11		
EDUC 405	Senior Pedagogy Seminar	1.0
EDUC 410 [WI]	Student Teaching	9.0
Free Elective		3.0
Term Credits		13.0
Term 12		
ARTH 101	History of Art I: Ancient to Medieval	3.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
Select one of the following:		4.0
HIST 201	United States History to 1815	
HIST 202	United States History, 1815-1900	
HIST 203	United States History since 1900	
Free Elective		6.0
Term Credits		16.0

Total Credit: 180.0

Education Faculty

Jennifer Adams, EdD (*Harvard University*). Associate Professor. Comparative and international education; Poverty and education; Child welfare; Educational policy.

Ayana Allen, PhD (*Texas A&M University*). Assistant Professor. Urban education; Identity construction in school contexts; Urban school transformation.

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in organizational contexts; Organizational development; Contextual issues confronting organizations, such as organizational leadership, organizational culture, and communities of practice.

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Learning, Culture and Technology

Major: Learning, Culture, and Technology

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 181.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.0401; 13.0501; 13.0607

Standard Occupational Classification (SOC) code: 11-3131; 15-1132; 15-1134; 25-9031

About the Program

The Bachelor of Science major in Learning, Culture, and Technology (LCT) prepares students to build the next generation of information and computing technology for learning. Students learn interdisciplinary skills and knowledge necessary to design, develop, and implement technology-enhanced learning environments for a variety of settings.

Students in the major will be exposed to three major themes in their coursework:

1. *Cognition and Learning*: Cognitive/mental processes and representations underlying knowledge and skill acquisition
2. *Culture and Society*: Social, cultural, and organizational aspects of teaching and learning, in and outside of schools
3. *Design and Technology*: Design and evaluation techniques to enable the development of new and emerging technologies to support learning and teaching

Work across these themes is coordinated to facilitate the development of expertise on the design of learning technologies grounded in strong theories of learning for a wide range of educational contexts (e.g., classrooms, museum exhibits, after-school, summer camps, etc.), audiences (e.g., teachers, students, corporations, children, adults, etc.), and learning environments.

The curriculum combines knowledge of how people learn, learning technology design, and child/adolescent development from the School of Education with design courses in the Westphal College of Media Arts & Design and computational thinking courses in the College of Computing and Informatics. Co-op experiences may include work within Drexel University's Innovation Neighborhood, Philadelphia schools, and software and design firms with a need for individuals with training in both learning theories and computational design.

Graduates of the program will have strong skills in applying theory to the creation of educational and learning environments. With hands-on courses focused on human learning and technology design, the Learning, Culture, and Technology major combines expertise in the foundations of education with design and technical expertise that is central for best practices of the application, development, and use of technologies throughout our lifetimes.

Degree Requirements

General Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
BIO 100	Applied Cells, Genetics & Physiology	3.0
BIO 101	Applied Biological Diversity, Ecology & Evolution	3.0
CHEM 111	General Chemistry I	4.0
COM 111	Principles of Communication	3.0
CRTV 301	Foundations in Creativity	3.0
CRTV 303	Creativity in the Workplace	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0

ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Literature Requirement (Select one from between ENGL 200 - ENGL 335)		3.0
American History Requirement (Select one from HIST 201 - HIST 203)		3.0
INFO 105	Introduction to Informatics	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	3.0
PHYS 151	Applied Physics	3.0
PSY 101	General Psychology I	3.0
PSY 330	Cognitive Psychology	3.0
SOC 335	Sociology of Education	3.0

Education Requirements

EDLT 103	Foundation in Education III: Learning Sciences	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 102	Foundations in Education II: Contemporary Issues	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0

(Students enroll in EDUC 105 three times; Fall, Winter and Spring of Freshman Year)

EDUC 120	Child Development I: Typical Development	3.0
EDUC 123	Adolescent Development	3.0
EDUC 201	Instructional Issues	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 335	Engaging the Learner	3.0

Learning, Culture & Technology Program Requirements

ANTH 370	Ethnographic Methods	3.0
CS 140	Introduction to Multimedia Programming	3.0
DIGM 223	Creative Concept Design	3.0
EDLT 101	Learning, Culture & Technology Workshop I	3.0
EDLT 201	Learning, Culture and Technology Workshop II	3.0
EDLT 238	New Media Literacies	3.0
EDLT 250	Sociocultural Perspectives on Learning	3.0
EDLT 301	Learning, Culture & Technology Workshop III	3.0
EDLT 339	Future Pedagogies	3.0
EDLT 353	Play and Learning in Participatory Cultures	3.0
EDLT 354	Learning In and Out of Schools	3.0
EDLT 491	Senior Project I	3.0
EDLT 492	Senior Project II	3.0
EDLT 493	Senior Project III	3.0
EHRD 205	Organizational Learning & Strategy	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 240	Introduction to Data Science	3.0
WEST 465	Special Topics in Media, Arts and Design	3.0

Electives 24.0

(Students are encouraged to work with their Advisor to select a minor)

Other University Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
UNIV 101	The Drexel Experience	1.0

Total Credits 181.0

Sample Plan of Study

Term 1		Credits
EDLT 101	Learning, Culture & Technology Workshop I	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0

EDUC 120	Child Development I: Typical Development	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 181	Mathematical Analysis I	3.0
UNIV 101	The Drexel Experience	1.0
Term Credits		17.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
CS 140	Introduction to Multimedia Programming	3.0
EDUC 102	Foundations in Education II: Contemporary Issues	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 182	Mathematical Analysis II	3.0
Term Credits		14.0
Term 3		
COM 111	Principles of Communication	3.0
EDLT 103	Foundation in Education III: Learning Sciences	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
INFO 110	Human-Computer Interaction I	3.0
MATH 183	Mathematical Analysis III	3.0
Term Credits		16.0
Term 4		
DIGM 223	Creative Concept Design	3.0
EDLT 201	Learning, Culture and Technology Workshop II	3.0
INFO 105	Introduction to Informatics	3.0
PSY 101	General Psychology I	3.0
PHYS 151	Applied Physics	3.0
Term Credits		15.0
Term 5		
CRTV 301	Foundations in Creativity	3.0
ECON 201	Principles of Microeconomics	4.0
EDLT 238	New Media Literacies	3.0
EHRD 205	Organizational Learning & Strategy	3.0
Term Credits		13.0
Term 6		
ANTH 101	Introduction to Cultural Diversity	3.0
BIO 100	Applied Cells, Genetics & Physiology	3.0
COOP 101	Career Management and Professional Development	0.0
EDLT 339	Future Pedagogies	3.0
EDUC 123	Adolescent Development	3.0
SOC 335	Sociology of Education	3.0
Term Credits		15.0
Term 7		
BIO 101	Applied Biological Diversity, Ecology & Evolution	3.0
EDLT 353	Play and Learning in Participatory Cultures	3.0
EDUC 201	Instructional Issues	3.0
ENGL 200 - ENGL 335		3.0
Free elective		3.0
Term Credits		15.0
Term 8		
CRTV 303	Creativity in the Workplace	3.0
EDLT 301	Learning, Culture & Technology Workshop III	3.0
EDLT 354	Learning In and Out of Schools	3.0
Free elective		3.0
HIST 201 - HIST 203		3.0
Term Credits		15.0
Term 9		
EDLT 250	Sociocultural Perspectives on Learning	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 335	Engaging the Learner	3.0

Free electives		6.0
Term Credits		15.0
Term 10		
CHEM 111	General Chemistry I	4.0
EDLT 491	Senior Project I	3.0
INFO 240	Introduction to Data Science	3.0
PSY 330	Cognitive Psychology	3.0
WEST 465	Special Topics in Media, Arts and Design	3.0
Term Credits		16.0
Term 11		
ANTH 370	Ethnographic Methods	3.0
EDLT 492	Senior Project II	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
Free elective		3.0
Term Credits		15.0
Term 12		
EDLT 493	Senior Project III	3.0
MUSC 130	Introduction to Music	3.0
Free electives		9.0
Term Credits		15.0

Total Credit: 181.0

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BS in Teacher Education

Major: Teacher Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0 - 191.5

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1205

Standard Occupational Classification (SOC) code: 25-2031

About the Program

The Bachelor of Science in Teacher Education program uses university-wide resources to prepare fully qualified teachers at the secondary education levels in various subjects of certification. The program applies the microcomputer in teaching and learning, and it is the only such program in the country to incorporate a six-month paid internship in industry related to the student's area of certification (for example, a prospective chemistry teacher might co-op at a chemical company).

Students pursuing the appropriate majors in the College of Arts and Sciences may also complete the requirements for certification within their area of study.

The BS in Teacher Education, is focused on secondary education, and provides graduates with the background to work with students in grades 7-12* in a specific subject area. Students may work with their academic advisor to satisfy teacher certification requirements for multiple areas if desired. Available certification areas include:

- Biology (p. 425)
- Chemistry (p. 428)
- Earth & Space Science (p. 431)
- English (p. 435)
- General Science (p. 438)
- Mathematics (p. 441)
- Physics (p. 444)
- Social Studies (p. 447)

The program requires that students have a B average (3.0 GPA) in content courses needed for teacher certification in addition to the grade of B or better in each EDUC course throughout their time in the program. These requirements must be satisfied in order for Drexel to recommend the student for teacher certification upon graduation and/or be considered to have completed the program.

A benchmark to assist students in meeting the GPA and B grade requirements is the formal review of each student's content and pedagogy coursework at the end of the sophomore year. Students who meet these requirements, as well as pass the *Pre-Professional Skills Test* (PPST Reading, PPST Writing, PPST Mathematics) of the *ETS Praxis Exams* according to Pennsylvania standards at that time, are officially accepted into Drexel's Teacher Preparation Program. Students who do not meet the requirements work with their academic advisor to develop a plan of action to work toward meeting the requirements, continue in the program to work toward the BS degree without being recommended for a teaching certificate, or explore another major.

Students participate in classroom observations and limited direct teaching experiences as a component of many of their pedagogy courses beginning in their freshman year.

In the senior year, students who are officially accepted into the Teacher Preparation Program and maintain the GPA and grade requirements, enroll and complete the 12-week, full-time, student-teaching experience () in their primary area of certification. Students must receive a grade of at least B in (and if applicable) and in all pedagogy (EDUC) coursework, as well as maintain an overall 3.0 GPA to be recommended for teacher certification.

Students who were not officially accepted into the Teacher Preparation Program and/or do not maintain the GPA and grade requirements but who are working towards the BS degree without being recommended for teacher certification take other courses as assigned by the Teacher Education Program Director and/or academic advisor to fulfill needed credits for the degree in lieu of student teaching.

Students pursuing the appropriate majors in the College of Arts and Sciences may also complete the requirements for certification within their area of study. For more information, contact the Program Coordinator for the School of Education at 215-895-6770.

Additional information is available at the School of Education's (<http://www.drexel.edu/soe>) web site.

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Constance Lyttle, PhD, JD (*University of Pittsburgh, Duquesne University*). Associate Clinical Professor. Legal rights of gifted and talented children and children with disabilities; inclusive education of exceptional children; special education mediation; special education IEP/IFSP facilitation; resolution session facilitation

Kenneth Mawritz, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Educational administration

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). Associate Clinical Professor. Curriculum and instruction K-16; teaching English as a foreign language (TEFL); instructional design business education and administration; industrial and career technology; oral and written communication; research methodology; instructional and assistive technology assessment; online learning pedagogy

Kathleen Provinzano, PhD (*Marywood University*). Associate Clinical Professor. Educational administration.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Lori Severino, EdD (*Neumann University*). Assistant Clinical Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). Associate Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

Brian Smith, PhD (*Northwestern University*). Professor. Design of computer-based learning environments; Human-computer interaction; Design sciences.

Toni A. Sondergeld, PhD (*University of Toledo*). Associate Professor. Cognitive and affective assessment development; program/grant

evaluation; high stakes testing measurement; STEM education; urban education

Nancy Butler Songer, PhD (*University of California, Davis*) *Dean, School of Education*. Distinguished Professor. STEM education, urban education, educational assistance

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*). Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Teacher Education: Biology

Major: Teacher Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 183.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1205

Standard Occupational Classification (SOC) code: 25-2031

About the Biology Concentration

Certification is for grades 7- 12

This certification option within the BS in Teacher Education (p. 423) emphasizes coursework in the biological sciences, including genetics, morphology and physiology, biochemistry, microbiology, and ecology. Students may also choose to pursue a second certification in chemistry and/or environmental education.

Additional Information

For more information about the program, visit the School of Education (<http://www.drexel.edu/soe>) website.

Degree Requirements

Degree Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 289	History of Science: Enlightenment to Modernity	4.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
UNIV T101	The Drexel Experience	1.0
Science Requirements		
BIO 122	Cells and Genetics	4.5

BIO 124	Evolution & Organismal Diversity	4.5
BIO 126	Physiology and Ecology	4.5
BIO 201	Human Physiology I	4.0
BIO 215 [WI]	Techniques in Cell Biology	3.0
BIO 218	Principles of Molecular Biology	4.0
BIO 220	Essential Microbiology	3.0
BIO 228	Evolutionary Biology & Human Health	3.0
BIO 270	Development Biology	3.0
BIO 271	Developmental Biology Laboratory	2.0
BIO 306	Biochemistry Laboratory	2.0
BIO 404	Structure and Function of Biomolecules	4.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
CHEM 244	Organic Chemistry Laboratory I	3.0
ENVS 230	General Ecology	3.0
ENVS 284	Physiological and Population Ecology	3.0
PHYS 131	Survey of the Universe	3.0
PHYS 152	Introductory Physics I	4.0
Pedagogy Requirements		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 315	Secondary Science Teaching Methods	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
Student Teaching Experience		
EDUC 409	Student Teaching Seminar I	9.0
EDUC 410 [WI]	Student Teaching	9.0
Total Credits		184.5

Biology Concentration: Plan of Study

Term 1		Credits
BIO 122	Cells and Genetics	4.5
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV T101	The Drexel Experience	1.0
Term Credits		16.5
Term 2		
BIO 124	Evolution & Organismal Diversity	4.5
CIVC 101	Introduction to Civic Engagement	1.0

EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
Term Credits		16.5
Term 3		
BIO 126	Physiology and Ecology	4.5
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
Term Credits		18.5
Term 4		
BIO 201	Human Physiology I	4.0
BIO 218	Principles of Molecular Biology	4.0
CHEM 101	General Chemistry I	3.5
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
Term Credits		15.5
Term 5		
BIO 215 [WI]	Techniques in Cell Biology	3.0
BIO 220	Essential Microbiology	3.0
CHEM 102	General Chemistry II	4.5
EDUC 223	Teaching the Middle School Child	3.0
EDUC 322	Evaluation of Instruction	3.0
Term Credits		16.5
Term 6		
BIO 270	Development Biology	3.0
BIO 271	Developmental Biology Laboratory	2.0
COOP 101	Career Management and Professional Development	0.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
PHYS 152	Introductory Physics I	4.0
Term Credits		16.0
Term 7		
CHEM 241	Organic Chemistry I	4.0
CHEM 244	Organic Chemistry Laboratory I	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
PSY 101	General Psychology I	3.0
Term Credits		13.0
Term 8		
BIO 228	Evolutionary Biology & Human Health	3.0
CHEM 242	Organic Chemistry II	4.0
EDUC 315	Secondary Science Teaching Methods	3.0
English Literature Elective 200-379		3.0
Term Credits		13.0
Term 9		
BIO 306	Biochemistry Laboratory	2.0
BIO 404	Structure and Function of Biomolecules	4.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
ENVS 230	General Ecology	3.0
Term Credits		18.0
Term 10		
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 409	Student Teaching Seminar I	9.0
Term Credits		12.0

Term 11		
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 410 [WI]	Student Teaching	9.0
Term Credits		12.0
Term 12		
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
ENVS 284	Physiological and Population Ecology	3.0
HIST 289	History of Science: Enlightenment to Modernity	4.0
PHIL 251	Ethics	3.0
PSY 320 [WI]	Educational Psychology	3.0
Term Credits		17.0

Total Credit: 184.5

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Paul Harrington, PhD (*University of Massachusetts, Boston*) *Director, Center for Labor Markets and Policy*. Professor. Teen and young adult job access; economic outlook, college labor market; workforce development, planning, and development; vocational rehabilitation and job market transition.

Elizabeth Haslam, PhD (*University of Pennsylvania*). Associate Clinical Professor. Educational field coordinator, instructional design, qualitative evaluation, writing across the curriculum.

Michael J. Haslip, PhD (*Old Dominion University*). Assistant Professor. Early childhood education, social and emotional learning, child guidance strategies, effects of public pre-school attendance.

Marlene Hilkwitz, M.Ed (*Temple University*). Assistant Clinical Professor. Science education; Curriculum development; Student engagement

Deanna Hill, JD, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Associate Dean for Academic Affairs*. Professor. Urban education, access and equity, high school dropout, parent involvement/family involvement, community engagement in research.

Jennifer Katz-Buonincontro, PhD (*University of Oregon*). Associate Professor. Educational administration, leadership development, survey & instrument design.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Assistant Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Valerie Klein, PhD (*Amherst College*). Assistant Clinical Professor. Mathematics learning and teaching; teacher's use of formative assessment in mathematics; creating opportunities for rich problem solving in the classroom; examining teachers growth and change; qualitative research methods.

Vera Lee, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Practitioner Research in online courses to explore inservice/preservice teachers' emerging understandings about issues of diversity; the development of information/digital literacies of urban youth; English language learners.

Bruce Levine, JD (*New York University*). Assistant Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). Associate Clinical Professor. Experiences of students of African descent at predominantly white colleges and universities, college access and college student development, youth civic engagement in urban school reform, qualitative research and evaluation.

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Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Teacher Education: Chemistry

Major: Teacher Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 185.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1205

Standard Occupational Classification (SOC) code: 25-2031

About the Concentration

Certification is for grades 7 - 12

This certification option within the BS in Teacher Education (p. 423) emphasizes coursework in such areas as organic chemistry, physical chemistry, biochemistry, analytical chemistry, and inorganic chemistry. Students may also choose to pursue a second certification in biology.

Additional Information

For more information about the program, visit the School of Education (<http://www.drexel.edu/soe>) website.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0

ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
English elective course between 200-329		3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0
PHIL 251	Ethics	3.0
PSY 320 [WI]	Educational Psychology	3.0
UNIV T101	The Drexel Experience	1.0

Science Requirements

BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
BIO 306	Biochemistry Laboratory	2.0
CHEC 352	Physical Chemistry and Applications II	4.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
CHEM 230	Quantitative Analysis	4.0
CHEM 231 [WI]	Quantitative Analysis Laboratory	2.0
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
CHEM 243	Organic Chemistry III	3.0
CHEM 244	Organic Chemistry Laboratory I	3.0
CHEM 245	Organic Chemistry Laboratory II	3.0
CHEM 253	Thermodynamics and Kinetics	4.0
CHEM 357 [WI]	Physical Chemistry Laboratory I	2.5
CHEM 420	Molecular Symmetry and Group Theory Applied Chemistry	3.0
CHEM 421	Inorganic Chemistry I	3.0
CHEM 430	Analytical Chemistry I	3.0
ENVS 401	Chemistry of the Environment	3.0
PHEV 145	Weather I: Climate and Global Change	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 201	Fundamentals of Physics III	4.0

Pedagogy Requirements

EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 315	Secondary Science Teaching Methods	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 405	Senior Pedagogy Seminar	1.0

Student Teaching Experiences

EDUC 409	Student Teaching Seminar I	9.0
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EDUC 410 [WI]	Student Teaching (Chemistry)	9.0
Total Credits		195.5

Chemistry Concentration: Plan of Study**4 YR UG Co-op Concentration**

Term 1		Credits
CHEM 101	General Chemistry I	3.5
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV T101	The Drexel Experience	1.0
Term Credits		15.5
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
CHEM 102	General Chemistry II	4.5
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
Term Credits		16.5
Term 3		
CHEM 103	General Chemistry III	5.0
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
Term Credits		19.0
Term 4		
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
CHEM 230	Quantitative Analysis	4.0
CHEM 231 [WI]	Quantitative Analysis Laboratory	2.0
CHEM 241	Organic Chemistry I	4.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
Term Credits		18.0
Term 5		
BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
CHEM 242	Organic Chemistry II	4.0
CHEM 244	Organic Chemistry Laboratory I	3.0
COOP 101	Career Management and Professional Development	0.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 322	Evaluation of Instruction	3.0
Term Credits		17.0
Term 6		
CHEM 243	Organic Chemistry III	3.0
CHEM 245	Organic Chemistry Laboratory II	3.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
PHYS 101	Fundamentals of Physics I	4.0
Term Credits		17.0
Term 7		
CHEM 420	Molecular Symmetry and Group Theory Applied Chemistry	3.0
CHEM 421	Inorganic Chemistry I	3.0

EDUC 312	Educational Policy, Law & Advocacy	3.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0
Term Credits		17.0
Term 8		
CHEM 253	Thermodynamics and Kinetics	4.0
EDUC 315	Secondary Science Teaching Methods	3.0
PHEV 145	Weather I: Climate and Global Change	4.0
PHYS 201	Fundamentals of Physics III	4.0
PSY 320 [WI]	Educational Psychology	3.0
Term Credits		18.0
Term 9		
BIO 306	Biochemistry Laboratory	2.0
CHEC 352	Physical Chemistry and Applications II	4.0
CHEM 357 [WI]	Physical Chemistry Laboratory I	2.5
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
Term Credits		17.5
Term 10		
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 409	Student Teaching Seminar I	9.0
Term Credits		12.0
Term 11		
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 410 [WI]	Student Teaching	9.0
Term Credits		12.0
Term 12		
CHEM 430	Analytical Chemistry I	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
ENVS 401	Chemistry of the Environment	3.0
PHIL 251	Ethics	3.0
English (ENGL) course between 200-239		3.0
Term Credits		16.0

Total Credit: 195.5

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Jennifer Adams, EdD (*Harvard University*). Associate Professor. Comparative and international education; Poverty and education; Child welfare; Educational policy.

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access; economic outlook, college labor market; workforce development, planning, and development; vocational rehabilitation and job market transition.

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Michael J. Haslip, PhD (*Old Dominion University*). Assistant Professor. Early childhood education, social and emotional learning, child guidance strategies, effects of public pre-school attendance.

Marlene Hilkowitz, M.Ed (*Temple University*). Assistant Clinical Professor. Science education; Curriculum development; Student engagement

Deanna Hill, JD, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Associate Dean for Academic Affairs*. Professor. Urban education, access and equity, high school dropout, parent involvement/family involvement, community engagement in research.

Jennifer Katz-Buonincontro, PhD (*University of Oregon*). Associate Professor. Educational administration, leadership development, survey & instrument design.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Assistant Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Valerie Klein, PhD (*Amherst College*). Assistant Clinical Professor. Mathematics learning and teaching; teacher's use of formative assessment in mathematics; creating opportunities for rich problem solving in the classroom; examining teachers growth and change; qualitative research methods.

Vera Lee, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Practitioner Research in online courses to explore inservice/preservice teachers' emerging understandings about issues of diversity; the development of information/digital literacies of urban youth; English language learners.

Bruce Levine, JD (*New York University*). Assistant Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). Associate Clinical Professor. Experiences of students of African descent at predominantly white colleges and universities, college access and college student development, youth civic engagement in urban school reform, qualitative research and evaluation.

William Lynch, PhD (*University of Maryland*). Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.

Constance Lyttle, PhD, JD (*University of Pittsburgh, Duquesne University*). Associate Clinical Professor. Legal rights of gifted and talented children and children with disabilities; inclusive education of exceptional children; special education mediation; special education IEP/IFSP facilitation; resolution session facilitation

Kenneth Mawritz, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Educational administration

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). Associate Clinical Professor. Curriculum and instruction K-16; teaching English as a foreign language (TEFL); instructional design business education and administration; industrial and career technology; oral and written communication; research methodology; instructional and assistive technology assessment; online learning pedagogy

Kathleen Provinzano, PhD (*Marywood University*). Associate Clinical Professor. Educational administration.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Lori Severino, EdD (*Neumann University*). Assistant Clinical Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). Associate Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

Brian Smith, PhD (*Northwestern University*). Professor. Design of computer-based learning environments; Human-computer interaction; Design sciences.

Toni A. Sondergeld, PhD (*University of Toledo*). Associate Professor. Cognitive and affective assessment development; program/grant evaluation; high stakes testing measurement; STEM education; urban education

Nancy Butler Songer, PhD (*University of California, Davis*) *Dean, School of Education*. Distinguished Professor. STEM education, urban education, educational assistance

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*). Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Teacher Education: Earth and Space Science

Major: Teacher Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 182.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1205

Standard Occupational Classification (SOC) code: 25-2031

About the Concentration

Certification is for grades 7 - 12

This option within the BS in Teacher Education (p. 423) emphasizes interdisciplinary study, involving coursework in biology, chemistry, geology, physics and atmospheric science. Students may also choose to pursue a second certification in chemistry or physics.

Additional Information

For more information about the program, visit the School of Education (<http://www.drexel.edu/soe>) website.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
UNIV T101	The Drexel Experience	1.0
	English elective course between 200-329	3.0

Science Requirements

BIO 122	Cells and Genetics	4.5
BIO 124	Evolution & Organismal Diversity	4.5
BIO 126	Physiology and Ecology	4.5
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENVS 230	General Ecology	3.0
ENVS 260	Environmental Science and Society	3.0
ENVS 284	Physiological and Population Ecology	3.0
ENVS 285 [WI]	Population Ecology Laboratory	2.0
ENVS 286	Community and Ecosystem Ecology	3.0
ENVS 287	Community Ecology Laboratory	2.0
ENVS 330	Aquatic Ecology	3.0
ENVS 390	Marine Ecology	3.0
ENVS 441 [WI]	Issues in Global Change I: Seminar	2.0
GEO 101	Physical Geology	4.0
GEO 102	History of the Earth	4.0
PHEV 145	Weather I: Climate and Global Change	4.0
PHEV 146	Weather II: Analysis and Forecasting	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 131	Survey of the Universe	3.0

Pedagogy Requirements

EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0

EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 315	Secondary Science Teaching Methods	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 405	Senior Pedagogy Seminar	1.0

Student Teaching Experiences

EDUC 409	Student Teaching Seminar I	9.0
EDUC 410 [WI]	Student Teaching	9.0

Total Credits 186.5

Earth and Space Science Concentration: Plan of Study

4 YR UG Co-op Concentration

Term 1		Credits
BIO 122	Cells and Genetics	4.5
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV T101	The Drexel Experience	1.0
	Term Credits	16.5

BIO 124	Evolution & Organismal Diversity	4.5
CIVC 101	Introduction to Civic Engagement	1.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
	Term Credits	16.5

BIO 126	Physiology and Ecology	4.5
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHEV 145	Weather I: Climate and Global Change	4.0
	Term Credits	18.5

EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
ENVS 230	General Ecology	3.0
MATH 123	Calculus III	4.0
PHYS 101	Fundamentals of Physics I	4.0
PSY 101	General Psychology I	3.0
	Term Credits	18.0

Term 5

COOP 101	Career Management and Professional Development	0.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 322	Evaluation of Instruction	3.0
GEO 102	History of the Earth	4.0
PHYS 102	Fundamentals of Physics II	4.0
English elective course between 200-329		3.0
Term Credits		17.0
Term 6		
CHEM 101	General Chemistry I	3.5
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
ENVS 284	Physiological and Population Ecology	3.0
ENVS 286	Community and Ecosystem Ecology	3.0
Term Credits		16.5
Term 7		
CHEM 102	General Chemistry II	4.5
EDUC 312	Educational Policy, Law & Advocacy	3.0
ENVS 285 [WI]	Population Ecology Laboratory	2.0
ENVS 441 [WI]	Issues in Global Change I: Seminar	2.0
GEO 101	Physical Geology	4.0
Term Credits		15.5
Term 8		
EDUC 315	Secondary Science Teaching Methods	3.0
ENVS 260	Environmental Science and Society	3.0
PSY 320 [WI]	Educational Psychology	3.0
PHEV 146	Weather II: Analysis and Forecasting	4.0
Term Credits		13.0
Term 9		
ECON 201	Principles of Microeconomics	4.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
ENVS 287	Community Ecology Laboratory	2.0
ENVS 390	Marine Ecology	3.0
Term Credits		18.0
Term 10		
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 409	Student Teaching Seminar I	9.0
Term Credits		12.0
Term 11		
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 410 [WI]	Student Teaching	9.0
Term Credits		12.0
Term 12		
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
ENVS 330	Aquatic Ecology	3.0
PHIL 251	Ethics	3.0
PHYS 131	Survey of the Universe	3.0
Term Credits		13.0

Total Credit: 186.5

Education Faculty

Jennifer Adams, EdD (*Harvard University*). Associate Professor. Comparative and international education; Poverty and education; Child welfare; Educational policy.

Ayana Allen, PhD (*Texas A&M University*). Assistant Professor. Urban education; Identity construction in school contexts; Urban school transformation.

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Jamie Callahan, EdD (*George Washington University*). Clinical Professor. Leadership; Sociological explorations of emotions occurring in organizational contexts; Organizational development; Contextual issues confronting organizations, such as organizational leadership, organizational culture, and communities of practice.

Holly Carpenter, PhD (*Arizona State University*). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Assistant Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Clinical Director and Research Fellow, A.J. Drexel Autism Institute*. Associate Professor. Identifying the variables that influence adult behavior change in community settings; autism intervention; widespread dissemination of evidence-based interventions in school and community settings.

D. Brent Edwards, PhD (*University of Maryland*). Assistant Clinical Professor. Global and international education

Salvatore V. Falletta, EdD (*North Carolina State University*). Associate Clinical Professor. Human Resource intelligence (i.e., HR research and analytics practices); HRD assessment, measurement, and evaluation models and taxonomies; organizational diagnostic models; web-based employee and organizational survey methods, and computational modeling.

Aroutis N. Foster, PhD (*Michigan State University*). Associate Professor. Educational psychology and educational technology, especially the following: Motivation; Technological Pedagogical Content Knowledge (TPACK); Immersive Interactive Digital Environments (simulation, games, virtual realities).

Kathy Geller, PhD (*Fielding Graduate University*). Assistant Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*). Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

Roger Geertz Gonzalez, PhD (*Pennsylvania State University*). Associate Clinical Professor. Civic engagement, college student identity development, indigenous higher education, comparative higher education access policies.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Associate Clinical Professor.

Change leadership, curriculum re-design, the impact of technology on learning.

Mary Jo Grdina, PhD (*Case Western Reserve University*). Associate Clinical Professor. Undergraduate studies, science education, curriculum design.

Dominic F. Gullo, PhD (*Indiana University*) *Associate Dean of Research*. Professor. Studying the relative and long-range effects of early schooling experiences in prekindergarten and kindergarten on children's achievement and social adaptation to school routine.

Penny Hammrich, PhD (*University of Minnesota*) *Associate Dean for Graduate Studies*. Professor. Urban education; science education; genetics; gender equity; science knowledge for conceptual teaching; sport science.

Paul Harrington, PhD (*University of Massachusetts, Boston*) *Director, Center for Labor Markets and Policy*. Professor. Teen and young adult job access; economic outlook, college labor market; workforce development, planning, and development; vocational rehabilitation and job market transition.

Elizabeth Haslam, PhD (*University of Pennsylvania*). Associate Clinical Professor. Educational field coordinator, instructional design, qualitative evaluation, writing across the curriculum.

Michael J. Haslip, PhD (*Old Dominion University*). Assistant Professor. Early childhood education, social and emotional learning, child guidance strategies, effects of public pre-school attendance.

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Valerie Klein, PhD (*Amherst College*). Assistant Clinical Professor. Mathematics learning and teaching; teacher's use of formative assessment in mathematics; creating opportunities for rich problem solving in the classroom; examining teachers growth and change; qualitative research methods.

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Constance Lyttle, PhD, JD (*University of Pittsburgh, Duquesne University*). Associate Clinical Professor. Legal rights of gifted and talented children and children with disabilities; inclusive education of exceptional children; special education mediation; special education IEP/IFSP facilitation; resolution session facilitation

Kenneth Mawritz, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Educational administration

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). Associate Clinical Professor. Curriculum and instruction K-16; teaching English as a foreign language (TEFL); instructional design business education and administration; industrial and career technology; oral and written communication; research methodology; instructional and assistive technology assessment; online learning pedagogy

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Lori Severino, EdD (*Neumann University*). Assistant Clinical Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). Associate Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

Brian Smith, PhD (*Northwestern University*). Professor. Design of computer-based learning environments; Human-computer interaction; Design sciences.

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Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Teacher Education: English

Major: Teacher Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.5

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1205

Standard Occupational Classification (SOC) code: 25-2031

About the Concentration

Certification is for grades 7 - 12

This certification option within the BS in Teacher Education (p. 423) emphasizes coursework in areas such as American and British Literature, young adult fiction, and techniques for effectively teaching reading and writing skills. Students may also choose to pursue a second certification in any of the other certification areas.

Additional Information

For more information about the program, visit the School of Education (<http://www.drexel.edu/soe>) website.

Degree Requirements

General Education Requirements

ARTH 101	History of Art I: Ancient to Medieval	3.0
CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENVS 260	Environmental Science and Society	3.0
Select one American History course:		3.0
HIST 201	United States History to 1815	
HIST 202	United States History, 1815-1900	
HIST 203	United States History since 1900	
INFO 101	Introduction to Information Technology	3.0
LING 101	Introduction to Linguistics	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	3.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
PSY 101	General Psychology I	3.0

PSY 320 [WI]	Educational Psychology	3.0
SOC 335	Sociology of Education	3.0
PHYS 181	Astronomy	3.0
WRIT 225 [WI]	Creative Writing	3.0
WRIT 301 [WI]	Writing Poetry	3.0
UNIV T101	The Drexel Experience	1.0

Science Sequence

Select one of the following:

CHEM 111	General Chemistry I	
CHEM 112	General Chemistry II	
or		
PHYS 103	General Physics I	
PHYS 104	General Physics II	

English Requirements (option to minor in English)

ENGL 200 [WI]	Classical to Medieval Literature	3.0
ENGL 201	Renaissance to the Enlightenment	3.0
ENGL 204	Post-Colonial Literature II	3.0
ENGL 205 [WI]	American Literature I	3.0
ENGL 206 [WI]	American Literature II	3.0
ENGL 211 [WI]	British Literature I	3.0
ENGL 212	British Literature II	3.0
ENGL 304	Young Adult Fiction	3.0
ENGL 325	Topics in World Literature	3.0
ENGL 335	Mythology	3.0
ENGL 355 [WI]	Women and Literature	3.0

Pedagogy Requirements

EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar (Enroll 3 times)	3.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 358	English Teaching Methods	3.0
EDUC 405	Senior Pedagogy Seminar	1.0

Student Teaching Experiences

EDUC 409	Student Teaching Seminar I	9.0
EDUC 410 [WI]	Student Teaching	9.0

Total Credits 182.0

English Concentration: Plan of Study

4 YR UG Co-op Concentration

Term 1		Credits
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 181	Mathematical Analysis I	3.0

PHYS 103 or CHEM 111	General Physics I General Chemistry I	4.0
UNIV T101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 182	Mathematical Analysis II	3.0
PHYS 104 or CHEM 112	General Physics II General Chemistry II	4.0
Term Credits		15.0
Term 3		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 183	Mathematical Analysis III	3.0
PSY 101	General Psychology I	3.0
Term Credits		16.0
Term 4		
COM 230	Techniques of Speaking	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
INFO 101	Introduction to Information Technology	3.0
LING 101	Introduction to Linguistics	3.0
Select one of the following:		3.0
HIST 201	United States History to 1815	
HIST 202	United States History, 1815-1900	
HIST 203	United States History since 1900	
Term Credits		16.0
Term 5		
COOP 101	Career Management and Professional Development	0.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 322	Evaluation of Instruction	3.0
ENGL 201	Renaissance to the Enlightenment	3.0
NFS 100	Nutrition, Foods, and Health	2.0
NFS 101	Introduction to Nutrition & Food	1.0
WRIT 301 [WI]	Writing Poetry	3.0
Term Credits		15.0
Term 6		
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
ENGL 200 [WI]	Classical to Medieval Literature	3.0
ENGL 204	Post-Colonial Literature II	3.0
WRIT 225 [WI]	Creative Writing	3.0
Term Credits		16.0
Term 7		
EDUC 312	Educational Policy, Law & Advocacy	3.0
ENGL 211 [WI]	British Literature I	3.0
ENGL 304	Young Adult Fiction	3.0
MUSC 130	Introduction to Music	3.0
PHYS 181	Astronomy	3.0
Term Credits		15.0
Term 8		
ARTH 101	History of Art I: Ancient to Medieval	3.0
ECON 201	Principles of Microeconomics	4.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
ENGL 355 [WI]	Women and Literature	3.0

ENGL 335	Mythology	3.0
Term Credits		16.0
Term 9		
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 216	Diversity and Today's Teacher	3.0
ENGL 205 [WI]	American Literature I	3.0
ENGL 212	British Literature II	3.0
ENGL 325	Topics in World Literature	3.0
EDUC 358	English Teaching Methods	3.0
Term Credits		18.0
Term 10		
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 409	Student Teaching Seminar I	9.0
Term Credits		12.0
Term 11		
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 410 [WI]	Student Teaching	9.0
Term Credits		12.0
Term 12		
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
ENGL 206 [WI]	American Literature II	3.0
ENVS 260	Environmental Science and Society	3.0
PSY 320 [WI]	Educational Psychology	3.0
SOC 335	Sociology of Education	3.0
Term Credits		16.0
Total Credit: 182.0		

Education Faculty

Jennifer Adams, EdD (*Harvard University*). Associate Professor. Comparative and international education; Poverty and education; Child welfare; Educational policy.

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Holly Carpenter, PhD (*Arizona State University*). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Assistant Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Clinical Director and Research Fellow, A.J. Drexel Autism Institute*. Associate Professor. Identifying the variables that influence adult behavior change in community settings; autism intervention; widespread dissemination of evidence-based interventions in school and community settings.

D. Brent Edwards, PhD (*University of Maryland*). Assistant Clinical Professor. Global and international education

Salvatore V. Falletta, EdD (*North Carolina State University*). Associate Clinical Professor. Human Resource intelligence (i.e., HR research and analytics practices); HRD assessment, measurement, and evaluation models and taxonomies; organizational diagnostic models; web-based employee and organizational survey methods, and computational modeling.

Arotis N. Foster, PhD (*Michigan State University*). Associate Professor. Educational psychology and educational technology, especially the following: Motivation; Technological Pedagogical Content Knowledge (TPACK); Immersive Interactive Digital Environments (simulation, games, virtual realities).

Kathy Geller, PhD (*Fielding Graduate University*). Assistant Clinical Professor. Educational leadership and management.

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Dominic F. Gullo, PhD (*Indiana University*) *Associate Dean of Research*. Professor. Studying the relative and long-range effects of early schooling experiences in prekindergarten and kindergarten on children's achievement and social adaptation to school routine.

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Paul Harrington, PhD (*University of Massachusetts, Boston*) *Director, Center for Labor Markets and Policy*. Professor. Teen and young adult job access; economic outlook, college labor market; workforce development, planning, and development; vocational rehabilitation and job market transition.

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Michael J. Haslip, PhD (*Old Dominion University*). Assistant Professor. Early childhood education, social and emotional learning, child guidance strategies, effects of public pre-school attendance.

Marlene Hilkowitz, M.Ed (*Temple University*). Assistant Clinical Professor. Science education; Curriculum development; Student engagement

Deanna Hill, JD, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Associate Dean for Academic Affairs*. Professor. Urban education, access and equity, high school dropout, parent involvement/family involvement, community engagement in research.

Jennifer Katz-Buonincontro, PhD (*University of Oregon*). Associate Professor. Educational administration, leadership development, survey & instrument design.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Assistant Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Valerie Klein, PhD (*Amherst College*). Assistant Clinical Professor. Mathematics learning and teaching; teacher's use of formative assessment in mathematics; creating opportunities for rich problem solving in the classroom; examining teachers growth and change; qualitative research methods.

Vera Lee, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Practitioner Research in online courses to explore inservice/preservice teachers' emerging understandings about issues of diversity; the development of information/digital literacies of urban youth; English language learners.

Bruce Levine, JD (*New York University*). Assistant Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). Associate Clinical Professor. Experiences of students of African descent at predominantly white colleges and universities, college access and college student development, youth civic engagement in urban school reform, qualitative research and evaluation.

William Lynch, PhD (*University of Maryland*). Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.

Constance Lyttle, PhD, JD (*University of Pittsburgh, Duquesne University*). Associate Clinical Professor. Legal rights of gifted and talented children and children with disabilities; inclusive education of exceptional children; special education mediation; special education IEP/IFSP facilitation; resolution session facilitation

Kenneth Mawritz, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Educational administration

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). Associate Clinical Professor. Curriculum and instruction K-16; teaching English as a foreign language (TEFL); instructional design business education and administration; industrial and career technology; oral and

written communication; research methodology; instructional and assistive technology assessment; online learning pedagogy

Kathleen Provinzano, PhD (*Marywood University*). Associate Clinical Professor. Educational administration.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Lori Severino, EdD (*Neumann University*). Assistant Clinical Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). Associate Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

Brian Smith, PhD (*Northwestern University*). Professor. Design of computer-based learning environments; Human-computer interaction; Design sciences.

Toni A. Sondergeld, PhD (*University of Toledo*). Associate Professor. Cognitive and affective assessment development; program/grant evaluation; high stakes testing measurement; STEM education; urban education

Nancy Butler Songer, PhD (*University of California, Davis*) *Dean, School of Education*. Distinguished Professor. STEM education, urban education, educational assistance

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*). Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Teacher Education: General Science

Major: Teacher Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 181.5

Co-op Options:

Classification of Instructional Programs (CIP) code: 13.1205

Standard Occupational Classification (SOC) code: 25-2031

About the Concentration

Certification is for grades 7 - 12

This certification option within the BS in Teacher Education (p. 423) is a well-rounded program incorporating biology, chemistry, mathematics, and physics. Students may also choose to pursue a second certification in any of the other certification areas. A sample plan of study is available.

Additional Information

For more information about the program, visit the School of Education (<http://www.drexel.edu/soe>) website.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 289	History of Science: Enlightenment to Modernity	4.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
UNIV T101	The Drexel Experience	1.0
Free Electives		6.0
English (ENGL) course between 200-329		3.0

Science Requirements

BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
ENVS 284	Physiological and Population Ecology	3.0
ENVS 285 [WI]	Population Ecology Laboratory	2.0
ENVS 286	Community and Ecosystem Ecology	3.0
ENVS 390	Marine Ecology	3.0
GEO 101	Physical Geology	4.0
GEO 102	History of the Earth	4.0
PHEV 145	Weather I: Climate and Global Change	4.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
PHYS 131	Survey of the Universe	3.0
Science, Technology and Human Affairs Elective (see program advisor)		6.0

Pedagogy Requirements

EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 258	Reading in the Content Areas	3.0

EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 315	Secondary Science Teaching Methods	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
Student Teaching Experiences		
EDUC 409	Student Teaching Seminar I	9.0
EDUC 410 [WI]	Student Teaching	9.0
Total Credits		181.0

General Science Concentration: Plan of Study

4 YR UG Co-op Concentration

Term 1		Credits
CHEM 101	General Chemistry I	3.5
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV T101	The Drexel Experience	1.0
	Term Credits	15.5
Term 2		
CHEM 102	General Chemistry II	4.5
CIVC 101	Introduction to Civic Engagement	1.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
	Term Credits	16.5
Term 3		
CHEM 103	General Chemistry III	5.0
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
	Term Credits	15.0
Term 4		
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
MATH 123	Calculus III	4.0
PHYS 101	Fundamentals of Physics I	4.0
	Term Credits	16.0
Term 5		
BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0
COOP 101	Career Management and Professional Development	0.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 322	Evaluation of Instruction	3.0
GEO 102	History of the Earth	4.0
	Term Credits	14.0
Term 6		

EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
ENVS 284	Physiological and Population Ecology	3.0
PHYS 102	Fundamentals of Physics II	4.0
PSY 101	General Psychology I	3.0
	Term Credits	17.0

Term 7

EDUC 312	Educational Policy, Law & Advocacy	3.0
ENVS 285 [WI]	Population Ecology Laboratory	2.0
GEO 101	Physical Geology	4.0
PHYS 131	Survey of the Universe	3.0
Free Elective		3.0
	Term Credits	15.0

Term 8

EDUC 315	Secondary Science Teaching Methods	3.0
ENVS 286	Community and Ecosystem Ecology	3.0
HIST 289	History of Science: Enlightenment to Modernity	4.0
PHEV 145	Weather I: Climate and Global Change	4.0
PSY 320 [WI]	Educational Psychology	3.0
	Term Credits	17.0

Term 9

EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
ENVS 390	Marine Ecology	3.0
Science, Technology and Human Affairs elective (See program advisor)		3.0
	Term Credits	15.0

Term 10

EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 409	Student Teaching Seminar I	9.0
	Term Credits	12.0

Term 11

EDUC 325	Multimedia in Instructional Design	3.0
EDUC 410 [WI]	Student Teaching	9.0
	Term Credits	12.0

Term 12

EDUC 316	Teaching in Urban Contexts	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
PHIL 251	Ethics	3.0
English (ENGL) course between 200-329		3.0
Science, Technology and Human Affairs elective (See program advisor)		3.0
Free Electives		3.0
	Term Credits	16.0

Total Credit: 181.0

Education Faculty

Jennifer Adams, EdD (*Harvard University*). Associate Professor. Comparative and international education; Poverty and education; Child welfare; Educational policy.

Ayana Allen, PhD (*Texas A&M University*). Assistant Professor. Urban education; Identity construction in school contexts; Urban school transformation.

Kristen Betts, EdD (*George Washington University*). Clinical Professor. Higher education administration and governance, online blended education, instructional design and educational technology, program assessment and evaluation.

W. Edward Bureau, PhD (*University of Pennsylvania*). Associate Clinical Professor. Leadership, supervision, and capacity development.

Jamie Callahan, EdD (*George Washington University*). Clinical Professor. Leadership; Sociological explorations of emotions occurring in organizational contexts; Organizational development; Contextual issues confronting organizations, such as organizational leadership, organizational culture, and communities of practice.

Holly Carpenter, PhD (*Arizona State University*). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

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Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Teacher Education: Mathematics

Major: Teacher Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.5

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1205

Standard Occupational Classification (SOC) code: 25-2031

About the Concentration

Certification is for grades 7 - 12

This certification option within the BS in Teacher Education (p. 423) emphasizes coursework in such areas of mathematics as calculus, linear algebra, differential equations, probability and statistics, techniques of mathematical proof, and discrete mathematics. Students may also choose to pursue a second certification in physics or one of the other sciences.

Additional Information

For more information about the program, visit the School of Education (<http://www.drexel.edu/soe>) website.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
English elective course between 200-329		3.0
HIST 289	History of Science: Enlightenment to Modernity	4.0
INFO 108	Foundations of Software	3.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
UNIV T101	The Drexel Experience	1.0

Mathematics Requirements

MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	4.0
MATH 205	Survey of Geometry	3.0
MATH 210	Differential Equations	4.0
MATH 220 [WI]	Introduction to Mathematical Reasoning	3.0
MATH 221	Discrete Mathematics	3.0
MATH 311	Probability and Statistics I	4.0
MATH 312	Probability and Statistics II	4.0
MATH 331	Abstract Algebra I	4.0

Science Requirements

BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
BIO 109	Biological Diversity, Ecology & Evolution	3.0

CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENVS 260	Environmental Science and Society	3.0
PHYS 101	Fundamentals of Physics I	4.0
PHYS 102	Fundamentals of Physics II	4.0
Pedagogy Requirements		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
MTED 428	Cultural and Historical Significance of Mathematics	3.0
MTED 419	Teaching Secondary Mathematics	3.0
Student Teaching Experience		
EDUC 409	Student Teaching Seminar I	9.0
EDUC 410 [WI]	Student Teaching	9.0
Total Credits		183.0

Mathematics Concentration: Plan of Study

4 YR UG Co-op Concentration

Term 1		Credits
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
PSY 101	General Psychology I	3.0
UNIV T101	The Drexel Experience	1.0
	Term Credits	15.0
Term 2		
CIVC 101	Introduction to Civic Engagement	1.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
INFO 108	Foundations of Software	3.0
MATH 122	Calculus II	4.0
	Term Credits	15.0
Term 3		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 123	Calculus III	4.0
	Term Credits	14.0

Term 4		
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
CHEM 101	General Chemistry I	3.5
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
MATH 200	Multivariate Calculus	4.0
	Term Credits	15.5
Term 5		
BIO 109	Biological Diversity, Ecology & Evolution	3.0
COOP 101	Career Management and Professional Development	0.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 322	Evaluation of Instruction	3.0
MATH 221	Discrete Mathematics	3.0
PSY 320 [WI]	Educational Psychology	3.0
	Term Credits	15.0
Term 6		
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
MATH 210	Differential Equations	4.0
MATH 311	Probability and Statistics I	4.0
PHYS 101	Fundamentals of Physics I	4.0
	Term Credits	19.0
Term 7		
EDUC 312	Educational Policy, Law & Advocacy	3.0
MATH 220 [WI]	Introduction to Mathematical Reasoning	3.0
MTED 428	Cultural and Historical Significance of Mathematics	3.0
MATH 312	Probability and Statistics II	4.0
PHYS 102	Fundamentals of Physics II	4.0
	Term Credits	17.0
Term 8		
CHEM 102	General Chemistry II	4.5
ECON 201	Principles of Microeconomics	4.0
MATH 331	Abstract Algebra I	4.0
MTED 419	Teaching Secondary Mathematics	3.0
	Term Credits	15.5
Term 9		
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
MATH 201	Linear Algebra	4.0
MATH 205	Survey of Geometry	3.0
	Term Credits	16.0
Term 10		
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 409	Student Teaching Seminar I	9.0
	Term Credits	12.0
Term 11		
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 410 [WI]	Student Teaching	9.0
	Term Credits	12.0
Term 12		
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
ENVS 260	Environmental Science and Society	3.0
HIST 289	History of Science: Enlightenment to Modernity	4.0
PHIL 251	Ethics	3.0

English (ENGL) course between 200-329	3.0
Term Credits	17.0

Total Credit: 183.0

Education Faculty

Jennifer Adams, EdD (*Harvard University*). Associate Professor. Comparative and international education; Poverty and education; Child welfare; Educational policy.

Ayana Allen, PhD (*Texas A&M University*). Assistant Professor. Urban education; Identity construction in school contexts; Urban school transformation.

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Valerie Klein, PhD (*Amherst College*). Assistant Clinical Professor. Mathematics learning and teaching; teacher's use of formative assessment in mathematics; creating opportunities for rich problem

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Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Lori Severino, EdD (*Neumann University*). Assistant Clinical Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). Associate Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

Brian Smith, PhD (*Northwestern University*). Professor. Design of computer-based learning environments; Human-computer interaction; Design sciences.

Toni A. Sondergeld, PhD (*University of Toledo*). Associate Professor. Cognitive and affective assessment development; program/grant

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Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Teacher Education: Physics

Major: Teacher Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.5

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1205

Standard Occupational Classification (SOC) code: 25-2031

About the Concentration

Certification is for grades 7- 12

This certification option within the BS in Teacher Education (p. 423) emphasizes coursework in physics and atmospheric science, including such topics as classical mechanics, electromagnetic fields, quantum mechanics, and physics of high fidelity, and survey of the universe. Students may also choose to pursue a second certification in mathematics.

Additional Information

For more information about the program, visit the School of Education (<http://drexel.edu/soe>) website.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
HIST 289	History of Science: Enlightenment to Modernity	4.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	4.0
MATH 210	Differential Equations	4.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology I	3.0

PSY 320 [WI]	Educational Psychology	3.0
UNIV T101	The Drexel Experience	1.0
English elective course between 200-329		3.0
Science Requirements		
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
BIO 109	Biological Diversity, Ecology & Evolution	3.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENVS 260	Environmental Science and Society	3.0
PHEV 141 [WI]	Atmospheric Science I: Climate and Global Change	3.0
PHYS 113	Contemporary Physics I	5.0
PHYS 114	Contemporary Physics II	5.0
PHYS 115	Contemporary Physics III	5.0
PHYS 131	Survey of the Universe	3.0
PHYS 201	Fundamentals of Physics III	4.0
PHYS 217	Thermodynamics	4.0
PHYS 311	Classical Mechanics I	4.0
PHYS 312	Classical Mechanics II	4.0
PHYS 321	Electromagnetic Fields I	4.0
PHYS 326	Quantum Mechanics I	4.0
Pedagogy Requirements		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 315	Secondary Science Teaching Methods	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
Student Teaching Experiences		
EDUC 409	Student Teaching Seminar I	9.0
EDUC 410 [WI]	Student Teaching	9.0
Total Credits		189.0

Physics Concentration: Plan of Study

4Yr UG Co-op Concentration

Term 1		Credits
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
PHYS 113	Contemporary Physics I	5.0
UNIV T101	The Drexel Experience	1.0
Term Credits		17.0

Term 2

CIVC 101	Introduction to Civic Engagement	1.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 122	Calculus II	4.0
PHYS 114	Contemporary Physics II	5.0
Term Credits		17.0
Term 3		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHYS 115	Contemporary Physics III	5.0
Term Credits		15.0
Term 4		
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
CHEM 101	General Chemistry I	3.5
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
MATH 123	Calculus III	4.0
Term Credits		15.5
Term 5		
BIO 109	Biological Diversity, Ecology & Evolution	3.0
COOP 101	Career Management and Professional Development	0.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 322	Evaluation of Instruction	3.0
MATH 200	Multivariate Calculus	4.0
Term Credits		13.0
Term 6		
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
MATH 201	Linear Algebra	4.0
PHYS 217	Thermodynamics	4.0
PHYS 311	Classical Mechanics I	4.0
Term Credits		19.0
Term 7		
CHEM 102	General Chemistry II	4.5
EDUC 312	Educational Policy, Law & Advocacy	3.0
MATH 210	Differential Equations	4.0
PHYS 131	Survey of the Universe	3.0
PHYS 312	Classical Mechanics II	4.0
Term Credits		18.5
Term 8		
EDUC 315	Secondary Science Teaching Methods	3.0
HIST 289	History of Science: Enlightenment to Modernity	4.0
PHEV 141 [WI]	Atmospheric Science I: Climate and Global Change	3.0
PHYS 201	Fundamentals of Physics III	4.0
PHYS 321	Electromagnetic Fields I	4.0
Term Credits		18.0
Term 9		
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
PSY 101	General Psychology I	3.0
English (ENGL) course between 200-329		3.0
Term Credits		15.0
Term 10		
EDUC 308	Creating a Positive Classroom Climate	3.0

EDUC 409	Student Teaching Seminar I	9.0
	Term Credits	12.0
Term 11		
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 410 [WI]	Student Teaching	9.0
	Term Credits	12.0
Term 12		
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
ENVS 260	Environmental Science and Society	3.0
PHIL 251	Ethics	3.0
PSY 320 [WI]	Educational Psychology	3.0
PHYS 326	Quantum Mechanics I	4.0
	Term Credits	17.0

Total Credit: 189.0

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Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Teacher Education: Social Studies

Major: Teacher Education

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 184.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 13.1205

Standard Occupational Classification (SOC) code: 25-2031

About the Concentration

Certification is for grades 7 - 12

This certification option within the BS in Teacher Education (p. 423) is designed to prepare students to teach social studies using appropriate pedagogy strategies. Topics include history, geography, civics, economics and psychology.

Additional Information

For more information about the program, visit the School of Education (<http://goodwin.drexel.edu/soe>) website.

Degree Requirements

General Education and Concentration Content Requirements

ANTH 101	Introduction to Cultural Diversity	3.0
ANTH 110	Human Past: Anthropology and Prehistoric Archeology	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ECON 201	Principles of Microeconomics	4.0

ECON 202	Principles of Macroeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
ENGL 205 [WI]	American Literature I	3.0
Select two:		8.0
HIST 161	Themes in World Civilization I	
or HIST 162	Themes in World Civilization II	
or HIST 163	Themes in World Civilization III	
HIST 201	United States History to 1815	4.0
HIST 202	United States History, 1815-1900	4.0
HIST 203	United States History since 1900	4.0
HIST 212	Themes in African-American History	4.0
HIST 224	Women in American History	4.0
HIST 275	History of Pennsylvania	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
PSCI 110	American Government I	4.0
PSCI 140	Introduction to Comparative Political Analysis	4.0
PSCI 150	International Politics	4.0
PSCI 220	Constitutional Law I	4.0
PSCI 240	Comparative Government	4.0
PSCI 375	Politics of Immigration	4.0
PSY 101	General Psychology I	3.0
PSY 320 [WI]	Educational Psychology	3.0
SOC 101	Introduction to Sociology	3.0
SOC 210	Race, Ethnicity and Social Inequality	4.0
SOC 335	Sociology of Education	4.0
UNIV T101	The Drexel Experience	1.0
Pedagogy Requirements		
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDGE 210	Geography Education	3.0
EDGE 211	Geography Education: Teacher Laboratory	1.5
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	3.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
EDUC 123	Adolescent Development	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 265	Instructing English Language Learners	3.0
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 356	Secondary Social Studies Methods	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
Student Teaching Experience		
EDUC 409	Student Teaching Seminar I	9.0
EDUC 410 [WI]	Student Teaching	9.0
Total Credits		188.5

Social Studies Concentration: Plan of Study

4 YR UG Co-op Concentration

Term 1		Credits
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HIST 161, 162, or 163	Themes in World Civilization I Themes in World Civilization II Themes in World Civilization III	4.0
MATH 181	Mathematical Analysis I	3.0
PSY 101	General Psychology I	3.0
UNIV T101	The Drexel Experience	1.0
Term Credits		18.0
Term 2		Credits
HIST 162, 161, or 163	Themes in World Civilization II Themes in World Civilization I Themes in World Civilization III	4.0
ANTH 101	Introduction to Cultural Diversity	3.0
CIVC 101	Introduction to Civic Engagement	1.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 123	Adolescent Development	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 182	Mathematical Analysis II	3.0
Term Credits		18.0
Term 3		Credits
ANTH 110	Human Past: Anthropology and Prehistoric Archeology	3.0
COOP 101	Career Management and Professional Development	0.0
EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDUC 105	Freshman Pedagogy Seminar	1.0
EDUC 113	Organizational Structure of Secondary Schools	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 183	Mathematical Analysis III	3.0
Term Credits		16.0
Term 4		Credits
EDEX 244	Inclusionary Practices for Exceptional Students	3.0
EDUC 205	Sophomore Pedagogy Seminar	1.0
EDUC 223	Teaching the Middle School Child	3.0
EDUC 265	Instructing English Language Learners	3.0
HIST 203	United States History since 1900	4.0
Term Credits		14.0
Term 5		Credits
ENGL 205 [WI]	American Literature I	3.0
HIST 275	History of Pennsylvania	3.0
PSCI 110	American Government I	4.0
PSCI 140	Introduction to Comparative Political Analysis	4.0
SOC 210	Race, Ethnicity and Social Inequality	4.0
Term Credits		18.0
Term 6		Credits
ECON 201	Principles of Microeconomics	4.0
EDEX 266 [WI]	Literacy and Content Skill Development 7-12	3.0
EDUC 258	Reading in the Content Areas	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 356	Secondary Social Studies Methods	3.0
Term Credits		16.0
Term 7		Credits
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 312	Educational Policy, Law & Advocacy	3.0
EDUC 322	Evaluation of Instruction	3.0

HIST 201	United States History to 1815	4.0
PSCI 240	Comparative Government	4.0
Term Credits		17.0
Term 8		
EDGE 210	Geography Education	3.0
EDGE 211	Geography Education: Teacher Laboratory	1.5
EDUC 305 [WI]	Junior Pedagogy Seminar	1.0
PSCI 150	International Politics	4.0
SOC 101	Introduction to Sociology	3.0
SOC 335	Sociology of Education	4.0
Term Credits		16.5
Term 9		
HIST 202	United States History, 1815-1900	4.0
PSCI 220	Constitutional Law I	4.0
PSCI 375	Politics of Immigration	4.0
PSY 320 [WI]	Educational Psychology	3.0
Term Credits		15.0
Term 10		
EDUC 308	Creating a Positive Classroom Climate	3.0
EDUC 409	Student Teaching Seminar I	9.0
Term Credits		12.0
Term 11		
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 410 [WI]	Student Teaching	9.0
Term Credits		12.0
Term 12		
EDUC 316	Teaching in Urban Contexts	3.0
EDUC 405	Senior Pedagogy Seminar	1.0
ECON 202	Principles of Macroeconomics	4.0
HIST 212	Themes in African-American History	4.0
HIST 224	Women in American History	4.0
Term Credits		16.0

Total Credit: 188.5

Education Faculty

Jennifer Adams, EdD (*Harvard University*). Associate Professor. Comparative and international education; Poverty and education; Child welfare; Educational policy.

Ayana Allen, PhD (*Texas A&M University*). Assistant Professor. Urban education; Identity construction in school contexts; Urban school transformation.

Kristen Betts, EdD (*George Washington University*). Clinical Professor. Higher education administration and governance, online blended education, instructional design and educational technology, program assessment and evaluation.

W. Edward Bureau, PhD (*University of Pennsylvania*). Associate Clinical Professor. Leadership, supervision, and capacity development.

Jamie Callahan, EdD (*George Washington University*). Clinical Professor. Leadership; Sociological explorations of emotions occurring in organizational contexts; Organizational development; Contextual issues confronting organizations, such as organizational leadership, organizational culture, and communities of practice.

Holly Carpenter, PhD (*Arizona State University*). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Assistant Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Clinical Director and Research Fellow, A.J. Drexel Autism Institute*. Associate Professor. Identifying the variables that influence adult behavior change in community settings; autism intervention; widespread dissemination of evidence-based interventions in school and community settings.

D. Brent Edwards, PhD (*University of Maryland*). Assistant Clinical Professor. Global and international education

Salvatore V. Falletta, EdD (*North Carolina State University*). Associate Clinical Professor. Human Resource intelligence (i.e., HR research and analytics practices); HRD assessment, measurement, and evaluation models and taxonomies; organizational diagnostic models; web-based employee and organizational survey methods, and computational modeling.

Arotis N. Foster, PhD (*Michigan State University*). Associate Professor. Educational psychology and educational technology, especially the following: Motivation; Technological Pedagogical Content Knowledge (TPACK); Immersive Interactive Digital Environments (simulation, games, virtual realities).

Kathy Geller, PhD (*Fielding Graduate University*). Assistant Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*). Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

Roger Geertz Gonzalez, PhD (*Pennsylvania State University*). Associate Clinical Professor. Civic engagement, college student identity development, indigenous higher education, comparative higher education access policies.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Associate Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Mary Jo Grdina, PhD (*Case Western Reserve University*). Associate Clinical Professor. Undergraduate studies, science education, curriculum design.

Dominic F. Gullo, PhD (*Indiana University*) *Associate Dean of Research*. Professor. Studying the relative and long-range effects of early schooling experiences in prekindergarten and kindergarten on children's achievement and social adaptation to school routine.

Penny Hammrich, PhD (*University of Minnesota*) *Associate Dean for Graduate Studies*. Professor. Urban education; science education; genetics; gender equity; science knowledge for conceptual teaching; sport science.

Paul Harrington, PhD (*University of Massachusetts, Boston*) *Director, Center for Labor Markets and Policy*. Professor. Teen and young adult job access; economic outlook, college labor market; workforce development, planning, and development; vocational rehabilitation and job market transition.

Elizabeth Haslam, PhD (*University of Pennsylvania*). Associate Clinical Professor. Educational field coordinator, instructional design, qualitative evaluation, writing across the curriculum.

Michael J. Haslip, PhD (*Old Dominion University*). Assistant Professor. Early childhood education, social and emotional learning, child guidance strategies, effects of public pre-school attendance.

Marlene Hilkowitz, M.Ed (*Temple University*). Assistant Clinical Professor. Science education; Curriculum development; Student engagement

Deanna Hill, JD, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) Associate Dean for Academic Affairs. Professor. Urban education, access and equity, high school dropout, parent involvement/family involvement, community engagement in research.

Jennifer Katz-Buonincontro, PhD (*University of Oregon*). Associate Professor. Educational administration, leadership development, survey & instrument design.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Assistant Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Valerie Klein, PhD (*Amherst College*). Assistant Clinical Professor. Mathematics learning and teaching; teacher's use of formative assessment in mathematics; creating opportunities for rich problem solving in the classroom; examining teachers growth and change; qualitative research methods.

Vera Lee, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Practitioner Research in online courses to explore inservice/preservice teachers' emerging understandings about issues of diversity; the development of information/digital literacies of urban youth; English language learners.

Bruce Levine, JD (*New York University*). Assistant Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). Associate Clinical Professor. Experiences of students of African descent at predominantly white colleges and universities, college access and college student development, youth civic engagement in urban school reform, qualitative research and evaluation.

William Lynch, PhD (*University of Maryland*). Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.

Constance Lyttle, PhD, JD (*University of Pittsburgh, Duquesne University*). Associate Clinical Professor. Legal rights of gifted and talented children and children with disabilities; inclusive education of exceptional children; special education mediation; special education IEP/IFSP facilitation; resolution session facilitation

Kenneth Mawritz, PhD (*University of Pittsburgh*). Assistant Clinical Professor. Educational administration

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). Associate Clinical Professor. Curriculum and instruction K-16; teaching

English as a foreign language (TEFL); instructional design business education and administration; industrial and career technology; oral and written communication; research methodology; instructional and assistive technology assessment; online learning pedagogy

Kathleen Provinzano, PhD (*Marywood University*). Associate Clinical Professor. Educational administration.

Fredricka K. Reisman, PhD (*Syracuse University*) Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Lori Severino, EdD (*Neumann University*). Assistant Clinical Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). Associate Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

Brian Smith, PhD (*Northwestern University*). Professor. Design of computer-based learning environments; Human-computer interaction; Design sciences.

Toni A. Sondergeld, PhD (*University of Toledo*). Associate Professor. Cognitive and affective assessment development; program/grant evaluation; high stakes testing measurement; STEM education; urban education

Nancy Butler Songer, PhD (*University of California, Davis*) Dean, School of Education. Distinguished Professor. STEM education, urban education, educational assistance

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Assistant Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*). Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*). Associate Clinical Professor. Behavior analysis, single subject research methods, functional analysis

Minor in Education

The minor in education provides a structured academic opportunity for students who wish to add a fundamental understanding of the field of education as well as practical knowledge in the art and science of teaching and learning to their undergraduate experience.

Designed for students with a strong interest in education and training, the minor will not necessarily lead to the student being recommended for a state teaching certificate. However, should a student decide to also pursue a teaching certificate as a component of his or her major—

or in post-baccalaureate work—the courses required for the minor are applicable to Pennsylvania State certification.

Required Courses

EDEX 142	Special Education Foundations: Referral and Assessment	3.0
EDEX 246 [WI]	Literacy and Content Skill Development PreK-8	3.0
EDUC 101	Foundations in Education I: A Historical and Philosophical Perspective	3.0
EDUC 120	Child Development I: Typical Development	3.0
or EDUC 123	Adolescent Development	
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 322	Evaluation of Instruction	3.0
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
Total Credits		24.0

Minor in STEM Education

This minor, which can be coupled with a variety of STEM majors and students pursuing the DragonsTeach program, will provide an opportunity for STEM majors to explore STEM Education, and to develop core knowledge and practices in secondary STEM Education. Successful STEM minor students may build upon the minor's course work to readily complete course work leading to recommendation for PA teaching certification as a secondary teacher (grades 7-12) in one or more STEM content areas. Additional course work includes for teacher certification includes Student Teaching and required special education and English language learner courses (an additional 3 courses + student teaching).

Introductory Courses

ESTM 201	DragonsTeach: Step 1	1.5
ESTM 210	DragonsTeach: Step 2	1.5

STEM Education Core Courses

ESTM 301	Knowing and Learning in Mathematics and Science	3.0
ESTM 302	Classroom Interactions	3.0
ESTM 303	Research and Practice in Science and Mathematics Education	3.0
ESTM 350	Problem-Based Instruction	4.0
EDUC 428	Cultural and Historical Significance of Mathematics *	3.0-4.0
or HIST 288	History of Science: Medieval to Enlightenment	

STEM Research Methods

ESTM 380	Research Methods **	3.0
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Special Education Courses

Select one of the following:

EDEX 142	Special Education Foundations: Referral and Assessment
EDUC 244	Inclusionary Practices for Exceptional Students
EDUC 265	Instructing English Language Learners

Total Credits 22.0-23.0

* Math majors should take EDUC 428 and Science majors should take HIST 288.

** A Research/Methods/Design course from the student's home department may be substituted with consultation from the DragonsTeach advisor.

Certificate in Creativity and Innovation

Certificate Level: Undergraduate

Admission Requirements: High school diploma

Certificate Type: Certificate

Number of Credits to Completion: 18.0 - 20.0

Instructional Delivery: Campus

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 30.9999

Standard Occupational Classification (SOC) Code: 11-9199

The undergraduate certificate in Creativity and Innovation seeks to produce individuals who are equipped with the fundamental creative problem solving competencies that are indicative of creative leaders. The certificate is designed to provide knowledge of the major creativity theories, to enhance a student's latent creative strengths, to foster ability to apply creativity in the workplace, and to present methods for assessing creative strengths.

Students have the option of completing this undergraduate certificate as a stand-alone professional development credential or as a concentration within their baccalaureate degree.

Requirements

Core Courses

CRTV 301	Foundations in Creativity	3.0
CRTV 302	Tools and Techniques in Creativity	3.0
PRST 450	Creative Leadership for Professionals	3.0

Electives

Select three of the following: 9.0-11.0

CRTV 303	Creativity in the Workplace
GSTD 210	Fact & Fiction in Film
MGMT 260	Introduction to Entrepreneurship
MGMT 364	Technology Management
PRST 330	Career & Professional Development
WRIT 220 [WI]	Creative Nonfiction Writing
WRIT 225 [WI]	Creative Writing

Total Credits 18.0-20.0

The Dornsife School of Public Health

About the School

The Dornsife School of Public Health (<http://drexel.edu/dornsife>) at Drexel University provides education, conducts research, and partners with communities and organizations to improve the health of populations.

Founded on the principle of health as a human right, our school is especially committed to improving health in cities, eliminating health disparities, and promoting health in all policies.

Key to the school's mission is active engagement with the world of public health practice, with communities, and with a range of policies and sectors within and outside the health care system relevant to health.

The Dornsife School of Public Health is the only fully accredited school of public health in the Philadelphia region.

Educational programs

School educational programs combine rigorous training with hands-on practical experiences. Students benefit from engagement with a broad set of community partnerships and research collaborations. Graduates acquire the knowledge, skills and perspective necessary to make a difference in the health of communities in the United States and worldwide.

Research

Dornsife School of Public Health faculty and students conduct research on the drivers of population health and the impact of a range of practices and policies on health. Areas of emphasis include urban health, health disparities, food policy and health, neighborhood and community interventions, behavior change, health consequences of environmental and occupational exposures, aging and chronic diseases, infectious disease, public health history and ethics, the health consequences of trauma and violence, the social determinants of health, and public health needs assessment and practice, among others.

Majors

- Public Health (BS) (p. 452)

Minor

- Global Public Health (p. 457)
- Public Health (p. 457)

Public Health

Major: Public Health

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 181.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 51.2201

Standard Occupational Classification (SOC) code: 11-9111; 21-1091; 21-1094

About the Program

Public health is the science of protecting and improving the health and well-being of communities. Where clinical professionals such as doctors and nurses focus on treating individuals after they become sick or are injured, public health professionals are concerned with the health of entire populations, attempting to prevent problems from occurring or recurring through education, policy development, advocacy, service and research.

Reflecting the interdisciplinary approach of the Dornsife School of Public Health (<http://publichealth.drexel.edu>), students in the major will take courses originating from the various public health core disciplines, which include epidemiology, community health and prevention, environmental and occupational health, and health management and policy. The diversity in course offerings provides the students with the general foundations of each discipline within public health. Student learning is enhanced by faculty expertise from a wide array of backgrounds ranging from epidemiology, community health, global health, sociology, psychology, medicine, health policy, health economics, industrial hygiene and anthropology in addition to many more. As the students progress through the major, they will gain more breadth and depth in the specific discipline of their choosing through the co-op experience as well as the capstone courses in their senior year.

The Dornsife School of Public Health is dedicated to the integration of social justice and human rights in academic public health and being a model for interdisciplinary collaboration and civic engagement. Additionally, a commitment to global engagement is core to the School's mission. The Global Public Health Initiative was created to provide opportunities for all public health student to gain rich and meaningful experiences working on health issues that transcend national boundaries or that may be influenced by circumstances or experiences in other countries.

Upon completion of the degree, students will be better equipped to complete graduate education in public health or health sciences. Students will have acquired skills that could be translated into the workplace (city, state or local government, non for profit, etc.) or other post baccalaureate educational settings such as an MPH, JD or MD.

Goals and Objectives

By the conclusion of the major, all students will be able to:

1. Illustrate the interdisciplinary nature of public health in disease prevention and health promotion on both individuals and populations.
2. Recognize the interconnectedness between physical and natural sciences and how each address population-based health challenges.
3. Illustrate the fundamental relationship between health and human rights and the role of social justice and ethics.
4. Highlight the important role that epidemiology and surveillance play in shaping and protecting the health of populations.
5. Recognize the importance of historical context regarding public health milestones as they shape policies and programs.
6. Obtain a greater understanding of the role of culture and values and how they influence relationships between social determinants of health and the built environment.

7. Identify and address population health challenges through the various public health concentrations.

8. Illustrate the overarching role that the social determinants of health have in promoting or hindering health.

9. Acquire a working knowledge of the US healthcare and healthcare delivery system.

Contact Information:

Karen DeVose, MEd
Undergraduate Advisor/Program Coordinator
Department of Undergraduate Education
Tel: 267.359.6115
kd42@drexel.edu

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
COM 320 [WI]	Science Writing	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PBHL 101	Public Health 101	3.0
UNIV PH101	The Drexel Experience	1.0
Students must select one of the following math sequences:		12.0

MATH 101 Introduction to Analysis I
& MATH 102 and Introduction to Analysis II
& MATH 239 and Mathematics for the Life Sciences

Or

MATH 121 Calculus I
& MATH 122 and Calculus II
& MATH 123 and Calculus III

Physical and Life Sciences Requirements 19.0

Students must select one of the following biology sequences:

BIO 107 Cells, Genetics & Physiology
& BIO 108 and Cells, Genetics and Physiology Laboratory
& BIO 109 and Biological Diversity, Ecology & Evolution
& BIO 110 and Biological Diversity, Ecology and Evolution Laboratory

Or

BIO 122 Cells and Genetics
& BIO 124 and Evolution & Organismal Diversity
& BIO 126 and Physiology and Ecology

*Please note that student who take the BIO 122, BIO 124, and BIO 126 sequence will be required to take fewer free electives.

Students must select one of the following chemistry sequences:

CHEM 111 General Chemistry I
& CHEM 112 and General Chemistry II

Or

CHEM 101 General Chemistry I
& CHEM 102 and General Chemistry II

Social Science Requirements

PSY 101	General Psychology I	3.0
SOC 101	Introduction to Sociology	3.0

Social Science Electives: 37.0

ANTH 240	Urban Anthropology	
ANTH 250	Anthropology of Immigration	
ANTH 370	Ethnographic Methods	
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	
ECON 240	Economics of Health Care Systems	
ENVS 341	Equatorial Guinea: Society & Environment	

ENVE 455	Geographic Information Systems	
ENSS 345	Sociology of the Environment	
GST 320	Building Global Bridges	
HIST 222	History of Work & Workers in America	
HIST 223	Women and Work in America	
HIST 224	Women in American History	
HRMT 323	Principles of Human Resource Administration	
HSAD 210	Health-Care Ethics I	
MIS 200	Management Information Systems	
ORGB 300 [WI]	Organizational Behavior	
PBHL 305	Women and Children: Health & Society	
PBHL 307	Injury Prevention and Control	
PBHL 310	Burden of Disease	
PBHL 316	Drugs, Society, and Public Health	
PBHL 318	Violence and Trauma in Public Health	
PBHL 333	Health Inequality	
PHIL 321	Biomedical Ethics	
PSCI 353	International Human Rights	
PSY 120	Developmental Psychology	
PSY 240 [WI]	Abnormal Psychology	
PSY 250 [WI]	Industrial Psychology	
PSY 368	Critical Psychology	
SOC 115	Social Problems	
SOC 210	Race, Ethnicity and Social Inequality	
SOC 235	Sociology of Health and Illness	
WGST 275	Women's Health and Human Rights	

Public Health Core Course Requirements

PBHL 301	Epidemiology in Public Health	3.0
PBHL 302	Introduction to the History of Public Health	3.0
PBHL 303	Overview of Issues in Global Health	3.0
PBHL 304	Introduction to Health & Human Rights	3.0
PBHL 306	Introduction to Community Health	3.0
PBHL 308	The U.S. Public Health System	3.0
PBHL 309	Public Health Ethics	3.0
PBHL 311	Public Health Biology	3.0
PBHL 312	Public Health Data Analysis	3.0
PBHL 313	The Social Determinants of Health and Well-Being	3.0
PBHL 314	Environmental and Occupational Health	3.0
PBHL 315	Public Health Leadership	3.0
PBHL 317	The World's Water	3.0

Public Health Capstone Experience

PBHL 497	Capstone Experience I	3.0
PBHL 498	Capstone Experience II	3.0
PBHL 499	Capstone Experience III	3.0

Free Electives 39.0

Total Credits 181.0

Sample Plan of Study

Term 1		Credits
BIO 107	Cells, Genetics & Physiology	3.0
BIO 108	Cells, Genetics and Physiology Laboratory	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101 or 121	Introduction to Analysis I Calculus I	4.0
PBHL 101	Public Health 101	3.0
UNIV PH101	The Drexel Experience	2.0
Term Credits		16.0
Term 2		
BIO 109	Biological Diversity, Ecology & Evolution	3.0
BIO 110	Biological Diversity, Ecology and Evolution Laboratory	1.0

ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102 or 121	Introduction to Analysis II Calculus I	4.0
UNIV PH101	The Drexel Experience	1.0
Social Science elective		3.0
Term Credits		15.0
Term 3		
Social Science		3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 239 or 123	Mathematics for the Life Sciences Calculus III	4.0
Free Elective		6.0
Term Credits		16.0
Term 4		
CHEM 111	General Chemistry I	4.0
CHEM 113	General Chemistry I Laboratory	1.5
PBHL 303	Overview of Issues in Global Health	3.0
PBHL 305	Women and Children: Health & Society	3.0
Social Science elective		3.0
Term Credits		14.5
Term 5		
CHEM 112	General Chemistry II	4.0
CHEM 114	General Chemistry II Laboratory	1.5
PBHL 301	Epidemiology in Public Health	3.0
PBHL 304	Introduction to Health & Human Rights	3.0
Free elective		3.0
Term Credits		14.5
Term 6		
Free elective		3.0
PBHL 302	Introduction to the History of Public Health	3.0
Public Health (PBHL) required course		3.0
Social Science electives		6.0
Term Credits		15.0
Term 7		
Public Health (PBHL) required courses		6.0
Social Science elective		3.0
Free electives		6.0
Term Credits		15.0
Term 8		
COM 230	Techniques of Speaking	3.0
Public Health (PBHL) required courses		6.0
Public Health (PBHL) elective		3.0
Social Science elective		3.0
Term Credits		15.0
Term 9		
COM 320 [WI]	Science Writing	3.0
Public Health (PBHL) required courses		6.0
Public Health (PBHL) elective		3.0
Social Science elective		3.0
Term Credits		15.0
Term 10		
PBHL 497	Capstone Experience I	3.0
Public Health (PBHL) elective		3.0
Social Science elective		3.0
Free electives		6.0
Term Credits		15.0
Term 11		
PBHL 498	Capstone Experience II	3.0
Public Health (PBHL) elective		3.0
Social Science elective		3.0

Free electives	6.0
Term Credits	
	15.0

Term 12

PBHL 499	Capstone Experience III	3.0
Public Health (PBHL) elective		3.0
Free electives		9.0
Term Credits		15.0

Total Credit: 181.0

Dornsife School of Public Health Faculty

Amy Auchincloss, PhD, MPH (*University of Michigan*). Associate Professor. Department of Epidemiology and Biostatistics. Environmental determinants of health and the health effects of air pollution; contribution of resources in residential environments to health behaviors, obesity, diabetes and cardiovascular disease; the use of spatial analysis methods and agent-based mode

Zekarias Berhane, PhD (*University of Pittsburgh*). Assistant Research Professor. Department of Epidemiology and Biostatistics. Modeling time-to-event data with single and multiple outcomes, mixed effect models and regression diagnostics.

Sandra Bloom, MD (*Temple University School of Medicine*). Associate Professor. Department of Health Management and Policy. Psychological trauma and organizational stress.

Jennifer Breaux, DrPh, MPH, CHES (*Drexel University*). Assistant Professor. Department of Community Health and Prevention. Maternal and child health, community health, human rights.

Darryl Brown, PhD (*Johns Hopkins University*). Assistant Professor. Department of Health Management and Policy. Health care research and planning; patient outcomes and applied health economic methods.

Robert J. Brulle, PhD (*George Washington University*). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

James W. Buehler, MD (*University of California, San Francisco*). Clinical Professor. Department of Health Management and Policy. Public health preparedness, e-health, health policy, building public health infrastructure and capacity, chronic diseases, behavioral health, data privacy, emergency preparedness and public health practice.

Igor Burstyn, PhD (*Utrecht University*). Associate Professor. Department of Environmental and Occupational Health. Occupational and environmental epidemiology, industrial hygiene, endocrine disruptors, environmental exposures, biomarkers, air quality, gene-environmental interaction, maternal and child health, Bayesian statistics, statistical modeling, etiology of autism.

Amy Carroll-Scott, PhD, MPH (*University of California at Los Angeles*). Assistant Professor. Department of Community Health and Prevention. The social and contextual determinants of persistent health disparities and the application of social science and community-based participatory research methods to understanding and eliminating such disparities.

Esther Chernak, MD, MPH, FACP (*UMDNJ-Robert Wood Johnson Medical School*) Director of the Center for Public Health Readiness and Communication; Director of Joint Degree Programs. Associate Clinical Professor. Department of Environmental and Occupational Health. Adjunct Faculty, Drexel University College of Medicine; Public health

emergency preparedness, infectious diseases, public health practice, global health.

Mariana Chilton, PhD, MPH (*University of Pennsylvania*) Director, *Center for Hunger-Free Communities*. Associate Professor. Department of Health Management and Policy. Nutrition, housing and health; chronic diseases; human rights, chronic diseases, community health, human rights and hunger.

Theodore Corbin, MD, MPP (*Drexel University*) Joint Appointment between *Dornsife School of Public Health and Drexel University College of Medicine*. Assistant Professor. Department of Health Management and Policy. Health policy; design of care systems; high risk youth; violence; healthcare services; injury prevention.

Anneclaire De Roos, PhD, MPH (*University of North Carolina at Chapel Hill*). Associate Professor. Department of Environmental and Occupational Health. Environmental and occupational epidemiology, exposure assessment, pesticides, persistent organic pollutants, drinking water quality, air pollution, urban environments, chemical risk assessment.

Ana Diez Roux, MD, PhD, MPH (*Johns Hopkins University*) Dean, *Dornsife School of Public Health*. Distinguished Professor. Department of Epidemiology and Biostatistics. Social determinants of health; neighborhoods and health; psychosocial factors; air pollution, cardiovascular disease epidemiology; multilevel and systems methods; urban health and health in Latin America.

Mary Duden, MBA (*Drexel University*). Associate Teaching Professor. Department of Health Management and Policy. Health care for the underserved and health disparities.

Jerome Dugan, PhD (*Rice University*) Primary appointment in *Health Economics at the Drexel College of Nursing and Health Professions*. Assistant Professor. Department of Health Management and Policy. Insurance markets and healthcare regulation.

Nancy Epstein, MPH, MAHL (*University of North Carolina at Chapel Hill*). Associate Professor. Department of Community Health and Prevention. Community organizing and community engagement strategies; religion and health; health policy and advocacy; organizational and group dynamics; health promotion; behavioral health; oral health; evaluation of community health programs.

Alison A. Evans, ScD (*Harvard University*). Associate Professor. Department of Epidemiology and Biostatistics. Epidemiology of infectious diseases and cancer; cohort studies; minority and immigrant health; chronic viral infections; hepatitis b; elimination of viral hepatitis; immunization; perinatal transmission.

Jerry Fagliano, MPH, PhD (*Johns Hopkins University*) Chair, *Department of Environmental and Occupational Health*. Associate Clinical Professor. Children's health and environmental exposures; health impacts of climate change; inequities in environmental exposure and disease; risks from transportation of hazardous materials; spatial distribution and clustering of disease.

Robert I. Field, PhD, JD, MPH (*Columbia University*) Joint Appointment in the *Drexel University Kline School of Law*. Professor. Department of Health Management and Policy. Health law and public health; ethical issues in managed care, public policy and legal facets of health care reform and genetic screening.

Janet Fleetwood, PhD (*University of Southern California*) Vice Provost for *Strategic Development & Initiatives*. Professor. Department of Community

Health and Prevention. Bioethics, Strategic Planning, Social Justice & Equity.

Arthur L. Frank, MD, PhD (*City University of New York*) Chair Emeritus. Professor. Department of Environmental and Occupational Health. Environmental and occupational health, agricultural safety and health, pneumoconiosis, occupational toxicology, environmental pollution.

Dennis Gallagher, MA, MPA (*University of Pittsburgh*). Assistant Teaching Professor. Department of Health Management and Policy. Health department structure and financing; health policy and law; Medicare/Medicaid and public health infrastructure.

Pamela Geller, PhD (*Kent State University*). Associate Professor. Stressful life events and physical and mental health outcomes, particularly in the area of women's reproductive health (e.g. pregnancy, pregnancy loss, infertility, medical education).

Marla Gold, MD (*University of Medicine and Dentistry-New Jersey Medical School*) Dean Emerita. Professor. Department of Health Management and Policy. Design of HIV/AIDS care systems, treatment protocols, resource utilization, and epidemiology; CQI, managed care and systems of health care, health administration, behavioral health care and substance abuse treatment systems.

Edward J. Gracely, PhD (*Temple University*) Joint Appointment in *Drexel University College of Medicine*. Associate Professor. Department of Epidemiology and Biostatistics. Statistics, experimental design/research methods and statistical analysis, clinical trials.

Ghassan Hamra, PhD (*University of North Carolina at Chapel Hill*). Assistant Professor. Department of Environmental and Occupational Health. Environmental and occupational epidemiology, Bayesian statistics, exposure assessment.

William J. Hickey, PhD (*Northwestern University*). Associate Teaching Professor. Department of Health Management and policy. Health care administration and organizational culture.

Mary E. Hovinga, PhD, MPH (*University of Michigan*). Associate Professor. Department of Epidemiology and Biostatistics. Cancer, cognitive disabilities; PCBs and DDT, lead exposure; neurological disorders, environmental hazards, epidemiologic study design.

Ann Klassen, PhD (*Johns Hopkins University*). Professor. Department of Community Health and Prevention. HIV/AIDS, food safety, excess burden intervention, GIS-based and spatial analysis.

Jennifer Kolker, MPH (*University of Michigan*) Associate Dean for *Public Health Practice; Director of Executive MPH Program*. Assistant Teaching Professor. Department of Health Management and Policy. Maternal and child health; federally qualified health center program; urban health issues; health department structure and financing; health policy and law; legislative advocacy; Medicare/Medicaid; preterm birth; public health education and training; public health infrastructure; welfare economics; women's health.

Brent Langellier, PhD, MA (*University of California, Los Angeles*). Assistant Professor. Department of Health Management and Policy. Health and health care disparities, Latino health, complex systems, quantitative methods, GIS.

Stephen E. Lankenau, PhD (*University of Maryland*). Professor. Department of Community Health and Prevention. HIV/AIDS, overdose

prevention, prescription drug misuse, medical marijuana, injection drug use, high risk youth, homelessness.

Felice Le-Scherban, PhD, MPH (*University of Michigan*). Assistant Professor. Department of Epidemiology and Biostatistics. Life course approaches to socioeconomic, racial, and ethnic health disparities; social determinants of health among immigrants; causal links between education and health; analytic methods in social epidemiology.

Brian K. Lee, PhD (*Johns Hopkins University*). Associate Professor. Department of Epidemiology and Biostatistics. Environmental determinants and epidemiology of autism spectrum disorders; perinatal epidemiology; child and maternal health; neuropsychiatric epidemiology, causal inference; machine learning.

Nora L. Lee, PhD (*Johns Hopkins University*). Assistant Research Professor. Department of Epidemiology and Biostatistics. Perinatal epidemiology; preterm birth; infant mortality; autism spectrum disorders; maternal and child health; racial and ethnic health disparities; secondhand smoke; tobacco control; environmental exposures.

Longjian Liu, MD, PhD, MSc, FAHA (*The University of Hong Kong*). Associate Professor. Department of Epidemiology and Biostatistics. Pharmacoepidemiology; cardiovascular disease and diabetes epidemiology; drug-lifestyle interaction; environmental and global health disparities; hospital electronic health records for cardiovascular and diabetes risk assessment and prediction.

Raymond K. Lum, MPhil, MS (*University of Pennsylvania*) Director of *E-Learning*. Associate Teaching Professor. Department of Health Management and Policy. Asian health; change management; e-health; health disparities; innovation diffusion; organization learning theory.

Shannon Marquez, MEng, PhD (*University of North Carolina at Chapel Hill*) Director, Office of Global Health. Associate Professor. Department of Environmental and Occupational Health. Global health; water sanitation and hygiene; health disparities; environmental health.

Ana Martinez-Donate, PhD (*Universidad Autonoma de Madrid, Spain*). Associate Professor. Department of Community Health and Prevention. HIV prevention; tobacco control; obesity prevention; access to health services; Latino immigrants and other disadvantaged populations; development and evaluation of community-based interventions.

Philip Massey, PhD, MPH (*University of California, Los Angeles*). Assistant Professor. Department of Community Health and Prevention. Health communication, health literacy, mHealth, social media and health, adolescent health, global health, program evaluation, quantitative methods.

Leslie McClure, PhD, MPH (*University of Michigan*) Chair, Department of Epidemiology and Biostatistics. Professor. Design, management and analysis of randomized clinical trials; issues of multiplicity in clinical trials; environmental risk factors for cardiovascular disease and stroke; geographic and racial disparities in cardiovascular disease and stroke.

Yvonne Michael, ScD (*Harvard School of Public Health*) Associate Dean for Academic and Faculty Affairs. Associate Professor. Department of Epidemiology and Biostatistics. Epidemiology of aging, social epidemiology, women's health, community-based participatory research; health disparities.

Jana M. Mossey, PhD, MPH, MSN (*University of North Carolina at Chapel Hill*). Professor. Department of Epidemiology and Biostatistics. Epidemiological methods; research design and methods including

observational and clinical trials research; psychosocial aspects of health; epidemiology of aging and pain, psychiatric epidemiology including major depression; sub-threshold and minor depression.

Craig J. Newschaffer, PhD (*Johns Hopkins University*) Director, A.J. Drexel Autism Institute; Associate Dean for Research. Professor. Department of Epidemiology and Biostatistics. Environmental determinants of autism spectrum disorders; gene-environment interaction; neurological disorders.

Alex Ortega, PhD (*University of Michigan*) Chair, Department of Health Management and Policy; Director, Center for Population Health and Community Impact. Professor. Epidemiological methods in health services research; health needs of Latino children and families; health disparities intervention research; youth engagement in community interventions.

Genevieve Pham-Kanter, PhD (*University of Chicago*). Assistant Professor. Department of Health Management and Policy. Conflicts of interest in medicine; pharmaceutical and medical device policy; physician behavior; health economics; empirical ethics.

Jonathan Purtle, DRPH, MPH, MSC (*Drexel University*). Assistant Professor. Department of Health Management and Policy. Mental health policy and services research; policy dissemination and implementation research; traumatic stress in urban areas; trauma-informed system design; violence prevention; political institutions and health.

John A. Rich, MD, MPH (*Duke University Medical School*) Director, Center for Nonviolence and Social Justice. Professor. Department of Health Management and Policy. Health disparities; men's health; violence; urban health issues; primary care.

Lucy Robinson, PhD (*Columbia University*). Assistant Professor. Department of Epidemiology and Biostatistics. Statistics, modeling and analysis of neuroimaging and CT image data, network modeling, spatio-temporal data, computational statistics, and functional data analysis.

John Rossi, VMD, MBE (*University of Pennsylvania*). Assistant Professor. Department of Community Health and Prevention. Bioethics and public health ethics, including moral theory, research ethics, ethics of risk & health communication, pediatric ethics, animal ethics.

Alexis Roth, PhD, MPH (*Indiana University*). Assistant Professor. Department of Community Health and Prevention. HIV/AIDS; sexually transmitted infections; individual, dyadic, and structural determinants of health; technology and health; mixed methods research; community-engagement and participatory research.

Randall L. Sell, ScD (*Harvard University*). Associate Professor. Department of Community Health and Prevention. Demographic variables, defining and measuring sexual orientations, sampling sexual minorities for public health research.

Paul Shattuck, PhD (*University of Wisconsin-Madison*) Director, Life Course Outcomes Research Program at the A.J. Drexel Autism Institute. Associate Professor. Department of Health Management and Policy. Design and evaluation of services for people with disabilities; autism.

David Barton Smith, PhD (*University of Michigan*). Research Professor. Department of Health Management and Policy. Healthcare; health disparities; history of public health; managed care.

Suruchi Sood, PhD (*University of New Mexico*). Associate Professor. Department of Community Health and Prevention. Human rights and health; nutrition; poverty; health disparities; innovation diffusion; HIV/

AIDS; violence; community-based participatory research; application of statistics to behavioral, biological and medical sciences; adolescent health; maternal and child health; international health; program evaluation; women's health; mixed methods; qualitative methods.

Mark Stehr, PhD (*University of California at Berkeley*) Assistant Director School of Economics. Associate Professor. Health economics, health behaviors, public finance, public policy.

Thersa Sweet, PhD, MPH (*University of Michigan*). Assistant Professor. Department of Epidemiology and Biostatistics. Molecular and infectious disease epidemiology, including virology, cancer biology, hospital infection control and prevention; epidemiologic studies involving HIV risk in sexual minorities.

Loni Philip Tabb, PhD (*Harvard University*). Assistant Professor. Department of Epidemiology and Biostatistics. Methods for categorical, missing and hierarchical data, spatial epidemiology/statistics.

Jennifer A. Taylor, PhD, MPH (*Johns Hopkins University*). Associate Professor. Department of Environmental and Occupational Health. Injury prevention, patient safety, healthcare quality, organizational culture, occupational safety, data policy and surveillance, first responders, healthcare workforce.

Renee M. Turchi, MD, MPH (*Johns Hopkins University*) Joint appointment in the Drexel University College of Medicine. Associate Professor. Department of Community Health and Prevention. Medical Home; children and youth with special health care needs; care coordination; cultural competency and access to care; maternal and child health policy, teaching, community partners.

Nicole A. Vaughn, PhD (*Uniformed Services University*). Assistant Professor. Department of Health Management and Policy. Racial/ethnic disparities in health and health care; nutrition and chronic disease; community-based participatory research, community engagement dissemination and implementation research.

Augusta M. Villanueva, PhD (*University of Texas at Austin*). Associate Professor. Department of Community Health and Prevention. Role of race, culture, and ethnicity on health status/outcomes; community-based participatory research; immigrant communities; academic service-learning.

Seth Welles, PhD, ScD (*Harvard University*). Professor. Department of Epidemiology and Biostatistics. Impact of HIV phenotypic and genotypic antiretroviral drug resistance on HIV disease progression and transmission; psychosocial risk for HIV infection and STDs among sexual minority adults and adolescents; correction of misclassification of sexuality and its impact on HIV/STI risk; surveys of sexual minority adults at community festivals and at health-clinics to assess demographic and psychosocial determinants of sexual risk-taking and HIV/STD infections; LGBT health disparities including excess risk for HIV and STIs, CVD and cancer; early life physical and sexual trauma, violence, mental health conditions and substance abuse.

Michael Yudell, MPH, MPhil, PhD (*Columbia University*) Chair, Department of Community Health and Prevention. Associate Professor. Public health genomics; bioethics; history of public health; addiction.

Issa Zakeri, PhD (*University of Illinois and Urbana-Champaign*). Professor. Department of Epidemiology and Biostatistics. Biostatistics, functional data analysis, longitudinal data analysis, multivariate analysis, statistical learning.

Minor in Global Public Health

About this Program

The Global Health minor is intended to complement any academic major offered at Drexel and to provide students with basic knowledge about global public health as well as the necessary skills and experience to begin to build their own unique global health career.

The minor will be open to all undergraduate students in all schools and colleges, and is designed around three specific educational objectives for students: to learn more about the problems of global public health in a classroom setting, to experience the issues in global health firsthand in a field setting, and to be exposed to the variety of careers available in global public health by working with faculty, professional staff, and graduate students who are currently engaged in the field.

Upon completion of the Global Health Minor, students are able to:

1. Analyze global health problems, issues and controversies using multiple disciplinary perspectives and conceptual frameworks,
2. Integrate knowledge from academic study and experiential learning toward being active and informed citizens in a global community,
3. Demonstrate the capacity to critically reflect on one's own values, ethics, assumptions and actions in the context of cultures, collaborations and institutions; and
4. Demonstrate the capacity to collaborate across differences (e.g. cultural, social, personal, economic, values, religious).

Requirements for admission

- Undergraduate students with at least 30 credits
- Undergraduate students in good academic standing

Please note: PBHL 101 is a prerequisite for all required PBHL courses in this minor.

It is strongly suggested that students in this minor participate in a field experience which can include an elective course or co-op.

Required courses:

PBHL 301	Epidemiology in Public Health	3.0
PBHL 303	Overview of Issues in Global Health	3.0
PBHL 304	Introduction to Health & Human Rights	3.0
PBHL 317	The World's Water	3.0
Elective Courses: take 12 credits of the following:		12.0
COM 390 [WI]	Global Journalism	
ECON 342	Economic Development	
PBHL 320	Exploring the HIV/AIDS Pandemic	
PBHL 321	Disease Outbreak Investigations	
PHIL 335	Global Ethical Issues	
WGST 225	Women & Human Rights Worldwide	
WGST 240	Women and Society in a Global Context	
Total Credits		24.0

Minor in Public Health

About this Program

The Dornsife School of Public Health trains new leaders to tackle society's current and future health challenges. The Public Health minor is designed to provide students with a broad overview of the field's diversity. Reflecting the interdisciplinary approach of the School, students are required to take courses originating from various public

health core disciplines, which include: epidemiology; community health and prevention; environmental and occupational health; and health management and policy.

This minor will be a relevant course of study for students pursuing pre-med, pre-law, biology and business curricula as well as students with an exposure to the breadth and depth of topics within public health, population-level challenges and solutions, as well as possible career options.

Requirements

Please note: PBHL 101 is a prerequisite for all required PBHL courses in this minor.

Required courses:

PBHL 301	Epidemiology in Public Health	3.0
PBHL 302	Introduction to the History of Public Health	3.0
PBHL 303	Overview of Issues in Global Health	3.0
PBHL 304	Introduction to Health & Human Rights	3.0
Complete 12 credits from the following:		12.0
BIO 318	Biology of Cancer	
ECON 240	Economics of Health Care Systems	
HSAD 210	Health-Care Ethics I	
PBHL 305	Women and Children: Health & Society	
PBHL 306	Introduction to Community Health	
PBHL 307	Injury Prevention and Control	
PBHL 308	The U.S. Public Health System	
PBHL 309	Public Health Ethics	
PBHL 310	Burden of Disease	
PBHL 311	Public Health Biology	
PBHL 312	Public Health Data Analysis	
PBHL 313	The Social Determinants of Health and Well-Being	
PBHL 314	Environmental and Occupational Health	
PBHL 315	Public Health Leadership	
PBHL 316	Drugs, Society, and Public Health	
PBHL 317	The World's Water	
PBHL 318	Violence and Trauma in Public Health	
PBHL 333	Health Inequality	
PHIL 321	Biomedical Ethics	
PSCI 353	International Human Rights	
PSY 355	Health Psychology	
PSY 368	Critical Psychology	
SOC 210	Race, Ethnicity and Social Inequality	
SOC 220	Wealth and Power	
SOC 235	Sociology of Health and Illness	
WGST 275	Women's Health and Human Rights	
Total Credits		24.0

Additional Information

For more information about this program, please contact the Program

Director:

Jennifer Breaux, DrPH, MPH

Director, Undergraduate Public Health Education

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The Antoinette Westphal College of Media Arts & Design

The Antoinette Westphal College of Media Arts & Design curricula include general studies in liberal arts and science, and experiential learning in studio, lab, and classroom settings within the disciplines.

Mission Statement

The Antoinette Westphal College of Media Arts & Design (<http://www.drexel.edu/westphal>) (The Westphal College) is a community of learning within the areas of media, design, fine arts, performing arts, and the management of creative enterprise that values experiential and immersive education. Students are encouraged to give form to ideas by learning to recognize invention and innovation in a rapidly changing world through creative, critical, and collaborative approaches. The Westphal College's diverse programs seek to foster innovation and leadership in progressively interconnected disciplines and areas of study.

The academic programs are rigorous, and provide the appropriate balance of a solid foundation with individual creative direction, cultural awareness, strong technical skills, and an understanding of management and professional practice. The College is committed to continual review of curricula, processes and outcomes in order to make those improvements and refinements necessary to further enrich the students' education, and to continue to foster independent thinkers, astute leaders, and creative problem solvers.

Majors

- Animation & Visual Effects (BS) (p. 462)
- Architecture (BA) (p. 465)
- Art History (BA, BS) (p. 472)
- Dance (BS) (p. 480)
- Design & Merchandising (BS) (p. 485)
- Entertainment & Arts Management (BS) (p. 489)
- Fashion Design (BS) (p. 499)
- Film & Video (BS) (p. 506)
- Game Design & Production (BS) (p. 510)
- Graphic Design (BS) (p. 512)
- Interactive Digital Media (BS) (p. 515)
- Interior Design (BS) (p. 518)
- Music Industry (BS) (p. 522)
- Photography (BS) (p. 526)
- Product Design (BS) (p. 528)
- Screenwriting & Playwriting (BS) (p. 530)
- TV Production & Media Management (BS) (p. 537)
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Minors

- Animation & Visual Effects (p. 464)
- Architecture (p. 471)
- Art History (p. 472)

- Dance (p. 484)
- Digital Media (p. 540)
- Film Studies (p. 509)
- Fine Art (p. 540)
- Interactive Digital Media (p. 517)
- Interdisciplinary Smart Initiatives (p. 541)
- Jazz and African-American Music (p. 541)
- Music (p. 542)
- Music Performance (p. 542)
- Music Theory and Composition (p. 542)
- Performing Arts (p. 542)
- Photography (p. 527)
- Product Design (p. 530)
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- Screenwriting (p. 543)
- Somatics (p. 543)
- Sports Media Production (p. 543)
- Sustainability in the Built Environment (p. 543)
- Television Industry and Enterprise (p. 544)
- TV Production & Media Management (p. 546)
- Theatre (p. 546)
- Video Production (p. 509)

Certificates

- Dance Studies (p. 547)

Undergraduate Co-operative Education

Co-op is an essential component in defining the "Drexel Difference" in the Antoinette Westphal College of Media Arts & Design.

Westphal College students spend a minimum of six months (two terms) applying classroom and studio skills in positions within their chosen professions. Often referred to as "The Ultimate Internship," a co-op is a valuable, direct way to learn about a career, work with other professionals, and gain skills and experience that set Drexel graduates apart from students who complete their professional education in more traditional academic settings.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Special Programs

The Westphal College offers a number of special programs including Study Abroad, Accelerated Dual Degree, Accelerated Summer Courses, Enrichment Programs and Dance for Professionals.

Study Abroad

Many students in the College participate in study abroad ranging from ten days to two terms. Some of the more popular programs are: Drexel in London, Fashion in London, Australia, Rome, France and Prague. Students interested in study abroad should consult with their Program Director, Academic Advisor and the Study Abroad Office, 215-895-1704.

Enrichment Programs

The Department of Architecture & Interiors runs summer study tours abroad to Rome and Paris as elective course offerings in history and theory. These programs focus the travel portion into three-week periods to accommodate student work commitments.

Accelerated Dual Degree Programs

Dual degree programs enable academically qualified students to earn both a bachelor's and an advanced degree in five years.

The following Accelerated Degree Programs are available to qualified High School students entering their freshman year in the Westphal College:

- **BS Music Industry/MBA:** This program offers the highly motivated and musically focused student an opportunity to combine music theory and technology with the MBA degree. The program is available to qualified Music Industry majors.
- **BS Entertainment & Arts Management/MBA:** This program allows high-achieving students preparing for leadership roles in media companies and arts organizations the opportunity to earn their MBA degree. The program is available to qualified Entertainment & Arts management majors.
- **BS in Design & Merchandising/MBA:** This program combines study in the area of fashion retail merchandising with the MBA degree. The program is available to qualified Design and Merchandising majors.

The following Accelerated Degree Programs are available to qualified matriculated students in the Westphal College:

- **BA Art History/MS in Arts Administration:** This five-year program is an excellent option for the student who wishes to broaden and deepen his or her knowledge of the world's cultures and their histories and further develop his or her capacities for critical thinking, reading and writing. Specialized University resources, such as the Leonard Pearlstein Gallery (<http://www.drexel.edu/pearlsteingallery>), the Drexel Collection (<http://drexel.edu/DrexelCollection/about/galleries>), and the Robert and Penny Fox Historic Costume Collection (<http://www.drexel.edu/foxcollection>) are available to directly support the student's studies.
- **BA Art History/MS in Museum Leadership:** This five-year program is an excellent option for the student who wishes to broaden and deepen his or her knowledge of the world's cultures and their histories and further develop his or her capacities for critical thinking, reading and writing, or gain competencies in various applied or technical areas. Specialized University resources, such as the Leonard Pearlstein Gallery (<http://www.drexel.edu/pearlsteingallery>), the Drexel Collection (<http://www.drexel.edu/DrexelCollection>), The Academy of Natural Sciences of Drexel University (<http://www.ansp.org/visit/exhibits>), and the Robert and Penny Fox Historic Costume Collection (<http://www.drexel.edu/foxcollection>) are available to students wishing to pursue careers in Museum work.
- **BS/MS in Digital Media Programs:** This program allows highly motivated students to complete both the BS (Animation & Visual Effects, Game Design & Production, Interactive Digital Media) and MS degrees in Digital Media programs in five years.
- **BS Interior Design/MS in Interior Architecture & Design:** This program combines the Interior Design undergraduate and the graduate Interior Architecture & Design degrees in an intensive five-year program that provides an opportunity for the student to focus on an area of specialization.

- **BS Dance/MS in Elementary Education:** This career focus, dance in education, prepares students for jobs as elementary school teachers (grades Pre-Kindergarten through 4) who may also serve as school dance specialists. Students choosing this option will earn a BS degree in Dance through the Department of Performing Arts and may elect to continue for a fifth year of study to earn an MS in the Teaching, Learning and Curriculum-Teacher Certification through the School of Education.
- **BS Entertainment & Arts Management/MS in Arts Administration:** While not an accelerated program, students who complete the EAM program may also choose to pursue a graduate degree at Drexel in Arts Administration. Students who apply for the graduate Arts Administration program and graduate with a 3.5 GPA in the last two years of the EAM degree program are automatically accepted into the program.

Accelerated Summer Courses

With departmental permission, students may enroll in Visual Studies accelerated courses over the summer. These typically include courses in Accelerated Design I, II, III, Introductory Drawing and Figure Drawing I. These courses primarily are offered so that new undergraduate transfer students and pre-graduate students can complete their future programs in an economical time frame. Students with some experience in studio coursework may be eligible to take accelerated courses. A portfolio review is required to determine eligibility.

Dance Part Time Professionals

The Part Time Professional Option of the Dance Major is designed for professional dancers interested in pursuing a BS degree in Dance while continuing their performance careers, or at the conclusion of their performing careers. This program grants "professional life experience" credits and an extended period of time to fulfill the remaining required courses.

Ensembles

Choral Ensembles

University Chorus (MUSC 101/001) Dr. Steven Powell, Director
As auditioned, 60-voice group which performs concert choir literature, both a cappella and with instrumental accompaniment.

Chamber Singers (MUSC 102/001) Dr. Steven Powell, Director
A select group of 18 singers chosen by audition from the University Chorus. They perform secular music from the Renaissance period (Madrigals).

Vocal Jazz Ensemble (MUSC 103/001) Dr. Steven Powell, Director
A select group of 16 singers chosen by audition from the University Chorus. They perform "anything that swings," doing a variety of pieces from the 20's to the 10's with a three-piece back-up band.

All College Choir (MUSC 104/001) Scott Bacon, Director
A large un-auditioned choir that performs a varied repertoire including light classics, spirituals, and popular music.

Gospel Choir (MUSC 115/001) Rev. Greg Ross, Director
The Gospel Choir is a group of approximately 60 singers that is open to all Drexel Students. This ensemble performs contemporary gospel music with its own backup band.

Instrumental Ensembles

Concert Band (MUSC 105/001) Dr. Wesley Broadnax, Director
Students who are proficient on woodwind, brass, or percussion instruments may become members of this large instrumental ensemble by auditioning for the director. Membership is based on the student's ability and the instrumental needs of the ensemble.

The Basketball Pep Band (MUSC 116/001) Dr. Wesley Broadnax, Director
This band is made up of brass players, saxophone players, and trap drummers drawn from the membership of the Concert Band.

Jazz Orchestra (MUSC 107/001) Dr. George Starks, Director
Performs music which is associated with and/or inspired by acknowledged masters of the jazz tradition such as Duke Ellington, Count Basie, Charlie Parker, Dizzy Gillespie, Miles Davis, Charles Mingus, Thad Jones, and others.

The Jazztet (MUSC 108/001) Dr. George Starks, Director
This ensemble performs small group masterpieces such as literature associated with Art Blakey, Horace Silver, Clifford Brown, John Coltrane, and others.

University Orchestra (MUSC 109/001)
This is a full orchestra that performs concert repertoire of various periods from the 18th century to the present day. Wind, brass, and percussionists must be in the Concert Band in order to participate.

Fusion Band (MUSC 112/001) Lynn Riley, Director
A small combo utilizing a rhythm section and any varying combination of saxes and brass. The repertoire includes music of the styles of jazz, Latin, funk, and rock.

Percussion Ensemble (MUSC 113/001) Mark Beecher, Director
Students in this group will have the opportunity to play, improve and perform on many instruments of the percussion family including: snare drum, bass drum, xylophone, marimba, timpani- and even hands and feet.

Mediterranean Ensemble (MUSC 114/001) Bruce Kaminsky, Director
Students perform traditional music from Southeastern Europe, the Middle East and Northern Africa. All traditional and Western instruments are welcomed including oud, bouzouki and saz along with guitar, violin and sax. Percussionists can play Drexel's wide assortment of traditional drums including doumbek, riq and djimbe. Students will have the opportunity to perform 7/8 and 9/8 rhythms from Greece, 10/8 rhythms from Turkey, learn songs in Greek, Turkish, Arabic and Hebrew. The ensemble also has a dance component.

Guitar Ensemble II (MUSC 106/002) Greg Wright, Director
An auditioned group of approximately ten guitarists plus bass players and a drummer. Repertoire includes a side range of styles utilizing music reading ability and improvisation skills

Guitar Ensemble I (MUSC 106/001) Greg Wright, Director
An un-auditioned group of ten to fifteen guitarists who use repertoire to sharpen their musical and technical skills.

Keyboard Ensemble (MUSC 110) Wanda Canfield, Director
A group of twelve keyboardists who utilize acoustic and electronic pianos to play a variety of repertoire.

Rock Ensemble (MUSC 117) Lynn Riley, Director

A small combo of vocalists, guitarists, bassists, keyboardist, and drummers who perform repertoire ranging from classic rock to alternative.

Drexel University Dance Program

Dr. Miriam Giguere, Director, Dance Ensemble (DANC 131)
Elegant, exciting, sophisticated, sleek are all words commonly used to describe the Drexel Dance Ensemble. Performing ballet, jazz, tap and modern dance, the Drexel Dancers are both versatile and original.

The Drexel Dance Ensemble (DANC 131)
A professional caliber dance company presenting two fully-produced concerts in the Mandell Theater each year. Students participating in the 60 member ensemble are given the opportunity to explore their artistry through working with professional choreographers, both faculty and guests artists, as well as a selection of student choreographers. The diversity of choreographic talent promises a show with dimension and unique perspectives on contemporary and classical dance forms. Entrance into this company is open to any dancers beyond their freshman year by audition twice yearly.

The FreshDance Ensemble (DANC 131)
Dance company open exclusively to freshmen at Drexel. The 30 dancers in the ensemble perform two fully produced concerts at the Mandell Theater each year. Works by both professional and student choreographers are performed in a variety of genres including ballet, modern, jazz and hip-hop. Entrance into the company is open twice yearly by audition.

The Youth Performance Exchange Touring Ensemble (DANC 131)
This 8-10 member dance troupe performs assembly style lecture demonstration programs introducing student K-8 to the art of dance. Students learn the program each fall and perform for 15-20 elementary and middle school each Friday morning in winter and spring terms. Open by audition each fall term.

Drexel University Theatre Program

Mr. Nick Anselmo, Director of Theatre Programs

Introduction to Theater Production Practicum (THTR 130)
An introduction to the tools, basic skills and safety procedures that students must know in order to work on Theater Program shows.

Theatre Performance Practicum (THTR 131)
Students perform in Mainstage productions in the URBN Annex Black Box Theater or the Mandell Theater. An audition is required to participate in this ensemble.

Theatre Production Practicum (THTR 132)
Students serve as the stage crew for all theatrical productions at the URBN Annex Black Box Theater or the Mandell Theater and build all the sets, costumes, hang lights and run sound for all the shows.

Theatre Management Practicum (THTR 133)
Students work as stage managers, production managers, and in administrative positions of Drexel's Co-op Theater Company.

Open Mic Management Practicum (THTR 134)
Students manage and run all aspects of The Late Night Series, a free weekly open mic that strives to both champion and nurture performing artists with Philadelphia and the Drexel community.

Theatre Performance Ensemble (THTR 141)

The Theatre Performance Ensemble focuses on a specific area of performance training, creation, and research to supplement the standard theatre curriculum in performance.

Director's Lab Practicum (THTR 142)

Practical experience in acting for the stage through participation in a student directed one-act play in conjunction with the Play Directing Class. An audition is required to participate in this ensemble.

Musical Theatre Cabaret (THTR 143)

Practical experience preparing a song for performance with an emphasis on applying acting techniques to the delivery, it concludes with a public Cabaret performance.

New Works Festival Performance Practicum (THTR 144)

Practical experience in acting and dramaturgy for the stage through participation, development, and performance of student written plays in conjunction with the Page-to-Stage class.

Students participate in all aspects of theatre performance and production, including; acting, directing, design, costumes, lighting, sets, sound, publicity, and box office.

Facilities

Designed to be an incubator for tomorrow's creative leaders, The URBN Center is the award-winning home for many of the programs in the Antoinette Westphal College of Media Arts & Design, providing students with rigorous, studio intensive instruction with the latest technological resources. Majors that share this space include Animation & Visual Effects, Architecture, Design & Merchandising, Entertainment & Arts Management, Fashion Design, Game Design & Production, Graphic Design, Interactive Digital Media, Interior Design, Music Industry and Product Design.

The URBN Center also provides a black box theater (<http://drexel.edu/performingarts/about/facilities/URBN-center-black-box-theater>) for our Theatre program, a 3,500 square foot Leonard Pearlstein Gallery (<http://www.drexel.edu/pearlsteingallery>), two MIDI labs (<http://drexel.edu/westphal/academics/undergraduate/MIP/Facilities>) and MAD Dragon Records Suite, a Motion Capture studio, a Hybrid Making Lab featuring Universal Laser Cutters and 3D printing and prototyping, the Robert and Penny Fox (<http://www.drexel.edu/foxcollection>) Historic Costume Collection (<http://www.drexel.edu/foxcollection>), the Charles Evans Fashion Design Library, a multi-use screening & lecture room, and offices for the College's administrative functions.

The Paul Peck Problem Solving & Research Building is home to our Photography major and Department of Art & Art History. Within this facility, the Westphal College occupies a 10,000- square-foot photography lab, lighting studios, two digital imaging labs, as well as six lecture/laboratory spaces for our Visual Studies courses.

In University Crossings, a 25,000 square foot space houses offices for Film & Video, Screenwriting & Playwriting and Television faculty. Also in this building are two state-of-the-art digital editing facilities, a shooting studio with special effects capability, two screening rooms, a digital audio post production studio, several multi-media classrooms, and a well-stocked equipment room.

MacAlister Hall serves students in the Westphal College with: digital audio labs and recording studios for Music Industry; The Mandell Theater (<http://www.drexel.edu/performingarts/about/facilities/mandell-theater>), a 420-

seat proscenium theater with scene shop and dressing rooms; the Ellen Forman Memorial Dance Studio (<http://drexel.edu/performingarts/about/facilities/ellen-forman-dance-studio>); and a high-definition studio space for our college-operated television station, DUTV, which reaches over 400,000 households.

Animation and Visual Effects

Major: Animation and Visual Effects

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 186.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 10.0304

Standard Occupational Classification (SOC) code: 27-1014

About the Program

The Animation & Visual Effects major provides students with the artistic, technological, story-telling and design skills to succeed as animators and visual effects artists in the highly competitive entertainment, design and communications industries.

Animation and Visual Effects has grown beyond its traditional applications in entertainment, such as feature films, television and internet based programming. Today, these production techniques are widely used in feature films, medical research, engineering, virtual reality and augmented reality systems, immersive media, web content, the performing arts, interactive game systems, corporate communications and higher education. The depth and complexity of this field necessitates a rigorous course of study.

To best prepare students for the demands of careers in these cutting-edge disciplines, this program provides a foundational understanding of design and technology, with core courses in multiple aspects of digital media, completing a six month co-op and delving into rigorous coursework covering specialized aspects of digital animation, visual effects and immersive media. Students will learn the underlying principles of animation, along with advanced, industry-standard software and hardware technologies. The entire creative pipeline from storyboarding through modeling and animation is covered in depth, allowing students to experience all aspects of production.

Additional Information

To find out more about this major, visit the Westphal College's Animation & Visual Effects Major (<http://www.drexel.edu/westphal/academics/undergraduate/ANIM>) web page.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
PHYS 121	Physical Science for Design I	4.0
PHYS 122	Physical Science for Design II	4.0
UNIV A101	The Drexel Experience	2.0
Required Arts and Humanities-students elect a minimum of 9 credits		9.0
Required Social Science-students elect a minimum of 9.0 credits		9.0

Free electives	24.0
Art and Art History Requirements	
ARTH 102 History of Art II: Renaissance to Romanticism	3.0
ARTH 103 History of Art: Modern Art	3.0
ARTH 300 [WI] History of Modern Design	3.0
VSST 108 Design I for Media	3.0
VSST 109 Design II for Media	3.0
VSST 110 Introductory Drawing	3.0
VSST 111 Figure Drawing I	3.0
VSST 210 Painting Basics	3.0
Media and Computer Science Requirements	
ANIM 231 Scripting for Animation and Visual Effects	3.0
CS 140 Introduction to Multimedia Programming	3.0
or CS 171 Computer Programming I	
FMVD 110 Basic Shooting and Lighting	3.0
FMVD 206 Audio Production and Post	3.0
SCR 270 [WI] Screenwriting I	3.0
VSCM 240 Typography I	3.0
Digital Media Core Requirements	
ANIM 140 Computer Graphics Imagery I	3.0
ANIM 141 Computer Graphics Imagery II	3.0
ANIM 152 Multimedia Timeline Design	3.0
ANIM 211 Animation I	3.0
DIGM 100 Digital Design Tools	3.0
DIGM 105 Overview of Digital Media	3.0
DIGM 223 Creative Concept Design	3.0
DIGM 250 Professional Practices	3.0
DIGM 350 [WI] Digital Storytelling	3.0
DIGM 451 [WI] Explorations in New Media	3.0
DIGM 475 [WI] Seminar: The Future of Digital Media	3.0
DIGM 490 Digital Media Senior Project	9.0
DIGM 491 Digital Media Senior Project Studio	3.0
GMAP 260 Overview of Computer Gaming	3.0
IDM 100 Introduction to Web Development	3.0
Animation Requirements	
ANIM 212 Animation II	3.0
ANIM 215 History of Animation	3.0
ANIM 220 Digital Compositing I	3.0
ANIM 221 Digital Compositing II	3.0
ANIM 247 Organic Modeling	3.0
ANIM 314 Character Animation I	3.0
Animation Electives	
Select two of the following:	6.0
ANIM 248 Advanced Lighting	
ANIM 315 Character Animation II	
ANIM 321 Immersive Animation	
ANIM 388 Spatial Data Capture	
ANIM 410 Advanced Compositing	
ANIM 411 Advanced Animation	
Total Credits	186.0

Sample Plan of Study

Term 1		Credits
DIGM 100 Digital Design Tools		3.0
DIGM 105 Overview of Digital Media		3.0
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research		3.0
PHYS 121 Physical Science for Design I		4.0
UNIV A101 The Drexel Experience		1.0
VSST 110 Introductory Drawing		3.0
Term Credits		17.0
Term 2		

ANIM 140 Computer Graphics Imagery I		3.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing		3.0
FMVD 110 Basic Shooting and Lighting		3.0
PHYS 122 Physical Science for Design II		4.0
VSST 108 Design I for Media		3.0
UNIV A101 The Drexel Experience		1.0
Term Credits		17.0
Term 3		
ANIM 141 Computer Graphics Imagery II		3.0
ANIM 152 Multimedia Timeline Design		3.0
CIVC 101 Introduction to Civic Engagement		1.0
ENGL 103 Composition and Rhetoric III: Themes and Genres		3.0
MATH 101 Introduction to Analysis I		4.0
VSST 109 Design II for Media		3.0
Term Credits		17.0
Term 4		
ANIM 211 Animation I		3.0
CS 140 Introduction to Multimedia Programming		3.0
or 171 Computer Programming I		
DIGM 223 Creative Concept Design		3.0
GMAP 260 Overview of Computer Gaming		3.0
VSST 111 Figure Drawing I		3.0
Term Credits		15.0
Term 5		
ANIM 212 Animation II		3.0
ANIM 215 History of Animation		3.0
ARTH 102 History of Art II: Renaissance to Romanticism		3.0
IDM 100 Introduction to Web Development		3.0
VSST 210 Painting Basics		3.0
Term Credits		15.0
Term 6		
ANIM 220 Digital Compositing I		3.0
ANIM 247 Organic Modeling		3.0
ARTH 103 History of Art: Modern Art		3.0
SCR 270 [WI] Screenwriting I		3.0
Elective		3.0
Term Credits		15.0
Term 7		
ANIM 221 Digital Compositing II		3.0
COOP 101 Career Management and Professional Development		0.0
COM 230 Techniques of Speaking		3.0
DIGM 250 Professional Practices		3.0
DIGM 350 [WI] Digital Storytelling		3.0
FMVD 206 Audio Production and Post		3.0
Term Credits		15.0
Term 8		
ANIM 231 Scripting for Animation and Visual Effects		3.0
ANIM 314 Character Animation I		3.0
ARTH 300 [WI] History of Modern Design		3.0
Free elective		3.0
Animation elective *		3.0
Term Credits		15.0
Term 9		
ANIM 410 Advanced Compositing		3.0
DIGM 451 [WI] Explorations in New Media		3.0
Animation elective *		3.0
Arts and Humanities elective		3.0
Social Science elective		3.0
Term Credits		15.0
Term 10		
ANIM 411 Advanced Animation		3.0

DIGM 490	Digital Media Senior Project	3.0
DIGM 491	Digital Media Senior Project Studio	1.0
Free elective		3.0
Arts and Humanities elective		3.0
Social Science elective		3.0
Term Credits		16.0
Term 11		
DIGM 490	Digital Media Senior Project	3.0
DIGM 491	Digital Media Senior Project Studio	1.0
Social Science elective		3.0
Free electives		6.0
Term Credits		13.0
Term 12		
DIGM 475 [WI]	Seminar: The Future of Digital Media	3.0
DIGM 490	Digital Media Senior Project	3.0
DIGM 491	Digital Media Senior Project Studio	1.0
Arts and Humanities elective		3.0
Free electives		6.0
Term Credits		16.0
Total Credit: 186.0		

* See degree requirements (p. 462).

Dual/Accelerated Degrees

The accelerated degree program enables academically qualified students to earn both their bachelor's degree and a master's degree in digital media — graduating sooner than they would in traditional programs.

Current Drexel animation and visual effects students may apply for the accelerated BS/MS degree through the Graduate College of Drexel University after completing 90.0 credits, but no more than 120.0 credits. Contact the Graduate College of Drexel University (<http://www.drexel.edu/graduatecollege>) for further information.

Minor in Animation and Visual Effects

The Animation and Visual Effects Minor requires the completion of eight courses (minimum 24.0 credits). The minor provides basic foundation in the technological, story-telling and design skills used by animators and visual effects artists in the highly competitive entertainment and design worlds, with the opportunity for individualized tailoring according to the student's interests.

Required Courses:

DIGM 100	Digital Design Tools	3.0
or VSCM 200	Computer Imaging II	
ANIM 140	Computer Graphics Imagery I	3.0
ANIM 141	Computer Graphics Imagery II	3.0
ANIM 152	Multimedia Timeline Design	3.0
ANIM 211	Animation I	3.0
Select three of the following:		9.0
ANIM 212	Animation II	
ANIM 215	History of Animation	
ANIM 220	Digital Compositing I	
ANIM 221	Digital Compositing II	
ANIM 247	Organic Modeling	
ANIM 248	Advanced Lighting	
ANIM 314	Character Animation I	
ANIM 315	Character Animation II	
ANIM 388	Spatial Data Capture	
ANIM 410	Advanced Compositing	

ANIM 411	Advanced Animation	
Total Credits		24.0

Facilities

Our facilities include more than 100 triple-boot MacPro and Boxx Technology workstations, a 16 camera Vicon motion capture studio, green screen room, a 2-ton motion platform theme park ride, FTIR multitouch displays, laser scanner, stereoscopic projector, eye tracker, fNIR and EEG brain interfaces, and 3D theater, recording studios, etc. Students use professional software including Unreal, Unity3D, Maya, 3D Studio Max, Houdini, Massive, etc.

More information can be found at Drexel RePlay Lab's Facilities (<http://replay.drexel.edu/facilities.html>) page.

Animation and Visual Effects Faculty

Theo Artz, BFA (*Tyler School of Art, Temple University*). Associate Professor. Digital media.

John Berton Assistant Professor. Visual effects, lighting and rendering Computer-Generated Imagery (CGI)

Paul Diefenbach, PhD (*University of Pennsylvania*). Assistant Professor. Game development, real-time rendering.

Jeremy Fernsler, BA (*Pennsylvania State University*) Program Director, *Game Design & Production*. Assistant Teaching Professor. Digital effects artist; compositor and animator for the feature film visual effects industry.

Nick Jushchyshyn, MFA (*Academy of Art University*) Program Director, *Animation and Visual Effects*. Assistant Teaching Professor. Visual effects, digital media and animation.

Frank J. Lee, PhD (*Carnegie Mellon University*). Associate Professor. Human-computer interaction; cognitive engineering and science; intelligent software agents for games and education.

Robert Lloyd, MFA (*Temple University*). Assistant Teaching Professor. Game development, themed entertainment and motion simulation.

David Mauriello, BA (*Lafayette College*). Assistant Professor. 3D modeling and animation.

Glen Muschio, PhD (*Temple University*). Associate Professor. Digital media, society, communication.

Stefan Rank, PhD (*Vienna University of Technology*). Assistant Professor. Artificial intelligence, game design and human-computer interaction.

Jervis Thompson, BS (*Drexel University*). Associate Teaching Professor. Digital media, interactive multimedia.

Michael Wagner, PhD (*Vienna University of Technology*) Program Director, *Digital Media*. Associate Professor. Educational use of digital media and computer games.

Jichen Zhu, PhD (*Georgia Institute of Technology*). Assistant Professor. Developing humanistic and interpretive framework of computational technology, particularly artificial intelligence (AI), and constructing AI-based cultural artifacts; interactive storytelling, games and software studies.

Architecture

Major: Architecture

Degree Awarded: Bachelor of Architecture Degree (BArch)

Calendar Type: Quarter

Total Credit Hours: 227.0

Classification of Instructional Programs (CIP) code: 04.0201

Standard Occupational Classification (SOC) code: 17-1011

About the Program

The practice of architecture requires a unique skill set—creative thinking and aesthetic sensitivity balanced with technical knowledge, cultural understanding, and social responsibility. Critical thinking and communication skills are needed. Drexel's Bachelor of Architecture program encompasses foundation courses in the applied and social sciences, the humanities, and a wide range of professional architecture courses to prepare students for careers in architecture and related fields. At the heart of the curriculum are the design studios where students are challenged to apply their knowledge acquired from the above disciplines to consequential design problems.

Drexel's work/study program is an experiential-based learning model that complements and provides an alternative to traditional full-time academic architecture programs. The Drexel model provides a practical, high-quality education to those students who seek early exposure to daily architectural practice as well as an affordable alternative to students who could not otherwise be able to enter the profession.

At Drexel there are two paths to an accredited Bachelor of Architecture degree, serving two distinct populations: the 2+4 option and the part-time evening option.

The Architecture Program's advising guidelines (<http://www.drexel.edu/westphal/undergraduate/ARCH/Curriculum/#c3>) include scheduling guidelines, studio advancement requirements, and general studio policies.

Accreditation

In the United States, most registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (<http://www.naab.org>) (NAAB), which is the sole agency authorized to accredit US professional degree programs in architecture, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted an eight-year, three-year, or two-year term of accreditation, depending on the extent of its conformance with established educational standards.

Doctor of Architecture and Master of Architecture programs may require a pre-professional undergraduate degree in architecture for admission. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

Drexel University, Antoinette Westphal College of Media Arts & Design, Department of Architecture + Interiors offers the following NAAB-accredited degree program(s):

2+4 Option: years part-time)	6 year program (2 years full-time, 4 years part-time)
	Bachelor of Architecture 227.0 undergraduate quarter- term credits

Part-Time Evening Option:	7 year part-time program Bachelor of Architecture 227.0 undergraduate quarter- term credits
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Next accreditation visit for both tracks: 2018

About the 2+4 Option

The 2+4 option is an accelerated route designed for a small class of well-prepared students entering directly from high school. In this program, two years of full-time coursework address the basic principles of architectural design and satisfy fundamental University core requirements in the arts and sciences as well as those job-related skills that are needed for entry-level professional positions. A comprehensive review of performance will take place after each year to ensure that students are making sufficient progress in all areas. After successfully completing the minimum requirements of the full-time phase, students find full-time employment in the building industry, including architecture firms, while continuing their academic program part-time in the evening for four additional years.

About the Part-time Evening Program

The part-time evening option is one of only two part-time evening architectural programs in the United States, leading to an accredited Bachelor of Architecture degree. Designed for non-traditional and transfer students, this program offers all courses part-time in the evening, enabling students to work full-time. The evening program sequence is seven years, but transfer students with university-level design credits can reduce its length by meeting specific program requirements through transcript and portfolio review.

By combining work and study, all Drexel Architecture students may be able to simultaneously satisfy their required internship for licensure, now called the Architectural Experience Program (AXP) while completing their professional degree, thus qualifying for the registration exam on graduation in most jurisdictions.

Additional Information

For more information, visit the Architecture Program (<http://www.drexel.edu/westphal/academics/undergraduate/ARCH>) website. For advising and transfer information please review the Architecture Program's curriculum (<http://www.drexel.edu/westphal/academics/undergraduate/ARCH/Curriculum>) page.

In August of 2015, Drexel was approved by the National Council of Architectural Registration Boards (NCARB) (<http://www.ncarb.org>) for participation in the Integrated Path to Architectural Licensure (IPAL) (<http://www.ncarb.org/Studying-Architecture/Overview-Of-Architectural-Education/Integrated-Path-to-Architectural-Licensure.aspx>) Program. Students seeking access to this track will be reviewed by the Program Director and Faculty starting in the Spring of 2017.

Note: Architecture vs Architectural Engineering

Because Drexel University offers two programs with "architecture" in their titles, it is useful to point out the significant differences between them:

- **Architects** design buildings to meet people's spatial, organizational, and aesthetic needs; they also coordinate the building design process. All states, the District of Columbia, and three U.S. territories (Guam, Puerto Rico, and the U.S. Virgin Islands) require individuals to be licensed (registered) before they may call themselves architects or contract to provide architectural services. Many architecture school graduates work in the field even though they are not licensed or while

they are in the process of becoming licensed. But they may not call themselves an architect.

A licensed architect is required to take legal responsibility for all work. Licensure requirements usually include:

- A professional degree in architecture;
 - A period of practical training or internship; and
 - Passage of all divisions of the Architect Registration Examination (ARE).
- **Architectural engineers** specialize in the design of engineering systems within buildings. Architectural engineers earn Bachelor of Science degrees and become professional engineers with the required experience and state examinations. Students whose interests are focused on the technological and engineering aspects of buildings should review Drexel's major in Architectural Engineering (<http://catalog.drexel.edu/undergraduate/collegeofengineering/architecturalengineering>) offered by the College of Engineering.

Degree Requirements (2 + 4 Option)

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
PHIL 317	Ethics and Design Professions	3.0
PHYS 182	Applied Physics I	3.0
PHYS 183	Applied Physics II	3.0
UNIV A101	The Drexel Experience	2.0
Humanities electives		6.0
Natural Science elective		3.0
Social Science electives		9.0
Free electives		30.0

Studios (must be taken in order)

ARCH 181	Architecture Studio 1A	4.0
ARCH 182	Architecture Studio 1B	4.0
ARCH 183	Architecture Studio 1C	4.0
ARCH 281	Architecture Studio 2A	4.0
ARCH 282	Architecture Studio 2B	4.0
ARCH 283	Architecture Studio 2C	4.0
ARCH 381	Architecture Studio 3A	4.0
ARCH 382	Architecture Studio 3B	4.0
ARCH 383	Architecture Studio 3C	4.0
ARCH 481	Architecture Studio 4A	4.0
ARCH 482	Architecture Studio 4B	4.0
ARCH 483	Architecture Studio 4C	4.0
ARCH 487	Architecture Studio 5A	4.0
ARCH 488	Architecture Studio 5B	4.0
ARCH 489	Architecture Studio 5C	4.0
ARCH 493	Senior Project I	4.0
ARCH 494	Senior Project II	4.0
ARCH 495	Senior Project III	4.0

Required Professional Courses (2 + 4 Option)

ARCH 141	Architecture and Society I	3.0
ARCH 142	Architecture and Society II	3.0
ARCH 143	Architecture and Society III	3.0
ARCH 144	Architecture and Society IV	3.0
ARCH 170	Architectural Technology I	3.0

ARCH 172	Architectural Technology II	3.0
ARCH 173	Architectural Technology III	3.0
ARCH 211	Architectural Representation I	2.0
ARCH 212	Architectural Representation II	2.0
ARCH 213	Architectural Representation III	2.0
ARCH 224	Architectural Representation IV	2.0
ARCH 225	Architectural Representation V	2.0
ARCH 226	Architectural Representation VI	2.0
ARCH 274	Architectural Technology IV	3.0
ARCH 275	Architectural Technology V	3.0
ARCH 276	Architectural Technology VI	3.0
ARCH 335	Professional Practice I	3.0
ARCH 336	Professional Practice II	3.0
ARCH 377	Architectural Technology VII	3.0
ARCH 378	Architectural Technology VIII	3.0
ARCH 379	Architectural Technology IX	3.0
ARCH 431 [WI]	Architectural Programming	3.0

History and Theory Electives

Select three of the following:		9.0
ARCH 340	American Architecture & Urbanism	
ARCH 341	Theories of Architecture I [WI]	
ARCH 342	Theories of Architecture II [WI]	
ARCH 343	Theories of Architecture III	
ARCH 344	History of Modern Architecture I [WI]	
ARCH 346	History of Philadelphia Architecture [WI]	
ARCH 347	Architectural Study Tour [WI]	
ARCH 348	Studies in Vernacular Architecture [WI]	
ARCH 350	Contemporary Architecture	
ARCH 421	Environmental Psychology and Design Theory [WI]	
ARCH 441	Urban Design Seminar	
ARCH 442	Urban Design Seminar II	
ARCH 499	Special Topics in Architecture [WI]	

Professional Electives

Select three of the following:		9.0
ARCH 432	The Development Process	
ARCH 451	Advanced Drawing	
ARCH 455	Computer Applications in Architecture I	
ARCH 456	Computer Applications in Architecture II	
ARCH 463	Emerging Architectural Technology	
ARCH 464	Building Enclosure Design	
ARCH 465	Energy and Architecture	
ARCH 491	Advanced Topics in Architecture	
ARCH 499	Special Topics in Architecture [WI]	
An approved Construction Management (CMGT) course		

Total Credits 227.0

Sample Plan of Study (2 + 4) Option

Freshman

Term 1		Credits
ARCH 141	Architecture and Society I	3.0
ARCH 181	Architecture Studio 1A	4.0
ARCH 211	Architectural Representation I	2.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0

UNIV A101	The Drexel Experience	1.0
	Term Credits	17.0
Term 2		
ARCH 142	Architecture and Society II	3.0
ARCH 182	Architecture Studio 1B	4.0
ARCH 212	Architectural Representation II	2.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV A101	The Drexel Experience	1.0
	Term Credits	17.0
Term 3		
ARCH 143	Architecture and Society III	3.0
ARCH 183	Architecture Studio 1C	4.0
ARCH 213	Architectural Representation III	2.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
	Humanities elective	3.0
UNIV 101	The Drexel Experience	1.0
	Term Credits	16.0
Sophomore		
Term 4		
ARCH 144	Architecture and Society IV	3.0
ARCH 170	Architectural Technology I	3.0
ARCH 281	Architecture Studio 2A	4.0
ARCH 224	Architectural Representation IV	2.0
	Free elective	3.0
	Social Science Elective	3.0
	Term Credits	18.0
Term 5		
ARCH 172	Architectural Technology II	3.0
ARCH 225	Architectural Representation V	2.0
ARCH 282	Architecture Studio 2B	4.0
PHYS 182	Applied Physics I	3.0
	Free elective	3.0
	Humanities elective	3.0
	Term Credits	18.0
Term 6		
ARCH 173	Architectural Technology III	3.0
ARCH 226	Architectural Representation VI	2.0
ARCH 283	Architecture Studio 2C	4.0
PHYS 183	Applied Physics II	3.0
	Free electives	6.0
	Term Credits	18.0
Third Year (Part-Time)		

Term 7		
ARCH 274	Architectural Technology IV	3.0
ARCH 381	Architecture Studio 3A	4.0
	History/Theory elective	3.0
	Term Credits	10.0
Term 8		
ARCH 275	Architectural Technology V	3.0
ARCH 382	Architecture Studio 3B	4.0
	Free elective	3.0
	Term Credits	10.0
Term 9		
ARCH 276	Architectural Technology VI	3.0
ARCH 383	Architecture Studio 3C	4.0
	Social Science elective	3.0
	Term Credits	10.0
Term 10		
	Summer Quarter	
	Social Science elective	3.0
	Free electives	6.0
	Term Credits	9.0
Fourth Year (Part-Time)		
Term 11		
ARCH 377	Architectural Technology VII	3.0
ARCH 481	Architecture Studio 4A	4.0
	Term Credits	7.0
Term 12		
ARCH 378	Architectural Technology VIII	3.0
ARCH 482	Architecture Studio 4B	4.0
	Free elective	3.0
	Term Credits	10.0
Term 13		
ARCH 379	Architectural Technology IX	3.0
ARCH 483	Architecture Studio 4C	4.0
	Term Credits	7.0
Term 14		
	Summer Quarter	
	History/Theory elective	3.0
	Professional elective	3.0
	Free elective	3.0
	Term Credits	9.0
Fifth Year (Part-Time)		
Term 15		
ARCH 335	Professional Practice I	3.0

ARCH 487	Architecture Studio 5A	4.0
Term Credits		7.0
Term 16		
ARCH 336	Professional Practice II	3.0
ARCH 488	Architecture Studio 5B	4.0
Term Credits		7.0
Term 17		
ARCH 489	Architecture Studio 5C	4.0
PHIL 317	Ethics and Design Professions	3.0
Term Credits		7.0
Term 18		
Summer Quarter		
Professional elective		3.0
History/Theory elective		3.0
Free elective		3.0
Term Credits		9.0
Sixth Year (Part-Time)		
Term 19		
ARCH 431 [WI]	Architectural Programming	3.0
ARCH 493	Senior Project I	4.0
Term Credits		7.0
Term 20		
ARCH 494	Senior Project II	4.0
Professional elective		3.0
Term Credits		7.0
Term 21		
ARCH 495	Senior Project III	4.0
Free elective		3.0
Term Credits		7.0
Total Credit: 227.0		

Degree Requirements (Part-time Evening Option)

General Education Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
PHIL 317	Ethics and Design Professions	3.0
PHYS 182	Applied Physics I	3.0
PHYS 183	Applied Physics II	3.0
UNIV 101	The Drexel Experience	2.0
Humanities electives		6.0
Social Science electives		9.0
Natural Science elective		3.0
Free electives		24.0
Studios (Must be taken in order)		
ARCH 107	Foundation Design I	2.0
ARCH 108	Foundation Design II	2.0

ARCH 109	Foundation Design III	2.0
ARCH 181	Architecture Studio 1A	4.0
ARCH 182	Architecture Studio 1B	4.0
ARCH 183	Architecture Studio 1C	4.0
ARCH 281	Architecture Studio 2A	4.0
ARCH 282	Architecture Studio 2B	4.0
ARCH 283	Architecture Studio 2C	4.0
ARCH 381	Architecture Studio 3A	4.0
ARCH 382	Architecture Studio 3B	4.0
ARCH 383	Architecture Studio 3C	4.0
ARCH 481	Architecture Studio 4A	4.0
ARCH 482	Architecture Studio 4B	4.0
ARCH 483	Architecture Studio 4C	4.0
ARCH 487	Architecture Studio 5A	4.0
ARCH 488	Architecture Studio 5B	4.0
ARCH 489	Architecture Studio 5C	4.0
ARCH 493	Senior Project I	4.0
ARCH 494	Senior Project II	4.0
ARCH 495	Senior Project III	4.0

Required Professional Courses (Part-time Evening Option)

ARCH 141	Architecture and Society I	3.0
ARCH 142	Architecture and Society II	3.0
ARCH 143	Architecture and Society III	3.0
ARCH 144	Architecture and Society IV	3.0
ARCH 211	Architectural Representation I	2.0
ARCH 212	Architectural Representation II	2.0
ARCH 213	Architectural Representation III	2.0
ARCH 224	Architectural Representation IV	2.0
ARCH 225	Architectural Representation V	2.0
ARCH 226	Architectural Representation VI	2.0
ARCH 170	Architectural Technology I	3.0
ARCH 172	Architectural Technology II	3.0
ARCH 173	Architectural Technology III	3.0
ARCH 274	Architectural Technology IV	3.0
ARCH 275	Architectural Technology V	3.0
ARCH 276	Architectural Technology VI	3.0
ARCH 335	Professional Practice I	3.0
ARCH 336	Professional Practice II	3.0
ARCH 377	Architectural Technology VII	3.0
ARCH 378	Architectural Technology VIII	3.0
ARCH 379	Architectural Technology IX	3.0
ARCH 431 [WI]	Architectural Programming	3.0

History and Theory Electives

Select three of the following:			9.0
ARCH 340	American Architecture & Urbanism		
ARCH 341 [WI]	Theories of Architecture I		
ARCH 342 [WI]	Theories of Architecture II		
ARCH 343	Theories of Architecture III		
ARCH 346 [WI]	History of Philadelphia Architecture		
ARCH 347 [WI]	Architectural Study Tour		
ARCH 348 [WI]	Studies in Vernacular Architecture		
ARCH 350	Contemporary Architecture		
ARCH 421 [WI]	Environmental Psychology and Design Theory		
ARCH 441	Urban Design Seminar		
ARCH 442	Urban Design Seminar II		
ARCH 499 [WI]	Special Topics in Architecture		

Professional Electives

Select three of the following:	9.0
ARCH 432 The Development Process	
ARCH 451 Advanced Drawing	
ARCH 455 Computer Applications in Architecture I	
ARCH 456 Computer Applications in Architecture II	
ARCH 463 Emerging Architectural Technology	
ARCH 464 Building Enclosure Design	
ARCH 465 Energy and Architecture	
ARCH 499 Special Topics in Architecture [W]	
Total Credits	227.0

Sample Plan of Study (Part-time Evening Option)

This curriculum format is adjustable to each student's academic situation. Transfer credit evaluation, prior architectural experience, and other considerations may restructure the student's yearly program schedule.

First Year (Part-Time)

Term 1	Credits
ARCH 107 Foundation Design I	2.0
ARCH 141 Architecture and Society I	3.0
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV A101 The Drexel Experience	1.0
Term Credits	9.0
Term 2	
ARCH 108 Foundation Design II	2.0
ARCH 142 Architecture and Society II	3.0
MATH 181 Mathematical Analysis I	3.0
UNIV A101 The Drexel Experience	1.0
Term Credits	9.0
Term 3	
ARCH 109 Foundation Design III	2.0
ARCH 143 Architecture and Society III	3.0
MATH 182 Mathematical Analysis II	3.0
Term Credits	8.0
Term 4	
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 183 Mathematical Analysis III	3.0
Natural Science elective	3.0
Term Credits	9.0

Second Year (Part-Time)

Term 5	
ARCH 144 Architecture and Society IV	3.0
ARCH 181 Architecture Studio 1A	4.0
ARCH 211 Architectural Representation I	2.0
Term Credits	9.0
Term 6	

PHYS 182 Applied Physics I	3.0
ARCH 182 Architecture Studio 1B	4.0
ARCH 212 Architectural Representation II	2.0
Term Credits	9.0

Term 7

ARCH 183 Architecture Studio 1C	4.0
ARCH 213 Architectural Representation III	2.0
PHYS 183 Applied Physics II	3.0
Term Credits	9.0

Term 8

ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
Humanities elective	3.0
Social Science elective	3.0
Term Credits	9.0

Third Year (Part-Time)

Term 9	
ARCH 170 Architectural Technology I	3.0
ARCH 224 Architectural Representation IV	2.0
ARCH 281 Architecture Studio 2A	4.0
Term Credits	9.0

Term 10

ARCH 172 Architectural Technology II	3.0
ARCH 225 Architectural Representation V	2.0
ARCH 282 Architecture Studio 2B	4.0
Term Credits	9.0

Term 11

ARCH 173 Architectural Technology III	3.0
ARCH 226 Architectural Representation VI	2.0
ARCH 283 Architecture Studio 2C	4.0
Term Credits	9.0

Term 12

Summer Quarter	
Free electives	6.0
Humanities elective	3.0
Term Credits	9.0

Fourth Year (Part-Time)

Term 13	
ARCH 274 Architectural Technology IV	3.0
ARCH 381 Architecture Studio 3A	4.0

History/Theory elective		3.0
Term Credits		10.0
Term 14		
ARCH 275	Architectural Technology V	3.0
ARCH 382	Architecture Studio 3B	4.0
Free elective		3.0
Term Credits		10.0
Term 15		
ARCH 276	Architectural Technology VI	3.0
ARCH 383	Architecture Studio 3C	4.0
Social Science elective		3.0
Term Credits		10.0
Term 16		
Free electives		6.0
Social science elective		3.0
Term Credits		9.0
Fifth Year (Part-Time)		
Term 17		
ARCH 377	Architectural Technology VII	3.0
ARCH 481	Architecture Studio 4A	4.0
Term Credits		7.0
Term 18		
ARCH 378	Architectural Technology VIII	3.0
ARCH 482	Architecture Studio 4B	4.0
Term Credits		7.0
Term 19		
ARCH 379	Architectural Technology IX	3.0
ARCH 483	Architecture Studio 4C	4.0
Term Credits		7.0
Term 20		
Free elective		3.0
History/Theory elective		3.0
Professional elective		3.0
Term Credits		9.0
Sixth Year (Part-Time)		
Term 21		
ARCH 335	Professional Practice I	3.0
ARCH 487	Architecture Studio 5A	4.0
Term Credits		7.0

Term 22		
ARCH 336	Professional Practice II	3.0
ARCH 488	Architecture Studio 5B	4.0
Term Credits		7.0
Term 23		
PHIL 317	Ethics and Design Professions	3.0
ARCH 489	Architecture Studio 5C	4.0
Term Credits		7.0
Term 24		
Free elective		3.0
History/Theory elective		3.0
Professional elective		3.0
Term Credits		9.0
Seventh Year (Part-Time)		
Term 25		
ARCH 431 [WI]	Architectural Programming	3.0
ARCH 493	Senior Project I	4.0
Term Credits		7.0
Term 26		
ARCH 494	Senior Project II	4.0
Professional elective		3.0
Term Credits		7.0
Term 27		
ARCH 495	Senior Project III	4.0
Free elective		3.0
Term Credits		7.0
Total Credit: 227.0		
* Prior to taking this course student must meet program's minimum studio advancement requirements. See the program's Advising Guidelines (http://www.drexel.edu/westphal/undergraduate/ARCH/Curriculum/#c3) for more details.		
** See degree requirements (p. 468).		
Opportunities		
Drexel's work/study program is an experiential-based learning model that complements and provides an alternative to traditional full-time academic architecture programs. The Drexel model provides a practical, high-quality education to those students who seek early exposure to daily architectural practice as well as an affordable alternative to students who could not otherwise be able to enter the profession.		
Ordinarily, Drexel's architecture graduates continue working for the firms that employed them during the work-study phase of their studies. In time, some architects reach positions of associate or partner in these offices, while others choose to launch their own firms. Urban design, historic preservation, interior design, and facilities management are some of		

the related careers that architectural graduates also pursue with similar patterns of success.

Drexel is located in University City, a Philadelphia neighborhood that includes several centers of education and research. Philadelphia itself offers an unparalleled collection of landmark architecture and urban planning that spans 300 years of development. The region has always been home to architectural firms of national and international prominence. A rich and varied environment combined with an accomplished and supportive professional community make Philadelphia an ideal laboratory for the study of architecture. All of the faculty in the program are active in the Philadelphia architecture community, many in leadership positions at firms.

Students seeking support for resume and portfolio development may schedule an appointment with the Program Director by contacting the Architecture Program. Job listings exclusively for Drexel Architecture students can be found on the Architecture Opportunities site. (<http://www.drexel.edu/westphal/academics/undergraduate/ARCH/Opportunities>) Firms seeking Drexel interns may contact students directly by finding student links to resume, worksample and web portfolios at this site.

Minor in Architecture

A minor in architecture gives students majoring in other disciplines an opportunity to explore architecture through a coherent sequence of coursework. The minor in architecture can also be used for preparation towards professional graduate study in this field. Interested students should consult the Architecture Program Director for course selection and scheduling.

The minor requires design studio courses, courses in architectural history, and architectural elective courses. No more than 9.0 credits from a student's major can be used to fulfill the minor requirements.

Required Courses

ARCH 141	Architecture and Society I	3.0
ARCH 142	Architecture and Society II	3.0
ARCH 143	Architecture and Society III	3.0
Elective Architecture Courses *		6.0
Required Architecture Studios **		10.0-12.0
ARCH 107	Foundation Design I	
ARCH 108	Foundation Design II	
ARCH 109	Foundation Design III	
ARCH 111	Studio 1-1	
or ARCH 18 Architecture Studio 1A		
ARCH 112	Studio 1-2	
or ARCH 18 Architecture Studio 1B		
ARCH 113	Studio 1-3	
or ARCH 18 Architecture Studio 1C		
ARCH 231	Studio 3-1	
or ARCH 38 Architecture Studio 3A		
ARCH 232	Studio 3-2	
or ARCH 38 Architecture Studio 3B		
Total Credits		25.0-27.0

* Chosen from BArch required professional courses, history/theory electives and professional electives appearing on the degree requirements page. Selection should be made after consultation with the Program Director or Academic Advisor.

** Students who have successfully completed INTR 233 should enter the studio sequence at the second-year level (ARCH 183). Students who have successfully completed ARCH 192 should start the studio sequence with (ARCH 181).

*** Students without Design background will be required to take the following studios: ARCH 107, ARCH 108, ARCH 109 and ARCH 181

Facilities

The Department's offices, studios and teaching facilities are located on floors 3, 3A, 4 and 4A of the URBN Center at 3501 Market Street. The Hybrid Making Lab (http://drexel.edu/westphal/about/overview/making_spaces/HybridMakingLab) on the first floor is open to all Westphal students and has state-of-the-art fabricating equipment, accessible to students after required training. The Westphal Print Center (http://www.drexel.edu/westphal/about/overview/making_spaces/WestphalPrintCenter) is a full-service, low-cost facility is located on 3A and is accessible to students from on and off campus. A full wood working shop is located in the Visual Studies Arts Annex at 3220 Cherry Street.

Architecture & Interiors Faculty

David Ade, AIA, LEED A.P., NCARB, BArch (*Drexel University*). Adjunct Associate Professor. Principal, SMP Architects, sustainable design

Ulrike Altenmuller-Lewis, AIA, Dr.-Ing. (*Bauhaus Universitat Weimar*). Associate Professor. Research on educational environments; translations of architectural theory texts.

Jason Austin, LEED A.P., MLA Landscape Architecture (*University of Pennsylvania*). Assistant Teaching Professor. Principal, Austin + Mergold; architecture, research, landscape architecture, urban design.

Stephen Bonitatibus, AIA, MArch (*University of Pennsylvania*). Adjunct Professor. Principal, Bonitatibus Associates; traditional residential architecture.

Anthony Bracali, AIA, LEED A.P., BArch (*Drexel University*). Adjunct Associate Professor. President, Friday Architects; civic, non-profit and community-based architecture.

Mark Brack, PhD (*University of California at Berkeley*). Associate Professor. British and American architecture from 1700 to the present; Hispanic colonial architecture in the American Southwest; vernacular architecture; historic preservation.

Daniel Chung, RA, PE, MArch, MSE (*Yale University, Princeton University*). Assistant Professor. Building performance and exterior envelope systems.

Jon Coddington, AIA, MArch (*University of Pennsylvania*). Professor. Architecture, urban design and planning.

Rena Cumby, BArch, MS (*Drexel University*) *Department Head, Department of Architecture & Interiors*. Associate Professor. Interior designer; foundation studies and design education.

John DeFazio, AIA, BArch (*New York Institute of Technology*). Adjunct Professor. Architecture in film.

Katherine Dowdell, AIA, BS Interior Design (*Drexel University*). Adjunct Assistant Professor. Principal, Farragut Street Architects; historic preservation

Eugenia Ellis, RA, PhD (*Virginia Polytechnic State University*). Associate Professor. Extended-care facilities design, research on spatial visualization, perception and imagination.

Dyer Alfred "Lyndsay" Falck, RA, ARCUK, ARIBA, NCARB, M.URP (*University of Capetown, South Africa*). Adjunct Professor. Building technology

Jeff Fama, MArch (*State University of New York at Buffalo*). Adjunct Associate Professor. Retail, entertainment, and theater design.

Susan Feenan, BArch (*Temple University*). Adjunct Assistant Teaching Professor. Institutional and commercial architecture.

Gary Garofalo, BS Arch Eng (*Pennsylvania State University*). Adjunct Assistant Professor. Principal Lighting Design Collaborative; lighting expert, lighting design.

Alan Greenberger, FAIA, BArch (*Rensselaer Polytechnic Institute*) *Distinguished Visiting Lindy Institute for Urban Innovation Fellow*. Distinguished Teaching Professor. Urban planning and policy.

Don Jones, FAIA, LEED DD+C, MArch (*University of Pennsylvania*). Adjunct Professor. Principal, Director of Sustainable Design, Ewing Cole; sports venues.

Tim Kearney, AIA, MArch (*University of Pennsylvania*). Adjunct Professor. Principal, CuetoKEARNEY design; sustainable design

Nicole Koltick, MArch (*University of California*) *Director, Design Futures Lab*. Assistant Professor. Researching possibilities for architecture and design through the use of unexpected and innovative interdisciplinary models. Foundation design studios, fabrication and technology seminars.

Jeffrey Krieger, AIA, LEED AP, MArch (*Carnegie Mellon University*). Adjunct Associate Professor. President, Krieger and Associates Architects; residential design.

Karin Kuenstler, MS (*Bank Street College of Education and Parsons*) *Associate Dean for Research and Graduate Studies*. Associate Professor. Interior design for corporate and commercial facilities.

Maria Kuttruff, MS (*Drexel University*). Adjunct Assistant Professor. Owner/Principal, Viola Interior Design, LLC. Residential interior design.

Robert Nalls, AIA, NCARB, MArch (*University of Pennsylvania*). Adjunct Professor. Principal, Nalls Architecture Inc.; institutional and educational buildings.

Diana S. Nicholas, RA, AIA, NCARB, MFA (*University of the Arts, Philadelphia*) *Associate Director of MS Interior Architecture and Design, Director, Sustainability in the Built Environment minor*. Assistant Professor. Coordinator, Sustainability in the Built Environment

Jacklynn Niemiec, LEED BD+C, MArch (*University of Pennsylvania*). Assistant Teaching Professor. Graphic representation

Karen Pelzer, NCIDQ, BS Interior Design (*Drexel University*). Assistant Teaching Professor. President, Karen Pelzer Interiors; hospitality design.

Marilynne L. Rose, NCIDQ, MS (*Drexel University*). Associate Teaching Professor. Residential and commercial design.

James Rowe, AIA, MArch (*University of Pennsylvania*). Adjunct Associate Professor. Principal, Studio Agoos Lovera; institutional, recreation, corporate, civic and residential design.

Debra Ruben, MS, IDEC, LEED AP, NCIDQ (*Drexel University*) *Director of Interiors Programs*. Associate Professor. Research on user participation and the design process.

Paul Salvaggio, AIA, LEED AP, NCARB, BArch, BS Arch (*Pennsylvania State University*). Adjunct Assistant Professor. Principal, Arcus Design Group; residential architecture.

Rachel Schade, AIA, MArch (*University of Pennsylvania*) *Program, Architecture, Associate Director for Student Placement*. Associate Teaching Professor. Principal, Rachel Simmons Schade Architect. Work-study placement; residential, graphic representation.

Harris Steinberg, FAIA, MArch (*University of Pennsylvania*) *Executive Director, Lindy Institute for Urban Innovation*. Distinguished Teaching Professor. Urban design and civic engagement.

Simon Tickell, AIA, MArch (*University of Pennsylvania*). Associate Teaching Professor. Principal, Simon J Tickell Architect; educational and museum buildings, residential design

Nancy Trainer, FAIA, AICP, LEED, AFAAR, MArch (*University of Pennsylvania*) *Associate Vice President of Design & Planning at Drexel*. Adjunct Teaching Professor. Planning, institutional design.

Ada Tremonte, NCIDQ, BS (*Drexel University*) *Associate Director, BS Interior Design*. Associate Teaching Professor. President, ada Design Associates; corporate/commercial design.

Emeritus Faculty

Judith Bing, MArch (*Yale University*). Professor Emeritus. Research on traditional architecture of the Balkans and Anatolia

Sylvia Clark, MArch (*University of Pennsylvania*). Professor Emeritus.

Paul M. Hirshorn, FAIA, MArch, MCP, (*University of Pennsylvania*). Professor Emeritus.

Marjorie Kriebel, BArch (*University of Pennsylvania*). Professor Emeritus.

Art History

Major: Art History

Degree Awarded: Bachelor of Arts (BA) or Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 180.0-184.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 50.0701

Standard Occupational Classification (SOC) code: 25-4011; 25-4012; 25-4013

About the Program

The history of art explores the meanings, values, and purposes of the visual arts within the historical cultures that create them. Works of fine and applied arts are understood not merely as aesthetic forms, but as expressions of the social, economic, scientific, religious, and political contexts that gave rise to them. The study of art history thus effectively serves the high purposes of a liberal education by equipping students with an understanding of world cultures and their histories from multiple disciplinary perspectives, and by encouraging the development of critical thinking, reading, and writing skills.

The art history program has a uniquely flexible curricular design in that it permits students to pursue art history as either a Bachelor of Arts or a Bachelor of Science degree. The BA degree is intended for students wishing to become professional art historians or who wish to supplement the art history curriculum with other courses leading to a specific career path. The BS degree is designed to allow students to combine the art history major with another major or to tailor the curriculum to their specific interests and aspirations. Both the BA and BS degrees require a total of 180.0-184.0 credit hours.

Another feature of the this program is that it offers two accelerated, five# year degree tracks leading to MS degrees in either Museum Leadership or Arts Administration.

Bachelor of Arts

The BA degree requires 60.0 credit hours of art history, 71.0-75.0 credit hours of General Education courses, and 49.0 credit hours of Free Electives. The BA degree requires a strong component of Arts and Humanities courses in order to prepare students to enter the professional world of art historians by exposing them to critical reasoning, philosophy, anthropology, literature, world cultures, and foreign languages. The 49.0 credit hours of Free Electives can be used under faculty advisement to take additional art history courses, develop special competencies and areas of interest (e.g., race and gender studies; the histories of technology, science and philosophy; Asian or Africana studies; writing, literature, and criticism; design history; museum studies, etc.), or gain competencies in various applied or technical areas. This BA program requires two 3-month co-ops.

Bachelor of Science

The BS degree also requires 60.0 credit hours of art history, but it only requires 35.0-39.0 credit hours of General Education courses, thereby freeing up 85.0 credit hours of coursework to accommodate another major or to design a personalized curriculum. The 85.0 credit hours of free electives provided by the BS degree permits the student to simultaneously pursue a second major, one or more minors, or simply explore the life of the mind by taking courses, with faculty advisement, in diverse fields. This program does not require a co-#op taken in addition to that which is required by the second major.

Degree Requirements (BA)

General education requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Mathematics and Natural Science		12.0
ENGL: Western Literature Elective		3.0
ENGL: Non-Western Literature Elective		3.0
Required Arts and Humanities-students elect a minimum of 6 credits		6.0
HIST 161	Themes in World Civilization I	4.0
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 105	Critical Reasoning	3.0
Select one of the following:		
HIST 162	Themes in World Civilization II	4.0
	or HIST 163 Themes in World Civilization III	
Foreign Language		12.0
Social Sciences		6.0
ANTH 101	Introduction to Cultural Diversity	3.0
PSCI 120	History of Political Thought	4.0
COOP 101	Career Management and Professional Development	0.0

UNIV A101	The Drexel Experience	2.0
Electives *		43.0
Art History requirements		
ARCH 141	Architecture and Society I	3.0
ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
ARTH 111	Introduction to Studio Methods and Materials	3.0
ARTH 150	Art History Research Methods	3.0
ARTH 200	Principles and Methods of Art History	3.0
ARTH 300 [WI]	History of Modern Design	3.0
ARTH 301	Asian Art and Culture	3.0
ARTH 313	20th Century Art	3.0
ARTH 325	Ancient Greek and Roman Art	3.0
	or ARTH 327 Italian Renaissance Art	
ARTH 400	Art History Senior Thesis	3.0
ARTH 477	Art History Seminar	3.0
Art History Electives select 8 courses from the following		24.0
Design		
ARTH 335 [WI]	History of Costume I: Preclassical to Directoire	
ARTH 336 [WI]	History of Costume II: Directoire to World War I	
ARTH 337	History of Costume: Post World War I to Present	
Western Art: Ancient to Modern		
ARTH 310	Early American Art	
ARTH 326	Medieval Art	
ARTH 328	Northern Renaissance	
ARTH 329	Art of the 17th and 18th Centuries	
Modern/Contemporary/Theory/Criticism		
ARTH 311	Twentieth-Century American Art	
ARTH 312	Nineteenth Century Art	
ARTH 314	Contemporary Art	
ARTH 315	History of African-American Art	
ARTH 317	Modern Art Theory and Criticism	
Asia, Africa, Latin America		
ARTH 302	Art of India	
ARTH 303	Art of China	
ARTH 304	Art of Japan	
ARTH 316	African Art	
Advanced Course Work		
ARTH 465 [WI]	Special Topics in Art History	
Architecture		
ARCH 142	Architecture and Society II	
ARCH 143	Architecture and Society III	
ARCH 144	Architecture and Society IV	
ARCH 344	History of Modern Architecture I	
[WI]		
ARCH 346	History of Philadelphia Architecture	
[WI]		
ARCH 499	Special Topics in Architecture	
[WI]		
Total Credits		180.0

Sample Plan of Study (BA)

Term 1		Credits
ANTH 101	Introduction to Cultural Diversity	3.0
ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 111	Introduction to Studio Methods and Materials	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HIST 161	Themes in World Civilization I	4.0
UNIV A101	The Drexel Experience	1.0
Term Credits		17.0

Term 2		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 200	Principles and Methods of Art History	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
HIST 162 or 163	Themes in World Civilization II Themes in World Civilization III	4.0
PHIL 105	Critical Reasoning	3.0
UNIV A101	The Drexel Experience	1.0
Term Credits		17.0
Term 3		
ARTH 103	History of Art: Modern Art	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 101	Introduction to Western Philosophy	3.0
Arts and Humanities elective		3.0
ARTH 150	Art History Research Methods	3.0
Term Credits		15.0
Term 4		
COOP 101	Career Management and Professional Development	0.0
Art History elective		3.0
Foreign Language		4.0
Math		4.0
Natural Science		4.0
Term Credits		15.0
Term 5		
ENGL (Western Literature)		3.0
Foreign Language		4.0
Natural Science		4.0
Social Science elective		3.0
Term Credits		14.0
Term 6		
ARTH 325 or 327	Ancient Greek and Roman Art Italian Renaissance Art	3.0
PSCI 120	History of Political Thought	4.0
Arts and Humanities elective		3.0
ENGL (Non-Western Literature)		3.0
Foreign Language		4.0
Term Credits		17.0
Term 7		
ARTH 300 [WI]	History of Modern Design	3.0
Art History elective		3.0
Free electives		9.0
Term Credits		15.0
Term 8		
ARTH 313	20th Century Art	3.0
Art History electives		6.0
Free electives		4.0
Term Credits		13.0
Term 9		
ARCH 141	Architecture and Society I	3.0
Free electives		12.0
Term Credits		15.0
Term 10		
ARTH 301	Asian Art and Culture	3.0
ARTH 477	Art History Seminar	3.0
Art History elective		3.0
Social Science elective		3.0
Term Credits		12.0
Term 11		
Art History electives		6.0
Free electives		9.0
Term Credits		15.0

Term 12		
ARTH 400	Art History Senior Thesis	3.0
Art History elective		3.0
Free electives		9.0
Term Credits		15.0
Total Credit: 180.0		

Degree Requirements (BS)

General Education requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV A101	The Drexel Experience	2.0
Mathematics and Natural Science		12.0-16.0
Arts and Humanities		6.0
Social Sciences		6.0
Free Electives		85.0

Art History requirements

ARCH 141	Architecture and Society I	3.0
ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
ARTH 111	Introduction to Studio Methods and Materials	3.0
ARTH 200	Principles and Methods of Art History	3.0
ARTH 300 [WI]	History of Modern Design	3.0
ARTH 301	Asian Art and Culture	3.0
ARTH 313	20th Century Art	3.0
ARTH 325	Ancient Greek and Roman Art (Or)	3.0
ARTH 327	Italian Renaissance Art	3.0
ARTH 400	Art History Senior Thesis	3.0
ARTH 477	Art History Seminar	3.0
Art History Electives: Select 8 courses from the following		24.0

Design

ARTH 335 [WI]	History of Costume I: Preclassical to Directoire
ARTH 336 [WI]	History of Costume II: Directoire to World War I
ARTH 337	History of Costume: Post World War I to Present

Western Art: Ancient to Modern

ARTH 310	Early American Art
ARTH 326	Medieval Art
ARTH 328	Northern Renaissance
ARTH 329	Art of the 17th and 18th Centuries

Modern/Contemporary/Theory/Criticism

ARTH 311	Twentieth-Century American Art
ARTH 312	Nineteenth Century Art
ARTH 314	Contemporary Art
ARTH 315	History of African-American Art
ARTH 317	Modern Art Theory and Criticism

Asia, Africa, Latin America

ARTH 302	Art of India
ARTH 303	Art of China
ARTH 304	Art of Japan
ARTH 316	African Art

Advanced Course Work

ARTH 465 [WI]	Special Topics in Art History
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Architecture

ARCH 142	Architecture and Society II
ARCH 143	Architecture and Society III
ARCH 144	Architecture and Society IV
ARCH 344	History of Modern Architecture I [WI]

ARCH 346 [WJ]	History of Philadelphia Architecture	
ARCH 499 [WJ]	Special Topics in Architecture	
Total Credits		183.0-187.0

Sample Plan of Study (BS)

Term 1		Credits
ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 111	Introduction to Studio Methods and Materials	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
UNIV A101	The Drexel Experience	1.0
Free elective		6.0
Term Credits		16.0
Term 2		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 200	Principles and Methods of Art History	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
UNIV A101	The Drexel Experience	1.0
Free elective		6.0
Term Credits		16.0
Term 3		
ARTH 103	History of Art: Modern Art	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Arts and Humanities elective		3.0
Free elective		3.0
Social Science elective		3.0
Term Credits		15.0
Term 4		
COOP 101	Career Management and Professional Development	0.0
Art History elective		3.0
Math		3.0-4.0
Natural Science		3.0-4.0
Free elective		4.0
Term Credits		13.0-15.0
Term 5		
Math		3.0-4.0
Natural Science		3.0-4.0
Free elective		6.0
Term Credits		12.0-14.0
Term 6		
ARTH 325	Ancient Greek and Roman Art (Or)	3.0
ARTH 327	Italian Renaissance Art	
Arts and Humanities elective		3.0
Free elective		11.0
Term Credits		17.0
Term 7		
ARTH 300 [WJ]	History of Modern Design	3.0
Art History elective		3.0
Free elective		12.0
Term Credits		18.0
Term 8		
ARTH 313	20th Century Art	3.0
Art History elective		6.0
Free elective		6.0
Term Credits		15.0
Term 9		
ARCH 141	Architecture and Society I	3.0
Free elective		13.0
Term Credits		16.0

Term 10		
ARTH 301	Asian Art and Culture	3.0
ARTH 477	Art History Seminar	3.0
Art History elective		3.0
Social Science elective		3.0
Term Credits		12.0

Term 11		
Art History elective		6.0
Free elective		9.0
Term Credits		15.0

Term 12		
ARTH 400	Art History Senior Thesis	3.0
Art History elective		3.0
Free elective		9.0
Term Credits		15.0

Total Credit: 180.0-184.0

Minor in Art History

The minor in art history provides a broad humanistic background not only for students planning to attend graduate and professional schools in the fields of applied, media and design arts, social and information sciences, education, business and medicine, but also for those entering a more general job market. The minor is designed to be flexible enough to appeal both to Antoinette Westphal College of Media Arts and Design majors and majors from the other colleges.

Required Courses

ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
Select five of the following: *		15.0

Art History

ARTH 300 [WJ]	History of Modern Design	
ARTH 301	Asian Art and Culture	
ARTH 302	Art of India	
ARTH 303	Art of China	
ARTH 304	Art of Japan	
ARTH 320	Art in the Age of Technology	
ARTH 335 [WJ]	History of Costume I: Preclassical to Directoire	
ARTH 336 [WJ]	History of Costume II: Directoire to World War I	
ARTH 337	History of Costume: Post World War I to Present	
ARTH 340	Women in Art	
ARTH 399	Independent Study In Art His	
ARTH 465 [WJ]	Special Topics in Art History	
ARTH 477	Art History Seminar	

History of Architecture

ARCH 141	Architecture and Society I	
ARCH 142	Architecture and Society II	
ARCH 143	Architecture and Society III	
ARCH 341 [WJ]	Theories of Architecture I	
ARCH 342 [WJ]	Theories of Architecture II	
ARCH 343	Theories of Architecture III	
ARCH 344 [WJ]	History of Modern Architecture I	
ARCH 345 [WJ]	History of Modern Architecture II	
ARCH 346 [WJ]	History of Philadelphia Architecture	
ARCH 347 [WJ]	Architectural Study Tour	

ARCH 348	Studies in Vernacular Architecture	
[WJ]		
ARCH 399	Independent Study in Architecture	
ARCH 421	Environmental Psychology and Design Theory	
[WJ]		
ARCH 441	Urban Design Seminar	
ARCH 442	Urban Design Seminar II	
ARCH 499	Special Topics in Architecture	
[WJ]		
History of Film		
FMST 150	American Classic Cinema	
FMST 250	The Documentary Tradition	
FMST 255	Hitchcock	
FMST 260	The Western	
FMST 265	Special Topics in Cinema Studies	
History of Interior Design		
INTR 200	History of Modern Architecture and Interiors	
INTR 300 [WJ]	Visual Culture: Interiors	
INTR 305 [WJ]	Visual Culture: Furniture	
History of Graphic Design		
VSCM 350	Graphic Design: 20th Century and Beyond	
[WJ]		
History of Theatre		
THTR 221 [WJ]	Theatre History I	
THTR 222 [WJ]	Theatre History II	
History of Photography		
PHTO 275	History of Photography I	
[WJ]		
PHTO 276	History of Photography II	
PHTO 452	History of Contemporary Photography	
[WJ]		
Total Credits		24.0

Dual/Accelerated Degree

Art History BA/ Arts Administration MS

This five-year, accelerated degree program leading to a Master of Science in Arts Administration, is an excellent option for the student who wishes to broaden and deepen his or her knowledge of the world's cultures and their histories and further develop his or her capacities for critical thinking, reading, and writing. The MS in Arts Administration prepares students for careers in the administration of museums and the performing arts.

Specialized University resources, such as the Pearlstein Gallery, the Drexel Museum, and the Historic Costume Collection, are available to directly support student's studies.

Degree Requirements

General Education Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Mathematics and Natural Science		12.0
ENGL: Western Literature Elective		3.0
ENGL: Non-Western Literature Elective		3.0
Arts and Humanities		6.0
HIST 161	Themes in World Civilization I	4.0
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 105	Critical Reasoning	3.0
Select one of the following:		
HIST 162	Themes in World Civilization II	4.0
or HIST 163	Themes in World Civilization III	

Foreign Language		12.0
Social Sciences		6.0
ANTH 101	Introduction to Cultural Diversity	3.0
PSCI 120	History of Political Thought	4.0
COOP 101	Career Management and Professional Development	0.0
UNIV A101	The Drexel Experience	2.0
Electives		43.0

Art History Requirements

ARCH 141	Architecture and Society I	3.0
ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
ARTH 111	Introduction to Studio Methods and Materials	3.0
ARTH 150	Art History Research Methods	3.0
ARTH 200	Principles and Methods of Art History	3.0
ARTH 300 [WJ]	History of Modern Design	3.0
ARTH 301	Asian Art and Culture	3.0
ARTH 313	20th Century Art	3.0
ARTH 325	Ancient Greek and Roman Art	3.0
or ARTH 327	Italian Renaissance Art	
ARTH 400	Art History Senior Thesis	3.0
ARTH 477	Art History Seminar	3.0

Art History Electives select 8 courses from the following: 24.0

Design

ARTH 335 [WJ]	History of Costume I: Preclassical to Directoire
ARTH 336 [WJ]	History of Costume II: Directoire to World War I
ARTH 337	History of Costume: Post World War I to Present

Western Art: Ancient to Modern

ARTH 310	Early American Art
ARTH 326	Medieval Art
ARTH 328	Northern Renaissance
ARTH 329	Art of the 17th and 18th Centuries

Modern/Contemporary/Theory/Criticism

ARTH 311	Twentieth-Century American Art
ARTH 312	Nineteenth Century Art
ARTH 314	Contemporary Art
ARTH 315	History of African-American Art
ARTH 317	Modern Art Theory and Criticism

Asia, Africa, Latin America

ARTH 302	Art of India
ARTH 303	Art of China
ARTH 304	Art of Japan
ARTH 316	African Art

Advanced Course Work

ARTH 465 [WJ]	Special Topics in Art History
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Architecture

ARCH 142	Architecture and Society II
ARCH 143	Architecture and Society III
ARCH 144	Architecture and Society IV
ARCH 344	History of Modern Architecture I
[WJ]	
ARCH 346	History of Philadelphia Architecture
[WJ]	
ARCH 499	Special Topics in Architecture
[WJ]	

Arts Administration Requirements

AADM 505	Overview of the Arts	3.0
AADM 510	Writing for the Arts	3.0
AADM 610	Financial Accounting for Non-Profit Arts Organizations	3.0
AADM 620	Legal and Ethical Issues in the Arts	3.0
AADM 650	Revenue Development in the Arts	3.0
AADM 675	Marketing and Engagement in the Arts	3.0

AADM 710	Leadership, Strategy and Planning in the Arts	3.0
AADM 751	Management Techniques In the Arts	3.0
AADM 770	Technology Tools for Cultural Managers	3.0
AADM 785	Research Design in the Arts	3.0
AADM 798	Thesis Development	1.5
AADM 799	Thesis Completion	1.5
Arts Administration Electives		12.0
Total Credits		225.0

Sample Plan of Study

Term 1		Credits
ANTH 101	Introduction to Cultural Diversity	3.0
ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 111	Introduction to Studio Methods and Materials	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HIST 161	Themes in World Civilization I	4.0
UNIV A101	The Drexel Experience	1.0
	Term Credits	17.0
Term 2		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 200	Principles and Methods of Art History	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
HIST 162 or 163	Themes in World Civilization II Themes in World Civilization III	4.0
PHIL 105	Critical Reasoning	3.0
UNIV 101	The Drexel Experience	1.0
	Term Credits	17.0
Term 3		
ARTH 103	History of Art: Modern Art	3.0
ARTH 150	Art History Research Methods	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 101	Introduction to Western Philosophy	3.0
Arts and Humanities elective		3.0
Social Science elective		3.0
	Term Credits	18.0
Term 4		
COOP 101	Career Management and Professional Development	0.0
Art History elective		3.0
Foreign Language		4.0
Math choice		4.0
Natural Science		4.0
	Term Credits	15.0
Term 5		
ENGL: Western Literature		3.0
Foreign Language		4.0
Natural Science		4.0
Social Science elective		3.0
	Term Credits	14.0
Term 6		
ARTH 325 or 327	Ancient Greek and Roman Art Italian Renaissance Art	3.0
PSCI 120	History of Political Thought	4.0
ENGL: Non-Western Literature		3.0
Foreign Language		4.0
Arts and Humanities elective		3.0
	Term Credits	17.0
Term 7		
ARTH 300 [WI]	History of Modern Design	3.0
Art History elective		3.0

Free electives		9.0
	Term Credits	15.0
Term 8		
ARTH 313	20th Century Art	3.0
Art History electives		6.0
Free electives		4.0
	Term Credits	13.0
Term 9		
ARCH 141	Architecture and Society I	3.0
Free electives		12.0
	Term Credits	15.0
Term 10		
AADM 505	Overview of the Arts	3.0
ARTH 301	Asian Art and Culture	3.0
ARTH 477	Art History Seminar	3.0
Art History elective		3.0
	Term Credits	12.0
Term 11		
AADM 751	Management Techniques In the Arts	3.0
Art History elective		3.0
Free electives		12.0
	Term Credits	18.0
Term 12		
AADM 710	Leadership, Strategy and Planning in the Arts	3.0
ARTH 400	Art History Senior Thesis	3.0
Art History elective		3.0
Free electives		9.0
	Term Credits	18.0
Term 13		
AADM 510	Writing for the Arts	3.0
AADM electives		6.0
	Term Credits	9.0
Term 14		
AADM 610	Financial Accounting for Non-Profit Arts Organizations	3.0
AADM 650	Revenue Development in the Arts	3.0
AADM 675	Marketing and Engagement in the Arts	3.0
	Term Credits	9.0
Term 15		
AADM 770	Technology Tools for Cultural Managers	3.0
AADM 785	Research Design in the Arts	3.0
AADM elective		3.0
	Term Credits	9.0
Term 16		
AADM 620	Legal and Ethical Issues in the Arts	3.0
AADM 798	Thesis Development	1.5
AADM 799	Thesis Completion	1.5
AADM elective		3.0
	Term Credits	9.0
Total Credit:	225.0	

Dual/Accelerated Degree

Art History BA/ Museum Leadership MS

This five-year, accelerated degree program leading to a Master of Science in Museum Leadership, is an excellent option for the student who wishes to broaden and deepen his or her knowledge of the world's museums and their practices. The degree prepares students for the opportunities and challenges of the evolving museum landscape. The innovative curriculum embraces planning and design, governance, financial management and resource development for museums. Graduates of this program

gain employment in museum marketing, development, education and administration.

Specialized University resources, such as the Pearlstein Gallery, the Drexel Museum, and the Historic Costume Collection, are available to students wishing to pursue careers in Museum work.

Degree Requirements

General Education requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Mathematics and Natural Science		12.0
ENGL: Western Literature Elective		3.0
ENGL: Non-Western Literature Elective		3.0
Arts and Humanities		6.0
HIST 161	Themes in World Civilization I	4.0
PHIL 101	Introduction to Western Philosophy	3.0
PHIL 105	Critical Reasoning	3.0
Select one of the following:		
HIST 162	Themes in World Civilization II	4.0
or HIST 163	Themes in World Civilization III	
Foreign Language		12.0
Social Sciences		6.0
ANTH 101	Introduction to Cultural Diversity	3.0
PSCI 120	History of Political Thought	4.0
COOP 101	Career Management and Professional Development	0.0
UNIV A101	The Drexel Experience	2.0
Free electives		43.0

Art History requirements

ARCH 141	Architecture and Society I	3.0
ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
ARTH 111	Introduction to Studio Methods and Materials	3.0
ARTH 150	Art History Research Methods	3.0
ARTH 200	Principles and Methods of Art History	3.0
ARTH 300 [WI]	History of Modern Design	3.0
ARTH 301	Asian Art and Culture	3.0
ARTH 313	20th Century Art	3.0
ARTH 325	Ancient Greek and Roman Art	3.0
or ARTH 327	Italian Renaissance Art	
ARTH 400	Art History Senior Thesis	3.0
ARTH 477	Art History Seminar	3.0
Art History Electives select 8 courses from the following:		24.0
Design		
ARTH 335 [WI] History of Costume I: Preclassical to Directoire		
ARTH 336 [WI] History of Costume II: Directoire to World War I		
ARTH 337 History of Costume: Post World War I to Present		
Western Art: Ancient to Modern		
ARTH 310 Early American Art		
ARTH 326 Medieval Art		
ARTH 328 Northern Renaissance		
ARTH 329 Art of the 17th and 18th Centuries		
Modern/Contemporary/Theory/Criticism		
ARTH 311 Twentieth-Century American Art		
ARTH 312 Nineteenth Century Art		
ARTH 314 Contemporary Art		
ARTH 315 History of African-American Art		
ARTH 317 Modern Art Theory and Criticism		

Asia, Africa, Latin America

ARTH 302	Art of India	
ARTH 303	Art of China	
ARTH 304	Art of Japan	
ARTH 316	African Art	
Advanced Course Work		
ARTH 465 [WI] Special Topics in Art History		
Architecture		
ARCH 142	Architecture and Society II	
ARCH 143	Architecture and Society III	
ARCH 144	Architecture and Society IV	
ARCH 344	History of Modern Architecture I [WI]	
ARCH 346	History of Philadelphia Architecture [WI]	
ARCH 499	Special Topics in Architecture [WI]	

Museum Leadership requirements

AADM 610	Financial Accounting for Non-Profit Arts Organizations	3.0
AADM 650	Revenue Development in the Arts	3.0
INFO 748	Museum Informatics	3.0
MUSL 500	Museum History and Philosophy	3.0
MUSL 510	Museum Leadership	3.0
MUSL 530	Inside the Museum	3.0
MUSL 670	Museum Communications and Marketing	3.0
MUSL 710	Bricks and Mortar	3.0
MUSL 750	Museum Leadership Practicum I	3.0
MUSL 755	Museum Leadership Practicum II	3.0
MUSL electives		12.0
MUSM 500	Foundations of Informal Education in Museum Settings	3.0
Total Credits		225.0

Sample Plan of Study

Term 1		Credits
ANTH 101	Introduction to Cultural Diversity	3.0
ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 111	Introduction to Studio Methods and Materials	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
HIST 161	Themes in World Civilization I	4.0
UNIV A101	The Drexel Experience	1.0
Term Credits		17.0
Term 2		Credits
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 200	Principles and Methods of Art History	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
HIST 162	Themes in World Civilization II	4.0
or 163	Themes in World Civilization III	
PHIL 105	Critical Reasoning	3.0
UNIV 101	The Drexel Experience	1.0
Term Credits		17.0
Term 3		Credits
ARTH 103	History of Art: Modern Art	3.0
ARTH 150	Art History Research Methods	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
PHIL 101	Introduction to Western Philosophy	3.0
Arts and Humanities elective		3.0
Social Science elective		3.0
Term Credits		18.0
Term 4		Credits
COOP 101	Career Management and Professional Development	0.0
Art History (ARTH) elective		3.0
Foreign Language course		4.0

Math course		4.0
Natural Science course		4.0
Term Credits		15.0
Term 5		
ENGL: Western Literature		3.0
Foreign Language course		4.0
Natural Science course		4.0
Social Science elective		3.0
Term Credits		14.0
Term 6		
ARTH 325	Ancient Greek and Roman Art	3.0
or 327	Italian Renaissance Art	
ENGL Non-Western Literature		3.0
PSCI 120	History of Political Thought	4.0
Foreign Language course		4.0
Arts and Humanities elective		3.0
Term Credits		17.0
Term 7		
ARTH 300 [WI]	History of Modern Design	3.0
Art History (ARTH) elective		3.0
Free electives		9.0
Term Credits		15.0
Term 8		
ARTH 313	20th Century Art	3.0
Art History (ARTH) electives		6.0
Free electives		4.0
Term Credits		13.0
Term 9		
ARCH 141	Architecture and Society I	3.0
Free electives		12.0
Term Credits		15.0
Term 10		
ARTH 301	Asian Art and Culture	3.0
ARTH 477	Art History Seminar	3.0
MUSL 500	Museum History and Philosophy	3.0
Art History (ARTH) elective		3.0
Term Credits		12.0
Term 11		
MUSM 500	Foundations of Informal Education in Museum Settings	3.0
Art History (ARTH) electives		6.0
Free electives		9.0
Term Credits		18.0
Term 12		
ARTH 400	Art History Senior Thesis	3.0
MUSL 710	Bricks and Mortar	3.0
Art History (ARTH) elective		3.0
Free electives		9.0
Term Credits		18.0
Term 13		
MUSL 750	Museum Leadership Practicum I	3.0
Museum Leadership (MUSL) electives		6.0
Term Credits		9.0
Term 14		
AADM 650	Revenue Development in the Arts	3.0
MUSL 510	Museum Leadership	3.0
MUSL 530	Inside the Museum	3.0
Term Credits		9.0
Term 15		
AADM 610	Financial Accounting for Non-Profit Arts Organizations	3.0
INFO 748	Museum Informatics	3.0

MUSL 670	Museum Communications and Marketing	3.0
Term Credits		9.0

Term 16		
MUSL 755	Museum Leadership Practicum II	3.0
Museum Leadership (MUSL) electives		6.0
Term Credits		9.0

Total Credit: 225.0

Co-op/Career Opportunities

Co-op Opportunities

Drexel's enviable geographical location in the northeast corridor of the United States provides a distinct advantage for an art history program because of the proximity of many important Museums, galleries, and auction houses. The Philadelphia Museum of Art, Pennsylvania Academy of Fine Arts, Barnes Foundation, Rodin Museum, Institute of Contemporary Art, and the Penn Museum of Archeology and Anthropology are all local and easily accessible. The Winterthur Museum, New Museum, Guggenheim, Metropolitan Museum of Art, Sotheby's, and Christie's, are all within a reasonable distance by train, bus, or car. These institutions will offer students an abundance of opportunities for first-hand study of the histories of art, architecture, and design. Proximity to these institutions can also provide for many choice opportunities for cooperative education experiences.

Some possibilities include:

- Barnes Foundation
- Philadelphia Museum of Art
- Pennsylvania Academy of Fine Arts
- American Philosophical Society
- Moderne Gallery (Old City)
- Calderwood Gallery (Center City)
- RagoArts Auction House, Lambertville, NJ
- Twelve Gates Gallery for Contemporary South Asian Art
- Newark Museum, NJ
- Metropolitan Museum of Art
- Brooklyn Museum
- Mural Arts Program
- Asia Society NY
- Christie's NY

Career Opportunities

A major in art history can prepare students for a wide variety of careers, as well as preparation for graduate school.

Possible career paths:

- Museum Administrator
- Gallery Director
- Curator
- Museum Registrar
- Museum Educator
- Art Consultant
- Art Librarian
- Editor
- Art Law
- Artist Representative

- Non-profit and governmental organizations

As a particularly broad humanities discipline, art history serves as an outstanding pre-professional degree, providing excellent preparation for a wide variety of professions, such as law, medicine, education and library science.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Art History Faculty

Jennifer Blazina, MFA (*Cranbrook Academy of Art, Bloomfield Hills, MI*). Associate Professor. Coordinator of printmaking, fine arts.

Mark Brack, PhD (*University of California at Berkeley*). Associate Professor. British and American architecture from 1700 to the present; Hispanic colonial architecture in the American Southwest; vernacular architecture; historic preservation.

Pia Brancaccio, PhD (*Istituto Universitario Orientale, Naples, Italy*) *Art History Program Co-Director*. Associate Professor. South Asian art.

Lewis Colburn, MFA (*Syracuse University*) *Sculpture Area Coordinator*. Assistant Professor. Sculpture, 3D design.

Anda Dubinskis, MFA (*University of Pennsylvania*) *Drawing Area Coordinator*. Associate Teaching Professor. Drawing.

Joseph F. Gregory, PhD (*SUNY at Binghamton*). Associate Professor. Modern European art.

Lydia Hunn, MFA (*University of Pennsylvania*) *Multimedia Area Coordinator*. Professor. Installations, sculpture, painting and drawing.

Linda Kim, PhD (*University of California, Berkeley*). Assistant Professor. American art, African art.

Elizabeth Milroy Professor. History of cultural spaces, specifically public parks and historic sites in the city of Philadelphia.

Charles Morscheck, PhD (*Bryn Mawr College*) *Art History Program Co-Director*. Professor. Italian Renaissance art.

Orlando Pelliccia, MFA *Director of the Leonard Perlstein Gallery; Materials Coordinator*. Teaching Professor. Multimedia.

Bruce W. Pollock, M.F.A. (*Tyler School of Art, Temple University*) *Painting Area Coordinator; Fine Arts minor advisor*. Associate Professor. Abstract painting and drawing.

Danielle Rice, PhD (*Yale University*) *Program Director, Museum Leadership*. Teaching Professor. Arts education

Clare Sauro, MA (*Fashion Institute of Technology*) *Curator, Historic Costume Collection*. Associate Teaching Professor. Costume history.

Delia Solomons, PhD (*Institute of Fine Arts, New York University*). Assistant Professor. Contemporary art, Latin American art.

Sara Steinwachs, MFA (*Yale University*) *Visual Studies Area Coordinator*. Associate Professor. Drawing, painting and design.

Mark Stockton, MFA (*Syracuse University*) *Design for Media Area Coordinator*. Assistant Teaching Professor. Drawing, painting, and design.

Blaise J. Tobia, MFA (*University of California, San Diego*) *Director of the Digital Media Program*. Professor. Photo-based works, design, art theory.

Joshua Weiss, MFA (*Yale University*). Associate Teaching Professor. Drawing, painting and design.

Dance

Major: Dance

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 185.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Program (CIP) code: 50.0399

Standard Occupational Classification (SOC) code: 25-1071; 27-2031

About the Program

The dance program at Drexel University provides intensive exploration of dance in its physical, intellectual, creative and therapeutic aspects. The major is designed for students to focus on one of the following four tracks:

- Dance/Movement Therapy
- Dance in Education
- Physical Therapy
- Performance

The dance major at Drexel University has a unique curriculum design and focus. This program combines rigorous academic coursework with extensive stage and studio dance experiences to prepare students for four possible career paths within dance: dance/movement therapy, dance in education, physical therapy and performance. Students participating in this major will earn a BS degree in dance with an optional minor in psychology.

Students focused on **dance/movement therapy** will prepare for jobs as dance/movement therapists. These are psychological counselors working in a variety of settings including hospitals, out-patient clinics and residential treatment centers. Students pursuing this option will earn a BS degree in dance at the Westphal College, through the Department of Performing Arts, for the first four years of study. They will then have the option to continue on to two years of study in the College of Nursing and Health Professions to earn an MA in Creative Arts in Therapy and become a licensed dance therapist.

The second career focus, **dance in education**, prepares students for jobs as elementary school teachers (grades Pre-K through 4) who may also serve as school dance specialists. Students choosing this option will earn a BS degree in dance through the Department of Performing Arts and may elect to continue for a fifth year of study to earn an MS in the Science of Instruction through the School of Education. Students who successfully complete the five year BS/MS option in education will then be recommended to the State for a Pennsylvania Teaching Certificate in the area of Elementary Education for Pre-K to 4 certification, general education.

The third career focus, **physical therapy**, prepares students to work as physical therapists in a variety of settings, including hospitals, treatment centers, schools, and private practice. Students interested in the physical therapy option will complete the four-year BS degree in dance, along with a series of recommended electives in the physical sciences. After completion of the BS degree, students will continue their education for an

additional three years in the College of Nursing and Health Professions to earn a DPT and become a licensed physical therapist.

The fourth option, **custom design**, allows students to work closely with faculty to create a personalized career in dance. Many students in this focus select **performance**, which prepares them to work as performers and/or choreographers in a variety of settings. Students interested in the performance option will complete the four-year BS degree in dance, with an emphasis on collaborative and interdisciplinary work.

The student who enters the dance major at Drexel University is an academically achieving student who has a deep curiosity for non-traditional careers in the field of dance. He or she is looking for extensive experiences to improve as a dancer, choreographer and performer while being stimulated academically. This student wants to study dance—both physically and cognitively—in college while being offered the possibility of gainful employment after graduation.

For more information about this major, visit the Westphal College's Dance (<http://www.drexel.edu/westphal/academics/undergraduate/DANC>) web page.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
PSY 101	General Psychology I	3.0
PSY 120	Developmental Psychology	3.0
PSY 240 [WI]	Abnormal Psychology	3.0
UNIV A101	The Drexel Experience	1.0
Two English (ENGL) electives		6.0
One Art or Humanities elective		3.0
Two Natural Science electives		8.0
Free electives		40.0

Dance Major Requirements

Foundation and Theory Requirements

ARTH 103	History of Art: Modern Art	3.0
DANC 201 [WI]	Dance Appreciation	3.0
DANC 210	Introduction to Dance	3.0
DANC 225	Dance Repertory	4.0
DANC 230	Survey of Dance and Movement Therapy	3.0
DANC 240	Dance Composition I	3.0
DANC 241	Dance Composition II	3.0
DANC 260	Injury Prevention for Dance	3.0
DANC 261	Foundations of Somatic Theory and Practice	3.0
DANC 310 [WI]	Dance Aesthetics and Criticism	3.0
DANC 325 [WI]	Twentieth Century Dance	3.0
DANC 330	Introduction to Laban Movement Analysis	3.0
DANC 340	Dance Pedagogy	3.0
DANC 355	Rhythmic Study for Dance	3.0
DANC 360	Dance Kinesiology	3.0
MUSC 331	World Musics	3.0
NFS 100	Nutrition, Foods, and Health	3.0
& NFS 101	and Introduction to Nutrition & Food	
THTR 240	Theatre Production I	3.0

Performance Requirements

DANC 131	Dance Practicum in Performance (1.0 credit course repeated for a total of 11.0 credits)	11.0
or DANC 133	Dance Practicum in Choreography	
Technique Requirements		
DANC 140	Ballet Technique I (2.0 credit course repeated for a total of 12.0 credits)	12.0
or DANC 141	Ballet Technique II	
or DANC 142	Ballet Dance Technique III	
DANC 150	Modern Dance Technique I (2.0 credit course repeated for a total of 12.0 credits)	12.0
or DANC 151	Modern Dance Technique II	
or DANC 152	Modern Dance Technique III	
DANC 180	Dance Improvisation	2.0
Select five of the following:		10.0
DANC 160	Jazz Dance Technique I	
DANC 161	Jazz Dance Technique II	
DANC 162	Jazz Dance Technique III	
DANC 170	Hip-Hop Dance Technique I	
DANC 171	Hip-Hop Dance Technique II	
DANC 181	Dance Improvisation II	
DANC 190	African Dance Technique I	
DANC 191	African Dance Technique II	
Total Credits		185.0

* For DANC 131: Sections 001, 005, 006, 007, 008 ONLY

Sample Plan of Study

Term 1		Credits
DANC 131	Dance Practicum in Performance	1.0
DANC 140	Ballet Technique I	2.0
DANC 150	Modern Dance Technique I	2.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 181	Mathematical Analysis I	3.0
PSY 101	General Psychology I	3.0
UNIV A101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		Credits
CIVC 101	Introduction to Civic Engagement	1.0
DANC 131	Dance Practicum in Performance	1.0
or 133	Dance Practicum in Choreography	
DANC 140, 141,	Ballet Technique I	2.0
or 142	Ballet Technique II	
	Ballet Dance Technique III	
DANC 261	Foundations of Somatic Theory and Practice	3.0
DANC 355	Rhythmic Study for Dance	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 182	Mathematical Analysis II	3.0
Term Credits		16.0
Term 3		Credits
ARTH 103	History of Art: Modern Art	3.0
DANC 131	Dance Practicum in Performance	1.0
or 133	Dance Practicum in Choreography	
DANC 140, 141,	Ballet Technique I	2.0
or 142	Ballet Technique II	
	Ballet Dance Technique III	
Select one of the following:		2.0
DANC 160	Jazz Dance Technique I	
DANC 161	Jazz Dance Technique II	
DANC 170	Hip-Hop Dance Technique I	
DANC 171	Hip-Hop Dance Technique II	
DANC 190	African Dance Technique I	
DANC 191	African Dance Technique II	

DANC 210	Introduction to Dance	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Free elective		3.0

Term Credits	17.0
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Term 4

DANC 131 or 133	Dance Practicum in Performance Dance Practicum in Choreography	1.0
DANC 150, 151, or 152	Modern Dance Technique I Modern Dance Technique II Modern Dance Technique III	2.0
DANC 180	Dance Improvisation	2.0
DANC 325 [WI]	Twentieth Century Dance	3.0
DANC 330	Introduction to Laban Movement Analysis	3.0
PSY 240 [WI]	Abnormal Psychology	3.0

Term Credits	14.0
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Term 5

COOP 101	Career Management and Professional Development	0.0
DANC 131 or 133	Dance Practicum in Performance Dance Practicum in Choreography	1.0
Select one of the following:		2.0
DANC 160	Jazz Dance Technique I	
DANC 170	Hip-Hop Dance Technique I	
DANC 171	Hip-Hop Dance Technique II	
DANC 190	African Dance Technique I	
DANC 191	African Dance Technique II	
DANC 161	Jazz Dance Technique II	
DANC 230	Survey of Dance and Movement Therapy	3.0
DANC 240	Dance Composition I	3.0
DANC 340	Dance Pedagogy	3.0
PSY 120	Developmental Psychology	3.0

Term Credits	15.0
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Term 6

DANC 131 or 133	Dance Practicum in Performance Dance Practicum in Choreography	1.0
DANC 140, 141, or 142	Ballet Technique I Ballet Technique II Ballet Dance Technique III	2.0
DANC 150, 151, or 152	Modern Dance Technique I Modern Dance Technique II Modern Dance Technique III	2.0
DANC 201 [WI]	Dance Appreciation	3.0
DANC 225	Dance Repertory	4.0
DANC 360	Dance Kinesiology	3.0
THTR 240	Theatre Production I	3.0

Term Credits	18.0
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Term 7

DANC 131 or 133	Dance Practicum in Performance Dance Practicum in Choreography	1.0
DANC 140, 141, or 142	Ballet Technique I Ballet Technique II Ballet Dance Technique III	2.0
DANC 310 [WI]	Dance Aesthetics and Criticism	3.0
Free elective		3.0
Arts and Humanities elective		3.0
English (ENGL) elective		3.0

Term Credits	15.0
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Term 8

DANC 131 or 133	Dance Practicum in Performance Dance Practicum in Choreography	1.0
DANC 150, 151, or 152	Modern Dance Technique I Modern Dance Technique II Modern Dance Technique III	2.0

Select one of the following:	2.0
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DANC 160	Jazz Dance Technique I	
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DANC 161	Jazz Dance Technique II	
DANC 170	Hip-Hop Dance Technique I	
DANC 171	Hip-Hop Dance Technique II	
DANC 190	African Dance Technique I	
DANC 191	African Dance Technique II	
DANC 260	Injury Prevention for Dance	3.0
Free electives		6.0

Term Credits	14.0
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Term 9

DANC 131 or 133	Dance Practicum in Performance Dance Practicum in Choreography	1.0
DANC 140, 141, or 142	Ballet Technique I Ballet Technique II Ballet Dance Technique III	2.0
DANC 150, 151, or 152	Modern Dance Technique I Modern Dance Technique II Modern Dance Technique III	2.0

Natural Science elective	4.0
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Free electives	6.0
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Term Credits	15.0
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Term 10

DANC 131 or 133	Dance Practicum in Performance Dance Practicum in Choreography	1.0
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Select two of the following:	4.0
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DANC 160	Jazz Dance Technique I	
DANC 161	Jazz Dance Technique II	
DANC 170	Hip-Hop Dance Technique I	
DANC 171	Hip-Hop Dance Technique II	
DANC 190	African Dance Technique I	
DANC 191	African Dance Technique II	

NFS 100 & NFS 101	Nutrition, Foods, and Health	3.0
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Free electives	6.0
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Term Credits	14.0
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Term 11

DANC 131 or 133	Dance Practicum in Performance Dance Practicum in Choreography	1.0
DANC 150, 151, or 152	Modern Dance Technique I Modern Dance Technique II Modern Dance Technique III	2.0

Natural Science elective	4.0
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Free electives	10.0
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Term Credits	17.0
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Term 12

DANC 241	Dance Composition II	3.0
MUSC 331	World Musics	3.0

English (ENGL) elective	3.0
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Free electives	6.0
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Term Credits	15.0
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Total Credit: 185.0

Co-op/Career Opportunities

The dance major is designed for students to focus on one of four career options. Several of the tracks lead to graduate study at Drexel or may be completed at the end of four years. Each also includes a co-op experience that allows for extended interaction with professionals in dance therapy, physical therapy, education, and performance. Students wishing to change career focus throughout the course of the undergraduate curriculum will have the option to do so.

Students focusing on **dance/movement therapy** participate in a six month co-op experience during the spring and summer terms of their junior year. These students may participate in co-op with a practicing

dance/movement therapist, community dance artist, or mental health professional in a mental health, social service, rehabilitation, medical, special education or community arts setting.

Students focusing on **physical therapy**, will participate in a six month co-op in which they work in a setting with a physical therapist, such as a hospital, treatment center, school, or private practice. Co-op experiences where students are able to work with physical therapists working on dancers as clients will be encouraged.

Students focusing on **dance in education** participate in after school dance programs, artist in residence school partnerships and auditorium lecture demonstration programs as part of a touring dance company run by the dance program at Drexel, or other dance education focused activities in a school or studio setting, during the fall and winter of their junior year as their co-op experience.

Students focusing on **custom design** or **performance** may participate in a six month co-op including performance, administration, production, event planning and grant writing. Students interested in performance will work with professional choreographers to experience multiple aspects of creating a sustainable life in performance and/or choreography.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Dual-Degree Option

BS/MS Dance and Elementary Education

About the Accelerated Degree Program

Qualified students in Dance have the option of continuing on into the graduate Science of Instruction program to obtain a BS in Dance and MS in Science of Instruction with Elementary Education certification. This program would allow highly motivated students to graduate with both degrees in a total of 5 years. Students apply for this accelerated program when they complete 90.0 credits of coursework and before completing 120.0 credits.

BS in Dance

Incoming students, 2016/2017

Bachelor of Science Degree: 185.0 quarter credits

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 181	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
PSY 101	General Psychology I	3.0
PSY 120	Developmental Psychology	3.0
PSY 240 [WI]	Abnormal Psychology	3.0
UNIV A101	The Drexel Experience	1.0
Two English (ENGL) electives		6.0
One Art or Humanities elective		3.0
Two Natural Science electives		8.0
Free electives		40.0

Dance Major Requirements

Foundation and Theory Requirements

ARTH 103	History of Art: Modern Art	3.0
DANC 201 [WI]	Dance Appreciation	3.0
DANC 210	Introduction to Dance	3.0
DANC 225	Dance Repertory	4.0
DANC 230	Survey of Dance and Movement Therapy	3.0
DANC 240	Dance Composition I	3.0
DANC 241	Dance Composition II	3.0
DANC 260	Injury Prevention for Dance	3.0
DANC 261	Foundations of Somatic Theory and Practice	3.0
DANC 310 [WI]	Dance Aesthetics and Criticism	3.0
DANC 325 [WI]	Twentieth Century Dance	3.0
DANC 330	Introduction to Laban Movement Analysis	3.0
DANC 340	Dance Pedagogy	3.0
DANC 355	Rhythmic Study for Dance	3.0
DANC 360	Dance Kinesiology	3.0
MUSC 331	World Musics	3.0
NFS 100 & NFS 101	Nutrition, Foods, and Health and Introduction to Nutrition & Food	3.0
THTR 240	Theatre Production I	3.0

Performance Requirements

DANC 131	Dance Practicum in Performance (1.0 credit course repeated for a total of 11.0 credits) *	11.0
or DANC 133	Dance Practicum in Choreography	

Technique Requirements

DANC 140	Ballet Technique I (2.0 credit course repeated for a total of 12.0 credits)	12.0
or DANC 141	Ballet Technique II	
or DANC 142	Ballet Dance Technique III	
DANC 150	Modern Dance Technique I (2.0 credit course repeated for a total of 12.0 credits)	12.0
or DANC 151	Modern Dance Technique II	
or DANC 152	Modern Dance Technique III	
DANC 180	Dance Improvisation	2.0
Select five of the following:		10.0
DANC 160	Jazz Dance Technique I	
DANC 161	Jazz Dance Technique II	
DANC 162	Jazz Dance Technique III	
DANC 170	Hip-Hop Dance Technique I	
DANC 171	Hip-Hop Dance Technique II	
DANC 181	Dance Improvisation II	
DANC 190	African Dance Technique I	
DANC 191	African Dance Technique II	

Total Credits

185.0

* For DANC 131: Sections 001, 005, 006, 007, 008 ONLY

MS in Science of Instruction

A minimum of 45.0 credits is required for students with or without prior certification (including 15.0 credits of professional electives).

Core Courses

At a minimum, 23.0 pedagogy credits will be required from the core courses for those without prior teacher certification. Students with prior certification or those seeking an add-on certification will select 11.0 credits from the core courses.

EDUC 520	Professional Studies in Instruction *	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 523	Diagnostic Teaching	4.0
EDUC 524	Current Research in Curriculum & Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 526	Language Arts Processes	3.0

EDUC 540	Field Experience *	3.0
Total Credits		22.0

* Not available to those with prior teacher certification.

Content Categories

For students without prior teacher certification, 7 credits are required, selected from the following content categories. (A list of suggested courses is available from the department.) Students with prior certification or those seeking add-on certification select 19 credits from the content categories.

1. Mathematics and science
2. Technological pedagogy
3. Applied pedagogy

Evaluation of transcripts by a program advisor in relation to Pennsylvania state standards determines the required content courses for initial certification and add-on certification. To satisfy state certification requirements, undergraduate courses may be taken in instances where graduate courses are not appropriate. These undergraduate courses will not satisfy graduate degree requirements. However, they will satisfy certification requirements and may satisfy requirements for salary increments in certain school districts. For those with prior certification who do not wish add-on certification, but desire to further professional competence, a distribution of courses from areas A, B, and C is selected under advisement on an individual basis.

Professional Electives

Students with or without prior certification select 15 credits of professional electives. Professional electives are selected with the advice of a program advisor to strengthen mathematics and science knowledge, to refine and update pedagogy competence, to broaden general education, to gain knowledge about the nature of information and information materials, to develop and refine skills in integrating technology into instruction, and to ensure that certification standards are satisfied. Professional electives may be taken from the core courses or from any course in the content categories. Any graduate course offered in the University may serve as a professional elective if the student has adequate preparation to take the course and it is deemed appropriate by the program advisor. The 15.0 credits of professional electives may comprise a combination of up to three Performance Learning Systems (PLS) courses and/or approved transfer credits. PLS courses must be taken at Drexel to count toward the master's degree.

Minor in Dance

The minor in dance offers students an opportunity to explore dance in the studio through technique classes, and in the classroom through academic classes in dance. Participation in the dance ensemble class(s) is required, although performance with the ensemble is not. There is no audition for the dance minor program.

Required Courses

DANC 140	Ballet Technique I	2.0
DANC 150	Modern Dance Technique I	2.0
DANC 160	Jazz Dance Technique I	2.0
or DANC 170	Hip-Hop Dance Technique I	
DANC 210	Introduction to Dance	3.0
DANC 240	Dance Composition I	3.0
DANC 325 [WI]	Twentieth Century Dance	3.0
DANC 355	Rhythmic Study for Dance	3.0

THTR 240	Theatre Production I	3.0
Electives in Dance (DANC 140-DANC 495)		3.0
Dance Practicum (6 terms from DANC 131-DANC 133)		0.0
Total Credits		24.0

Dance Faculty

Lindsay Browning, BFA (*Bradford University*). Adjunct Professor. Yoga

Jim Bunting, BFA (*University of the Arts, Philadelphia*). Adjunct Instructor. Jazz dance.

Antoinette Coward-Gilmore, MA (*New York University*). Adjunct Instructor. African dance, modern dance.

Clyde Evans Adjunct Assistant Professor. Director of Chosen Dance Company; hip-hop.

Chris Farrell, MBA (*Fordham University*). Adjunct Instructor. Rhythmic studies; accompaniment.

Miriam Giguere, PhD (*Temple University*) *Department Head, Performing Arts*. Associate Professor. Professional modern dancer, choreographer and dance educator whose research centers on cognition during the creative process. She has published nationally and internationally and is a frequent presenter on the integration of dance and academics at national and international conferences.

Valerie Ifill, MFA (*University of Oregon*) *Program Director, Dance; Director of the Youth Performance Exchange and Dornsife Dance*. Assistant Teaching Professor. Intersections of dance and the community

Tania Isaac, MFA (*Temple University*). Assistant Teaching Professor. Caribbean-American dancer/choreographer; fusion of choreography with personal documentary and social commentary to grapple with identity, post-colonial issues, feminism and juxtapositions of European and African influences.

Lucinda Lea, BA (*Indiana University*). Adjunct Assistant Professor. Ballet.

Marcie Mamura, MFA (*University of Oregon*). Adjunct Assistant Professor. Assistant Director, FreshDance.

Jennifer Morley, MFA (*Temple University*). Assistant Teaching Professor. Master Pilates instructor and director of the Drexel Pilates Teaching Training program; modern dance, choreography.

Carl Paris, PhD (*Temple University*). Adjunct Associate Professor. Interdisciplinary approach to dance studies, cultural studies and issues around black dance and performance.

Olive Prince, MFA (*Temple University*). Adjunct Assistant Professor. Choreography, creative process and improvisation; Director of Olive Prince Dance.

Meredith Rainey Adjunct Assistant Professor. Former soloist with Pennsylvania Ballet and director of Carbon Dance Theater. Ballet, choreography.

Heather Smalley, BS (*Drexel University*). Adjunct Assistant Professor. Arts administration.

Leah Stein, BA (*Wesleyan University*). Adjunct Assistant Professor. Modern technique; improvisation.

Lauren Stepanski, DPT (Drexel University). Adjunct Assistant Professor.
Dance kinesiology

Design & Merchandising

Major: Design and Merchandising

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 181.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 50.0499

Standard Occupational Classification (SOC) code: 13-1022

About the Program

Students in the Design & Merchandising program develop an appreciation for style and product quality, learn to communicate verbally and visually about design across traditional and emerging media, and gain the business knowledge and skills required to promote an aesthetically grounded point of view in the global marketplace.

The Design & Merchandising program at Drexel University's Antoinette Westphal College of Media Arts & Design educates and prepares students to effect change via creative problem-solving in design and commerce. Through an interdisciplinary approach, we strive to graduate adaptable, creative, confident and passionate professionals who are technologically adept and globally aware.

Through the classroom, co-op experience and study abroad opportunities (<http://www.drexel.edu/studyabroad>), the program prepares students to create, merchandise, market, promote and distribute fashion product, based on a knowledge of visual/aesthetic and business considerations. Design & Merchandising students graduate with the knowledge and skills needed for success in traditional and emerging roles in the global marketplace, and as practical and responsible corporate citizens who will make the world a more compelling, beautiful place in which to live and work.

Design & Merchandising majors typically focus study in the areas of fashion and fashion-related retail merchandising, product development and product promotions. Elective credits may be used for a concentration in Retail Buying & Merchandising; Fashion Product Development; Fashion Promotion & Special Events; Merchandising Technologies; and Design Management for Design & Merchandising. Elective credits may also provide students with an option to minor in business administration, art history, product design, another discipline, or to pursue other specific educational goals.

For more information about this major, visit the College's Design & Merchandising (<http://www.drexel.edu/westphal/academics/undergraduate/DSMR>) page.

Degree Requirements

Students pursuing the Bachelor of Science in Design & Merchandising may complete a concentration in an area of study using free electives. Students may pursue more than one concentration or combine a concentration with a minor.

Concentration in Retail Buying & Merchandising

This concentration is designed to broaden students' practical and theoretical understanding of consumption as it relates to retail buying, management and merchandising. With the growth in cross-channel retail, students need to develop their skills not only for careers in traditional

brick-and-mortar retailing establishments, but other retail models. These include: print and electronic based retailing (catalog, television, and Internet). In this concentration, students explore all major retail merchandising and marketing channels and their requirements for buying, staffing, technology, logistics, distribution, and organizational behavior.

Concentration in Fashion Product Development

This concentration analyzes the dominant forces shaping 21st century merchandising decisions, including global product sourcing, international retail development, and the increasingly important role of the consumer in product design. Students successfully completing this concentration develop practical applications to critical issues facing industry decision makers, understand supply chain management from the producer and retailer perspective, identify new markets for products and create strategies for entering those markets, implement merchandising strategies in sectors across the design industries and gain exposure to the latest technology and communication tools that support the industry.

Concentration in Fashion Promotion and Special Events

Through the Fashion Promotion and Special Events concentration students who are interested in a career in public relations, special events planning and marketing, creative and media direction within the design industries will have the opportunity to take classes inside and outside the AW College of Media Arts & Design. These partnerships will enhance the students' background in this area of specialization, and dramatically increase networking and employment opportunities.

Concentration in Merchandising Technologies

Merchandising utilizes technology on the front end for fashion product promotion and on the back end to research, design, source, produce and distribute fashion and home product. In this concentration, students will study topical issues in merchandising technologies through a variety of theory and "hands on" based courses. Upon completion of this concentration students will be familiar with the current technologies in play, analyze the appropriate uses of available technology and be familiar with emerging trends.

Concentration in Design Management in Design & Merchandising

Design management is a relatively new area of study for the design and merchandising student. This concentration is specifically designed to prepare the student to pursue Design Management at the graduate level.

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
PHYS 121	Physical Science for Design I	4.0
PHYS 122	Physical Science for Design II	4.0
UNIV A101	The Drexel Experience	2.0
Required Arts and Humanities - students elect a minimum of 9 credits. *		9.0
Required Social Science - students elect a minimum of 9 credits **		9.0
Free Electives		31.0

Visual Studies Requirements

ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
PHTO 110	Photography	3.0
VSST 101	Design I	4.0
VSST 102	Design II	4.0
VSST 103	Design III	4.0

VSST 110	Introductory Drawing	3.0
VSST 111	Figure Drawing I	3.0
VSST 201	Multimedia: Performance	4.0
VSST 202	Multimedia: Space	4.0
VSST 203	Multimedia: Materials	4.0
Professional Requirements		
ACCT 110	Accounting for Professionals	4.0
ARTH 300 [WI]	History of Modern Design	3.0
DSMR 100	Computer Imaging I	3.0
DSMR 201	Analysis of Product	3.0
DSMR 210	Presentation Techniques Design and Merchandising	3.0
DSMR 211	Computer Design for Design and Merchandising	3.0
DSMR 230	Textiles for Design and Merchandising	3.0
DSMR 231	Retail Principles	3.0
DSMR 232	Retail Merchandise Planning	4.0
DSMR 310	Computer Integrated Merchandising Management	3.0
DSMR 311	Visual Merchandising	4.0
DSMR 333	Fashion Product Development	3.0
DSMR 477 [WI]	Design and Merchandising Seminar	3.0
DSMR 496 [WI]	Senior Problem in Design and Merchandising	3.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FASH 201	Survey of the Fashion Industry	3.0
MKTG 201	Introduction to Marketing Management	4.0
Art History Electives ***		6.0
Total Credits		181.0

* Arts and humanities electives must equal a minimum of 9.0 credits. Suggested arts and humanities electives: ENGL 303 Science Fiction; ENGL 335 Mythology (Women in Literature); HIST 163 Themes in World Civilization III; ENGL 335 Mythology; any foreign language.

** Social science electives must equal a minimum of 9.0 credits. Suggested social science electives: SOC 210 Race, Ethnicity and Social Inequality; SOC 215 Sociology of Work; SOC 240 Urban Sociology; SOC 345 Sociology for the Environment; SOC 340 Globalization; SOC I499 Independent Study in SOC.

*** Suggested art history electives: ARTH 335 History of Costume I: Preclassical to Directoire [WI] ; ARTH 336 History of Costume II: Directoire to World War I [WI] ; ARTH 477 Art History Seminar.

Concentration Options

Retail Buying & Merchandising Concentration

Required Courses		
DSMR 313	International Fashion Merchandising	3.0
DSMR 314	Visual Merchandising III	4.0
DSMR 324	Retail Intersections: Social & Cultural Issues	3.0
DSMR 325	Retail Buying and Assortment Strategies	4.0
Select three from the following:		11.0
DSMR 309	Color and Trend Forecasting	
DSMR 326	Fashion Product Promotion	
MKTG 324	Marketing Channels and Distribution Systems	
MKTG 344	Professional Personal Selling	
MKTG 355	Interactive Marketing	
MKTG 356	Consumer Behavior	
Total Credits		25.0

Fashion Product Development Concentration

Required Courses		
DSMR 313	International Fashion Merchandising	3.0
DSMR 320	Merchandising and Design Directions	3.0

DSMR 434	Fashion Product Sourcing	3.0
Select four from the following:		14.0
COM 362	International Negotiations	
DSMR 326	Fashion Product Promotion	
INTB 200	International Business	
INTB 334	International Trade	
MKTG 347	New Product Development	
MKTG 357	Global Marketing	
Total Credits		23.0

Fashion Promotion and Special Events Concentration

Required Courses		
DSMR 205	eFashion Promotion	3.0
DSMR 326	Fashion Product Promotion	4.0
Select one of the following:		2.0-3.0
DSMR 312	Visual Merchandising II	
DSMR 315 [WI]	Media Merchandising I [WI]	
DSMR 321 [WI]	Fashion Show Production I [WI]	
Select 13.0 - 14.0 additional credits from the following:		13.0-14.0
COM 160	Introduction to Journalism	
COM 181	Public Relations Principles and Theory	
COM 350 [WI]	Document Design and Evaluation	
COM 361	International Public Relations	
DSMR 316	Media Merchandising II	
DSMR 317	Media Merchandising III	
DSMR 318	Music Merchandising	
DSMR 322	Fashion Show Production II	
FASH 467	Style and the Media	
MKTG 322	Advertising & Integrated Marketing Communications	
MKTG 356	Consumer Behavior	
Total Credits		23.0

Merchandising Technologies Concentration

Required Courses		
DSMR 205	eFashion Promotion	3.0
DSMR 305	eTailing	3.0
Select a minimum of 5 from the following:		15.0
COM 335	Electronic Publishing	
CT 230	Web Development I	*
CT 240	Web Development II	**
CT 385	Web Development III	**
DIGM 105	Overview of Digital Media	
DIGM 350 [WI]	Digital Storytelling	
DIGM 451 [WI]	Explorations in New Media	
DSMR 312	Visual Merchandising II	
DSMR 316	Media Merchandising II	
DSMR 317	Media Merchandising III	
Total Credits		21.0

* The pre-requisite for this course is CT 230.

** The pre-requisite for this course is CT 240.

Design Management in Design & Merchandising Concentration

Required Courses		
DSMR 205	eFashion Promotion	3.0
DSMR 305	eTailing	3.0
DSMR 313	International Fashion Merchandising	3.0

DSMR 434	Fashion Product Sourcing	3.0
Choose 11.0 -12.0 additional credits from the following:		11.0-12.0
BLAW 201	Business Law I	
COM 361	International Public Relations	
COM 362	International Negotiations	
INTB 200	International Business	
INTB 334	International Trade	
MGMT 364	Technology Management	
MKTG 347	New Product Development	
MKTG 357	Global Marketing	
Total Credits		23.0

Sample Plans of Study

Fall/Winter Co-op (Cycle A)

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FASH 201	Survey of the Fashion Industry	3.0
PHYS 121	Physical Science for Design I	4.0
UNIV A101	The Drexel Experience	1.0
VSST 101	Design I	4.0
Term Credits		15.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHYS 122	Physical Science for Design II	4.0
UNIV A101	The Drexel Experience	1.0
VSST 102	Design II	4.0
VSST 110	Introductory Drawing	3.0
Term Credits		15.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
DSMR 100	Computer Imaging I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
VSST 103	Design III	4.0
VSST 111	Figure Drawing I	3.0
Term Credits		18.0
Term 4		
ACCT 110	Accounting for Professionals	4.0
ARTH 101	History of Art I: Ancient to Medieval	3.0
DSMR 231	Retail Principles	3.0
ECON 201	Principles of Microeconomics	4.0
Term Credits		14.0
Term 5		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
COOP 101	Career Management and Professional Development	0.0
DSMR 211	Computer Design for Design and Merchandising	3.0
DSMR 232	Retail Merchandise Planning	4.0
ECON 202	Principles of Macroeconomics	4.0
Term Credits		14.0
Term 6		
DSMR 201	Analysis of Product	3.0
DSMR 210	Presentation Techniques Design and Merchandising	3.0
DSMR 230	Textiles for Design and Merchandising	3.0
VSST 201	Multimedia: Performance	4.0
Term Credits		13.0
Term 7		
ARTH 300 [WI]	History of Modern Design	3.0
VSST 203	Multimedia: Materials	4.0
PHOT 110	Photography	3.0

Free Elective		3.0
Arts and Humanities Elective		3.0
Term Credits		16.0
Term 8		
ARTH 103	History of Art: Modern Art	3.0
DSMR 310	Computer Integrated Merchandising Management	3.0
DSMR 333	Fashion Product Development	3.0
MKTG 201	Introduction to Marketing Management	4.0
Social Science Elective		3.0
Term Credits		16.0
Term 9		
DSMR 311	Visual Merchandising	4.0
DSMR 477 [WI]	Design and Merchandising Seminar	3.0
Art History (ARTH) Elective		3.0
Arts and Humanities Elective		3.0
Free Electives		3.0
Term Credits		16.0
Term 10		
DSMR 496 [WI]	Senior Problem in Design and Merchandising	3.0
Art History (ARTH) Elective		3.0
Social Science Elective		3.0
Free Electives		7.0
Term Credits		16.0
Term 11		
VSST 202	Multimedia: Space	4.0
Social Science Elective		3.0
Free Electives		9.0
Term Credits		16.0
Term 12		
Free Electives		9.0
Arts and Humanities Elective		3.0
Term Credits		12.0
Total Credit: 181.0		

Fall/Winter Co-op (Cycle A - London Option)

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FASH 201	Survey of the Fashion Industry	3.0
PHYS 121	Physical Science for Design I	4.0
UNIV A101	The Drexel Experience	1.0
VSST 101	Design I	4.0
Term Credits		15.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHYS 122	Physical Science for Design II	4.0
VSST 102	Design II	4.0
UNIV A101	The Drexel Experience	1.0
VSST 110	Introductory Drawing	3.0
Term Credits		15.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
DSMR 100	Computer Imaging I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
VSST 103	Design III	4.0
VSST 111	Figure Drawing I	3.0
Term Credits		18.0
Term 4		
ACCT 110	Accounting for Professionals	4.0
ARTH 101	History of Art I: Ancient to Medieval	3.0

DSMR 210	Presentation Techniques Design and Merchandising	3.0
DSMR 231	Retail Principles	3.0
ECON 201	Principles of Microeconomics	4.0
Term Credits		17.0
Term 5		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
COOP 101	Career Management and Professional Development	0.0
DSMR 211	Computer Design for Design and Merchandising	3.0
ECON 202	Principles of Macroeconomics	4.0
Free Elective		4.0
Term Credits		14.0
Term 6		
DSMR 201	Analysis of Product	3.0
DSMR 230	Textiles for Design and Merchandising	3.0
DSMR 232	Retail Merchandise Planning	4.0
VSST 201	Multimedia: Performance	4.0
Term Credits		14.0
Term 7		
DSMR 477 [WI]	Design and Merchandising Seminar	3.0
PHTO 110	Photography	3.0
VSST 203	Multimedia: Materials	4.0
Arts and Humanities Elective		3.0
Art History (ARTH) Elective		3.0
Term Credits		16.0
Term 8		
DSMR 310	Computer Integrated Merchandising Management	3.0
DSMR 333	Fashion Product Development	3.0
MKTG 201	Introduction to Marketing Management	4.0
Social Science Elective		3.0
Term Credits		13.0
Term 9		
London Option (History of Modern Design 4.5, Fashion Product Promotion 4.5, and 9 credits electives)		18.0
Term Credits		18.0
Term 10		
ARTH 103	History of Art: Modern Art	3.0
DSMR 496 [WI]	Senior Problem in Design and Merchandising	3.0
Free Electives		3.0
Social Science Elective		3.0
Term Credits		12.0
Term 11		
DSMR 311	Visual Merchandising	4.0
VSST 202	Multimedia: Space	4.0
Arts and Humanities Elective		3.0
Art History (ARTH) Elective		3.0
Term Credits		14.0
Term 12		
Free Electives		6.0
Art History (ARTH) Elective		3.0
Social Science Elective		3.0
Arts and Humanities Elective		3.0
Term Credits		15.0

Total Credit: 181.0

Spring/Summer (Co-op Cycle B)

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FASH 201	Survey of the Fashion Industry	3.0
PHYS 121	Physical Science for Design I	4.0
UNIV A101	The Drexel Experience	1.0

VSST 101	Design I	4.0
Term Credits		15.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHYS 122	Physical Science for Design II	4.0
UNIV A101	The Drexel Experience	1.0
VSST 102	Design II	4.0
VSST 110	Introductory Drawing	3.0
Term Credits		15.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
DSMR 100	Computer Imaging I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
VSST 103	Design III	4.0
VSST 111	Figure Drawing I	3.0
Term Credits		18.0
Term 4		
ACCT 110	Accounting for Professionals	4.0
ARTH 101	History of Art I: Ancient to Medieval	3.0
DSMR 231	Retail Principles	3.0
ECON 201	Principles of Microeconomics	4.0
Term Credits		14.0
Term 5		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
DSMR 232	Retail Merchandise Planning	4.0
ECON 202	Principles of Macroeconomics	4.0
Free Elective		3.0
Term Credits		14.0
Term 6		
DSMR 201	Analysis of Product	3.0
DSMR 210	Presentation Techniques Design and Merchandising or 211	3.0
DSMR 230	Textiles for Design and Merchandising	3.0
VSST 201	Multimedia: Performance	4.0
Term Credits		13.0
Term 7		
ARTH 300 [WI]	History of Modern Design	3.0
COOP 101	Career Management and Professional Development	0.0
PHTO 110	Photography	3.0
VSST 203	Multimedia: Materials	4.0
Free Elective		3.0
Arts and Humanities Elective		3.0
Term Credits		16.0
Term 8		
ARTH 103	History of Art: Modern Art	3.0
DSMR 310	Computer Integrated Merchandising Management	3.0
DSMR 333	Fashion Product Development	3.0
MKTG 201	Introduction to Marketing Management	4.0
Social Science Elective		3.0
Term Credits		16.0
Term 9		
DSMR 311	Visual Merchandising	4.0
DSMR 477 [WI]	Design and Merchandising Seminar	3.0
Art History (ARTH) Elective		3.0
Arts and Humanities Elective		3.0
Free Elective		3.0
Term Credits		16.0
Term 10		
DSMR 496 [WI]	Senior Problem in Design and Merchandising	3.0
Art History (ARTH) Elective		3.0

Social Science Elective	3.0
Free Electives	6.0
Term Credits	15.0
Term 11	
VSST 202 Multimedia: Space	4.0
Free Electives	8.0
Social Science Elective	3.0
Term Credits	15.0
Term 12	
Free Electives	11.0
Arts and Humanities Elective	3.0
Term Credits	14.0
Total Credit: 181.0	

Co-op/Career Opportunities Opportunities

An education in Design & Merchandising prepares individuals for a wide variety of career paths. Graduates often pursue opportunities in retail operations and buying, fashion and home product development, fashion product promotion. More recently, graduates select careers in merchandising technologies, or design management. Each of these areas is offered as a concentration, or the student may elect to choose a minor opening up an unlimited number of options.

Co-Op Experiences

Some past co-op employments of design and merchandising students include:

- Wholesale Co-op, Alexander McQueen, New York, NY
- Assistant Buyer, Urban Outfitters/Anthropologie, Philadelphia, PA
- Product Development Assistant, Charming Shoppes, Bensalem, PA
- Design and Merchandising Assistant, Jones New York, New York, NY
- Public Relations Assistant, QVC, West Chester, PA
- Assistant Fashion Coordinator, Special Events Department, Saks Fifth Avenue
- Fashion Showroom Co-op, BCBG Max Azria, New York, NY
- Public Relations Assistant, Neiman Marcus, King of Prussia, PA
- Design/Market Co-op, Charlotte Ronson, New York, NY
- Design Assistant, Calvin Klein, New York, NY
- Retail/Manufacturing/Merchandising Asst., Nicole Miller, Philadelphia PA

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Dual/Accelerated Degree Program

Only available to Design & Merchandising majors (4-year with co-op), this dual degree program combines study in the areas of fashion retail merchandising and product development with the MBA degree. The program is designed to allow students to complete both the bachelor's degree and the Master of Business Administration degree in five years.

Incoming freshmen selected for this program will generally have a minimum of 1350 on the SAT, a GPA of 3.5 or better, and rank in the top 10% of their high school graduating class. A strong candidate for this program will have taken significant AP coursework while in high school.

Degree Requirements

The degree requirements for each program are located on the following pages:

- BS in Design & Merchandising Requirements (p. 485)
- MBA Requirements (<http://catalog.drexel.edu/graduate/collegeofbusiness/businessadministration/#degreerequirementstext>)

Additional requirements for the dual degree program

- A cumulative GPA of at least 3.2 is required throughout the program.
- Students must take the GMAT examination and achieve a minimum score of 570 prior to the end of the tenth term in order to continue in the program. It is recommended that students take the GMAT examination late in the student's third year.
- Students must submit an acceptable plan of study at least three terms before anticipated start of graduate part of the program.

Students should visit the Westphal College of Media Arts and Design (<http://www.drexel.edu/westphal>) for more information.

Fashion, Product Design & Merchandising Faculty

Kristen Ainscoe, BS (*Drexel University*). Assistant Teaching Professor. Visual merchandiser; merchandise management.

Catherine Byers, MA (*American University*). Assistant Teaching Professor. Journalism; marketing and communications.

Nick Cassway, BFA (*Tyler School of Art*). Assistant Teaching Professor. Curating; experimental portraiture; computer design.

Anne C. Cecil, MA (*University of the Arts*). Assistant Teaching Professor. Web designer, product designer, merchandising and artist.

Michael Glaser, MFA (*Ohio State University*) *Program Director for Product Design*. Associate Professor. Quantifying the designer's intuition; the interplay between digital and physical forms; human desire to shape our surroundings.

Joseph H. Hancock, II, PhD (*Ohio State University*). Professor. Apparel merchandising, textiles and clothing, culture and marketing strategies.

Beth Phillips, MS (*Georgetown University*). Associate Teaching Professor. Business and international marketing, linguist, analysis of products.

Entertainment and Arts Management

Major: Entertainment and Arts Management

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 185.0 - 187.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Program (CIP) code: 51.1001

Standard Occupational Classification (SOC) code: 13-1011

About the Program

The Entertainment and Arts Management (EAM) program at Drexel University is an international leader in teaching the business of show business. Our unique program is a business degree, yet one that is based

in the entertainment and arts sectors. Students in the Entertainment and Arts Management major choose an area of concentration from media, performing arts, or visual arts management disciplines. The curriculum is designed to prepare students to lead and manage in both commercial and non-profit areas of the field. Concentrations are available in: Cinema and Television, Performing Arts; Dance; Theatre; Visual Arts, Digital Media; and Sports Entertainment. Coursework in the EAM program includes general education, core requirements and features a built-in business minor. Students also enjoy a wide-selection of specialized coursework within their chosen area of concentration.

Unlike other undergraduate programs in this field, students are not required to choose commercial or nonprofit. Our philosophy is to prepare students for leadership careers in the vast world of arts and entertainment. This gives EAM students increased flexibility when choosing their career paths, and a distinct professional advantage in today's ever-changing arts and entertainment industries.

Our Goal

Our overall goal in the EAM program is to prepare students for leadership careers in the entertainment and arts fields by giving them:

- a broad understand of the business of entertainment & the arts, from for-profit commercial entertainment companies to non-profit arts & culture organizations;
- real world work experience;
- skills development in the creative discipline that interests them, and
- expert advice and insight from practicing professionals.

BS/MS Option

Students who complete the Entertainment and Arts Management program may also choose to pursue a graduate degree at Drexel University in arts administration or museum leadership. Students who graduate with a 3.5 GPA in the last two years of the program who apply to the MS in Arts Administration (<http://catalog.drexel.edu/graduate/collegeofmediaartsanddesign/artsadministration>) are automatically accepted into the MS program. Other graduate degrees within the college are available to students as well.

Dual Degree MBA Option

EXCLUSIVE to students majoring in Entertainment and Arts Management (4-year with co-op) is the BS Entertainment and Arts Management/MBA dual degree option. This highly attractive program option combines study in the management of the arts and entertainment industries along with the MBA degree. The program is designed to allow students to complete both the bachelor's degree and the MBA in five years.

Applying to the Dual Degree MBA Option

Freshman applicants to the Entertainment and Arts Management program with a combined Math and Critical Reading SAT score of 1300 and a 3.5 GPA may apply for the BS/MBA program at the time of their initial application to Drexel University. Students who are accepted into the accelerated program must maintain a 3.2 GPA as an EAM undergraduate, and must submit 2 letters of recommendation and meet minimum GMAT requirements at the time of the application to the MBA program.

For more information about this major, visit the College's Entertainment and Arts Management (<http://www.drexel.edu/westphal/academics/undergraduate/eam>) page.

Degree Requirements

Coursework in the EAM program includes general education and core requirements as well as specialized coursework within the student's chosen area of concentration and, if applicable, within a specific arts or media discipline. For instance, within the media management concentration, students choose coursework in one of two disciplines: film, video, and screenwriting or digital media. In the performing arts management concentration, students choose coursework in a dance, performing arts, or theatre discipline.

The core requirements provide an overview of the student's future career field and its required key skills and abilities. The core requirements build a foundation for further advanced and specialized courses, taught in the student's area of concentration. At the end of their freshman year, students select one of the following concentrations:

- **(A) Visual Arts Management Concentration**
- **(B) Performing Arts Management**
 - a. Dance Concentration
 - b. Performing Arts Concentration
 - c. Theatre Concentration
- **(C) Media Management**
 - a. Digital Media Concentration
 - b. Cinema and Television Concentration
- **(D) Sports Entertainment Concentration**

General Education Requirements

Written Analysis and Communication Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0

Mathematics and Natural Sciences Requirements

MATH 101	Introduction to Analysis I	4.0
MATH 102	Introduction to Analysis II	4.0
Select one of the following sequences:		6.0-8.0
Biology		
BIO 100	Applied Cells, Genetics & Physiology	
BIO 101	Applied Biological Diversity, Ecology & Evolution	
Physics		
PHYS 121	Physical Science for Design I	
PHYS 122	Physical Science for Design II	

Arts/Humanities Requirements

COM 230	Techniques of Speaking	3.0
Required Arts and Humanities-students elect a minimum of 6 credits		6.0

Social Science Requirements

Required Social Science-students elect a minimum of 9.0 credits		9.0
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University Seminar Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
UNIV A101	The Drexel Experience	2.0
Free electives		26.0-21.0

Entertainment and Arts Management Core Requirements

ACCT 110	Accounting for Professionals	4.0
BLAW 201	Business Law I	4.0
DSMR 100	Computer Imaging I	3.0
EAM 130	Overview of Entertainment and Arts Management	3.0
EAM 211	Strategic Management for Entertainment and Arts Management	3.0
EAM 261	Copyrights and Trademarks	3.0
EAM 361	Law for Entertainment and Arts Management Managers	3.0

EAM 391 [WI]	Promotion, Press and Publicity	3.0
EAM 461	Entertainment Publishing	3.0
EAM 491	Entertainment and Arts Management Senior Project **	3.0
ECON 201	Principles of Microeconomics	4.0
HRMT 323	Principles of Human Resource Administration	4.0
MKTG 201	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Select one of the following:		4.0
ACCT 116	Managerial Accounting Foundations	
BUSN 301	Accounting and Finance for Nonfinancial Professionals	
MKTG 356	Consumer Behavior	
Select two of the following: ***		8.0
ECON 202	Principles of Macroeconomics	
FIN 301	Introduction to Finance	
MIS 200	Management Information Systems	
OPM 200	Operations Management	
STAT 201	Introduction to Business Statistics	
STAT 202	Business Statistics II	
Concentration Requirements *		55.0-60.0
Total Credits		185.0-187.0

* Minimum number of free electives depends on chosen concentration.

** EAM 491 is a 1.0 credit course, taken 3 times during the senior year, for a total of 3.0 credits.

*** BS/MBA students should take STAT 201 and FIN 301. Students who take STAT 201 and FIN 301 should not take BUSN 301.

Concentration Requirements

A. Visual Arts Management Concentration

ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
EAM 270	Audience Development for Arts	3.0
EAM 301	Gallery and Collection Management	3.0
EAM 302	Exhibition Design	3.0
EAM 312	Introduction to Fund Development for the Arts	3.0
EAM 350	Arts, Culture and Society	3.0
EAM 401	Writing for Arts Managers	3.0
EAM 471	Fine Arts Market Development	3.0
EAM 472	Trends in Visual Arts	3.0
Visual Arts students select 24 additional credits from the following:		24.0
ARTH 300 [WI]	History of Modern Design	
INTR 200	History of Modern Architecture and Interiors	
PHTO 110	Photography	
PHTO 210	Intermediate Photography	
PHTO 275	History of Photography I [WI]	
PHTO 276	History of Photography II	
VSST 101	Design I	
VSST 102	Design II	
VSST 103	Design III	
VSST 110	Introductory Drawing	
VSST 111	Figure Drawing I	
VSST 112	Figure Drawing II	
VSST 301	Painting I	
VSST 302	Painting II	
VSST 303	Painting III	
Total Credits		57.0

B. Performing Arts Management

1. Dance Concentration

DANC 140	Ballet Technique I	2.0
DANC 150	Modern Dance Technique I	2.0
DANC 160	Jazz Dance Technique I	2.0
or DANC 170	Hip-Hop Dance Technique I	
DANC 201 [WI]	Dance Appreciation	3.0
DANC 210	Introduction to Dance	3.0
DANC 240	Dance Composition I	3.0
DANC 325 [WI]	Twentieth Century Dance	3.0
DANC 355	Rhythmic Study for Dance	3.0
EAM 270	Audience Development for Arts	3.0
EAM 312	Introduction to Fund Development for the Arts	3.0
EAM 313	Volunteer and Board Management	3.0
EAM 321	Box Office and Venue Management	3.0
EAM 322	Performing Arts Touring and Promotion	3.0
EAM 340	Artist Representation and Management	3.0
EAM 350	Arts, Culture and Society	3.0
EAM 401	Writing for Arts Managers	3.0
MUSC 130	Introduction to Music	3.0
THTR 240	Theatre Production I	3.0
DANC Electives		6.0
Six terms of Dance ensembles (DANC 131 -132)		3.0
Total Credits		60.0

2. Performing Arts Concentration

DANC 201 [WI]	Dance Appreciation	3.0
DANC 210	Introduction to Dance	3.0
DANC 325 [WI]	Twentieth Century Dance	3.0
EAM 270	Audience Development for Arts	3.0
EAM 312	Introduction to Fund Development for the Arts	3.0
EAM 313	Volunteer and Board Management	3.0
EAM 321	Box Office and Venue Management	3.0
EAM 322	Performing Arts Touring and Promotion	3.0
EAM 340	Artist Representation and Management	3.0
EAM 350	Arts, Culture and Society	3.0
EAM 401	Writing for Arts Managers	3.0
MUSC 130	Introduction to Music	3.0
MUSC 331	World Musics	3.0
MUSC 333	Afro-American Music USA	3.0
MUSC 338 [WI]	American Popular Music	3.0
THTR 115	Theatrical Experience	3.0
THTR 210	Acting: Fundamentals	3.0
THTR 240	Theatre Production I	3.0
THTR Theatre Elective		3.0
Six terms of Performing Arts ensembles (3 classes must be taken for 1 credit each. One must be THTR 130)		3.0
Total Credits		60.0

3. Theatre Concentration

EAM 270	Audience Development for Arts	3.0
EAM 312	Introduction to Fund Development for the Arts	3.0
EAM 313	Volunteer and Board Management	3.0
EAM 321	Box Office and Venue Management	3.0
EAM 322	Performing Arts Touring and Promotion	3.0
EAM 340	Artist Representation and Management	3.0
EAM 350	Arts, Culture and Society	3.0
EAM 401	Writing for Arts Managers	3.0
THTR 121 [WI]	Dramatic Analysis	3.0
THTR 210	Acting: Fundamentals	3.0

THTR 211	Acting: Scene Study	2.0
THTR 221 [WI]	Theatre History I	3.0
THTR 222 [WI]	Theatre History II	3.0
THTR 240	Theatre Production I	3.0
THTR 260	Production Design	3.0
THTR 320	Play Direction	3.0
Two Theatre (THTR) electives		6.0
Six terms of Theatre Practicum Courses *		4.0
Total Credits		57.0

* THTR 130, THTR 131, THTR 132

C. Media Management

1. Digital Media Concentration

ANIM 140	Computer Graphics Imagery I	3.0
COM 111	Principles of Communication	3.0
COM 150	Mass Media and Society	3.0
COM 240	New Technologies In Communication	3.0
COM 270 [WI]	Business Communication	3.0
COM 335	Electronic Publishing	3.0
DIGM 100	Digital Design Tools	3.0
DIGM 105	Overview of Digital Media	3.0
EAM 340	Artist Representation and Management	3.0
EAM 365	Media and Entertainment Business	3.0
FMVD 110	Basic Shooting and Lighting	3.0
GMAP 260	Overview of Computer Gaming	3.0
IDM 100	Introduction to Web Development	3.0
IDM 211	User Interface Design I	3.0
IDM 221	Web Design I	3.0
MKTG 322	Advertising & Integrated Marketing Communications	4.0
VSST 110	Introductory Drawing	3.0
One Digital Media (ANIM, GMAP, WBDV) elective		3.0
Digital Media track students also select one course from the following:		3.0
ANIM 220	Digital Compositing I	
DIGM 350 [WI]	Digital Storytelling	
DIGM 451 [WI]	Explorations in New Media	
IDM 222	Web Design II	
Total Credits		58.0

2. Cinema and Television Concentration

COM 111	Principles of Communication	3.0
COM 150	Mass Media and Society	3.0
COM 240	New Technologies In Communication	3.0
COM 270 [WI]	Business Communication	3.0
COM 335	Electronic Publishing	3.0
EAM 340	Artist Representation and Management	3.0
EAM 365	Media and Entertainment Business	3.0
FMVD 110	Basic Shooting and Lighting	3.0
FMVD 115	Basic Editing	3.0
FMVD 120	Basic Sound	3.0
MKTG 322	Advertising & Integrated Marketing Communications	4.0
SCRIP 270 [WI]	Screenwriting I	3.0
TVIE 285	Media Law and Ethics	3.0
TVIE 290	Introduction to Money and the Media	3.0
TVPR 212	TV Commercials and Promos	3.0
Select three from the following:		9.0
FMVD 210	Documentary Video Production	
FMVD 215	Narrative Video Production	
FMVD 220	Experimental Video Production	
FMVD 235	Intermediate Lighting	
FMVD 237	Intermediate Editing	

FMVD 286	Producing for Features	
FMVD 305	Special Effects Make-up	
FMVD 365	Special Topics in Production	
SCRIP 241	Writing TV Comedy	
SCRIP 242	Writing TV Drama	
SCRIP 275	Screenwriting II	
[WI]		
SCRIP 280	Writing the Short Film	
[WI]		
SCRIP 310	Literature for Screenwriters	
SCRIP 370	Screenplay Story Development	
SCRIP 380	Screenwriting Workshop I	
SCRIP 381	Screenwriting Workshop II	
TVIE 280	Research, Sales and Programming	
TVPR 100	TV Studio: Basic Operations	
TVPR 200	TV Studio: Live Directing	
TVPR 230	Scripted TV Production	
TVPR 232	TV Field: Industrials	
TVPR 236	Reality TV Production	
TVPR 240	Producing for Television	
Total Credits		55.0

D. Sports Entertainment

COM 111	Principles of Communication	3.0
COM 150	Mass Media and Society	3.0
COM 240	New Technologies In Communication	3.0
COM 270 [WI]	Business Communication	3.0
COM 335	Electronic Publishing	3.0
EAM 340	Artist Representation and Management	3.0
EAM 365	Media and Entertainment Business	3.0
FMVD 110	Basic Shooting and Lighting	3.0
FMVD 115	Basic Editing	3.0
FMVD 120	Basic Sound	3.0
SMT 110	The Business of Sport	4.0
SMT 201	Sports Marketing, Promotion, and Public Relations	4.0
SMT 205	Sport Media Relations	4.0
SMT 215	Sports Ticket Sales & Operations	3.0
TVPR 100	TV Studio: Basic Operations	3.0
TVPR 240	Producing for Television	3.0
TVPR 340	Remote TV Production	3.0
Sport Entertainment Concentration students also select any two of the following courses:		6.0
SMT 200	Introduction to Sport Facility and Event Management	
SMT 225	Sports Budgeting	
SMT 230	Sports and the Law	
SMT 240	Olympic Games	
SMT 260	Sports Agents & Labor Relations	
SMT 305	Fundraising in Sports	
SMT 307	Corporate Sponsorship in Sports	
SMT 309	Capital Campaigns in Athletics	
SMT 310	Sports Contracts	
SMT 315	Sports Publications & Graphics	
SMT 320	Sport Economics	
SMT 337	Risk Management in Sports	
SMT 345	Fan Experience Management	
SMT 347	Sport Tourism	
TVPR 200	TV Studio: Live Directing	
TVST 260	History of Television	
Total Credits		60.0

Recommended Plans of Study

At the end of their freshman year, students select one of the following concentrations. Each concentration has its own unique Plan of Study:

(A) Visual Arts Management Concentration

Term 1		Credits
EAM 130	Overview of Entertainment and Arts Management	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV A101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		
ACCT 110	Accounting for Professionals	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV A101	The Drexel Experience	1.0
Arts and Humanities elective		3.0
Term Credits		15.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
EAM 211	Strategic Management for Entertainment and Arts Management	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Social science elective		3.0
Free Elective		6.0
Term Credits		16.0
Term 4		
BLAW 201	Business Law I	4.0
COOP 101	Career Management and Professional Development	0.0
DSMR 100	Computer Imaging I	3.0
EAM 391 [WI]	Promotion, Press and Publicity	3.0
PHYS 121 or BIO 100	Physical Science for Design I Applied Cells, Genetics & Physiology	4.0
Social science elective		3.0
Term Credits		17.0
Term 5		
EAM 261	Copyrights and Trademarks	3.0
EAM 270	Audience Development for Arts	3.0
EAM 312	Introduction to Fund Development for the Arts	3.0
PHYS 122 or BIO 101	Physical Science for Design II Applied Biological Diversity, Ecology & Evolution	4.0
Visual Arts Track elective*		3.0
Term Credits		16.0
Term 6		
COM 230	Techniques of Speaking	3.0
EAM 313	Volunteer and Board Management	3.0
EAM 361	Law for Entertainment and Arts Management Managers	3.0
Social science elective		3.0
Visual Arts Track elective*		3.0
Term Credits		15.0
Term 7		
ARTH 101	History of Art I: Ancient to Medieval	3.0
EAM 301	Gallery and Collection Management	3.0
EAM 401	Writing for Arts Managers	3.0
Visual Arts Track elective*		3.0
Business elective*		4.0
Term Credits		16.0
Term 8		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
EAM 302	Exhibition Design	3.0

MKTG 201	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Visual Arts Track elective*		3.0
Term Credits		17.0

Term 9		
EAM 350	Arts, Culture and Society	3.0
ARTH 103	History of Art: Modern Art	3.0
Visual Arts Track elective*		3.0
Arts and Humanities elective		3.0
Business elective*		4.0
Term Credits		16.0

Term 10		
EAM 461	Entertainment Publishing	3.0
EAM 471	Fine Arts Market Development	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
HRMT 323	Principles of Human Resource Administration	4.0
Free elective		3.0
Visual Arts Track elective*		3.0
Term Credits		17.0

Term 11		
EAM 472	Trends in Visual Arts	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
Visual Arts Track elective*		3.0
Free electives		6.0
Term Credits		13.0

Term 12		
EAM 491	Entertainment and Arts Management Senior Project	1.0
Visual Arts Track elective*		3.0
Free electives		6.0
Business elective*		4.0
Term Credits		14.0

Total Credit: 187.0

(B) Performing Arts Management

(1.) Dance Concentration

Term 1		Credits
EAM 130	Overview of Entertainment and Arts Management	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV A101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		
ACCT 110	Accounting for Professionals	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV A101	The Drexel Experience	1.0
Arts and Humanities elective		3.0
Term Credits		15.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
EAM 211	Strategic Management for Entertainment and Arts Management	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Social science elective		3.0
Free elective		6.0
Term Credits		16.0
Term 4		
BLAW 201	Business Law I	4.0
COOP 101	Career Management and Professional Development	0.0

DSMR 100	Computer Imaging I	3.0
EAM 391 [WI]	Promotion, Press and Publicity	3.0
PHYS 121 or BIO 100	Physical Science for Design I Applied Cells, Genetics & Physiology	4.0
Social science elective		3.0
Term Credits		17.0
Term 5		
EAM 261	Copyrights and Trademarks	3.0
EAM 270	Audience Development for Arts	3.0
EAM 312	Introduction to Fund Development for the Arts	3.0
THTR 240	Theatre Production I	3.0
PHYS 122 or BIO 101	Physical Science for Design II Applied Biological Diversity, Ecology & Evolution	4.0
Term Credits		16.0
Term 6		
COM 230	Techniques of Speaking	3.0
DANC 210	Introduction to Dance	3.0
EAM 313	Volunteer and Board Management	3.0
EAM 361	Law for Entertainment and Arts Management Managers	3.0
Required ensemble		0.0
Social science elective		3.0
Term Credits		15.0
Term 7		
DANC 140	Ballet Technique I	2.0
DANC 150 or 160	Modern Dance Technique I Jazz Dance Technique I	2.0
EAM 321	Box Office and Venue Management	3.0
EAM 401	Writing for Arts Managers	3.0
MUSC 130	Introduction to Music	3.0
DANC 170	Hip-Hop Dance Technique I	2.0
Required ensemble		1.0
Term Credits		16.0
Term 8		
DANC 355	Rhythmic Study for Dance	3.0
EAM 322	Performing Arts Touring and Promotion	3.0
MKTG 201	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Required ensemble		1.0
Term Credits		15.0
Term 9		
DANC 201 [WI]	Dance Appreciation	3.0
EAM 340	Artist Representation and Management	3.0
EAM 350	Arts, Culture and Society	3.0
Required ensemble		1.0
Business elective *		4.0
Free Elective		3.0
Term Credits		17.0
Term 10		
DANC 325 [WI]	Twentieth Century Dance	3.0
EAM 461	Entertainment Publishing	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
HRMT 323	Principles of Human Resource Administration	4.0
Dance (DANC) elective		3.0
Term Credits		14.0
Term 11		
DANC 240	Dance Composition I	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
Free electives		9.0
Ensemble		0.0
Business elective		4.0
Term Credits		17.0
Term 12		

EAM 491	Entertainment and Arts Management Senior Project	1.0
Ensemble		0.0
Free electives		6.0
Business elective *		4.0
Dance (DANC) elective		3.0
Term Credits		14.0

Total Credit: 187.0

(2.) Performing Arts Concentration

Term 1		Credits
EAM 130	Overview of Entertainment and Arts Management	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV A101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		
ACCT 110	Accounting for Professionals	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV A101	The Drexel Experience	1.0
Arts and Humanities elective		3.0
Term Credits		15.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
EAM 211	Strategic Management for Entertainment and Arts Management	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Free elective		6.0
Social science elective		3.0
Term Credits		16.0
Term 4		
BLAW 201	Business Law I	4.0
COOP 101	Career Management and Professional Development	0.0
DSMR 100	Computer Imaging I	3.0
EAM 391 [WI]	Promotion, Press and Publicity	3.0
THTR 130	Introduction to Theater Production Practicum	1.0
THTR 240	Theatre Production I	3.0
PHYS 121 or BIO 100	Physical Science for Design I Applied Cells, Genetics & Physiology	4.0
Term Credits		18.0
Term 5		
EAM 261	Copyrights and Trademarks	3.0
EAM 270	Audience Development for Arts	3.0
EAM 312	Introduction to Fund Development for the Arts	3.0
PHYS 122 or BIO 101	Physical Science for Design II Applied Biological Diversity, Ecology & Evolution	4.0
Social science elective		3.0
Term Credits		16.0
Term 6		
COM 230	Techniques of Speaking	3.0
DANC 201 [WI]	Dance Appreciation	3.0
EAM 313	Volunteer and Board Management	3.0
EAM 361	Law for Entertainment and Arts Management Managers	3.0
Required ensemble		0.0
Arts and Humanities elective		3.0
Social science elective		3.0
Term Credits		18.0
Term 7		
EAM 321	Box Office and Venue Management	3.0
EAM 401	Writing for Arts Managers	3.0

MUSC 130	Introduction to Music	3.0
THTR 115	Theatrical Experience	3.0
THTR 210	Acting: Fundamentals	3.0
Required ensemble		0.0
Term Credits		15.0
Term 8		
EAM 322	Performing Arts Touring and Promotion	3.0
MKTG 201	Introduction to Marketing Management	4.0
MUSC 331	World Musics	3.0
ORGB 300 [WI]	Organizational Behavior	4.0
Required ensemble		1.0
Term Credits		15.0
Term 9		
DANC 210	Introduction to Dance	3.0
EAM 340	Artist Representation and Management	3.0
EAM 350	Arts, Culture and Society	3.0
MUSC 333	Afro-American Music USA	3.0
Free elective		3.0
Required ensemble		0.0
Term Credits		15.0
Term 10		
DANC 325 [WI]	Twentieth Century Dance	3.0
EAM 461	Entertainment Publishing	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
HRMT 323	Principles of Human Resource Administration	4.0
Ensemble		0.0
Business elective *		4.0
Term Credits		15.0
Term 11		
EAM 491	Entertainment and Arts Management Senior Project	1.0
Business elective		4.0
Free electives		6.0
Theatre elective *		3.0
Ensemble		1.0
Term Credits		15.0
Term 12		
EAM 491	Entertainment and Arts Management Senior Project	1.0
MUSC 338 [WI]	American Popular Music	3.0
Free electives		6.0
Business elective *		4.0
Term Credits		14.0

Total Credit: 187.0

(3.) Theatre Concentration

		Credits
Term 1		
EAM 130	Overview of Entertainment and Arts Management	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV A101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		
ACCT 110	Accounting for Professionals	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV A101	The Drexel Experience	1.0
Arts and Humanities elective		3.0
Term Credits		15.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0

EAM 211	Strategic Management for Entertainment and Arts Management	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Free elective		6.0
Social science elective		3.0
Term Credits		16.0
Term 4		
BLAW 201	Business Law I	4.0
COOP 101	Career Management and Professional Development	0.0
DSMR 100	Computer Imaging I	3.0
EAM 391 [WI]	Promotion, Press and Publicity	3.0
THTR 130	Introduction to Theater Production Practicum	1.0
THTR 240	Theatre Production I	3.0
PHYS 121	Physical Science for Design I	4.0
or BIO 100	Applied Cells, Genetics & Physiology	
Term Credits		18.0
Term 5		
EAM 261	Copyrights and Trademarks	3.0
EAM 270	Audience Development for Arts	3.0
EAM 312	Introduction to Fund Development for the Arts	3.0
THTR 221 [WI]	Theatre History I	3.0
PHYS 122	Physical Science for Design II	4.0
or BIO 101	Applied Biological Diversity, Ecology & Evolution	
Term Credits		16.0
Term 6		
COM 230	Techniques of Speaking	3.0
EAM 313	Volunteer and Board Management	3.0
EAM 361	Law for Entertainment and Arts Management Managers	3.0
THTR 121 [WI]	Dramatic Analysis	3.0
Required ensemble		0.0
Social science elective		3.0
Term Credits		15.0
Term 7		
EAM 401	Writing for Arts Managers	3.0
THTR 210	Acting: Fundamentals	3.0
EAM 321	Box Office and Venue Management	3.0
Business elective *		4.0
Theatre elective *		3.0
Required ensemble		1.0
Term Credits		17.0
Term 8		
EAM 322	Performing Arts Touring and Promotion	3.0
MKTG 201	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
Arts and Humanities elective		3.0
Required ensemble		1.0
Term Credits		15.0
Term 9		
EAM 340	Artist Representation and Management	3.0
EAM 350	Arts, Culture and Society	3.0
THTR 211	Acting: Scene Study	2.0
THTR 222 [WI]	Theatre History II	3.0
Business elective *		4.0
Required ensemble		1.0
Term Credits		16.0
Term 10		
EAM 461	Entertainment Publishing	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
HRMT 323	Principles of Human Resource Administration	4.0
THTR 320	Play Direction	3.0
Free elective		3.0
Ensemble		0.0
Term Credits		14.0

Term 11		
EAM 491	Entertainment and Arts Management Senior Project	1.0
THTR 260	Production Design	3.0
Free elective		9.0
Social Science elective		3.0
Ensemble		0.0
	Term Credits	16.0
Term 12		
EAM 491	Entertainment and Arts Management Senior Project	1.0
Theatre elective *		3.0
Free electives		6.0
Business elective *		4.0
	Term Credits	14.0
Total Credit: 187.0		

(C) Media Management

(1.) Digital Media Concentration

Term 1			Credits
EAM 130	Overview of Entertainment and Arts Management	3.0	
ECON 201	Principles of Microeconomics	4.0	
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0	
MATH 101	Introduction to Analysis I	4.0	
UNIV A101	The Drexel Experience	1.0	
	Term Credits	15.0	
Term 2			
ACCT 110	Accounting for Professionals	4.0	
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0	
MATH 102	Introduction to Analysis II	4.0	
UNIV A101	The Drexel Experience	1.0	
Arts and Humanities elective		3.0	
	Term Credits	15.0	
Term 3			
CIVC 101	Introduction to Civic Engagement	1.0	
EAM 211	Strategic Management for Entertainment and Arts Management	3.0	
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0	
Free elective		6.0	
Social science elective		3.0	
	Term Credits	16.0	
Term 4			
BLAW 201	Business Law I	4.0	
COOP 101	Career Management and Professional Development	0.0	
DIGM 100	Digital Design Tools	3.0	
DIGM 105	Overview of Digital Media	3.0	
VSST 110	Introductory Drawing	3.0	
PHYS 121 or BIO 100	Physical Science for Design I Applied Cells, Genetics & Physiology	4.0	
	Term Credits	17.0	
Term 5			
ANIM 140	Computer Graphics Imagery I	3.0	
COM 111	Principles of Communication	3.0	
EAM 261	Copyrights and Trademarks	3.0	
EAM 391 [WI]	Promotion, Press and Publicity	3.0	
PHYS 122 or BIO 101	Physical Science for Design II Applied Biological Diversity, Ecology & Evolution	4.0	
	Term Credits	16.0	
Term 6			
COM 230	Techniques of Speaking	3.0	
COM 150	Mass Media and Society	3.0	
EAM 361	Law for Entertainment and Arts Management Managers	3.0	
FMVD 110	Basic Shooting and Lighting	3.0	

IDM 100	Introduction to Web Development	3.0
	Term Credits	15.0
Term 7		
COM 240	New Technologies In Communication	3.0
EAM 365	Media and Entertainment Business	3.0
IDM 211	User Interface Design I	3.0
Business elective		4.0
Arts and Humanities elective		3.0
Social science elective		3.0
	Term Credits	19.0
Term 8		
MKTG 201	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
IDM 221	Web Design I	3.0
GMAP 260	Overview of Computer Gaming	3.0
Free elective		3.0
	Term Credits	17.0
Term 9		
EAM 340	Artist Representation and Management	3.0
MKTG 322	Advertising & Integrated Marketing Communications	4.0
Business elective *		4.0
ANIM, GMAP or IDM elective		3.0
	Term Credits	14.0
Term 10		
COM 270 [WI]	Business Communication	3.0
EAM 461	Entertainment Publishing	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
HRMT 323	Principles of Human Resource Administration	4.0
Free elective		3.0
	Term Credits	14.0
Term 11		
EAM 491	Entertainment and Arts Management Senior Project	1.0
Free electives		9.0
ANIM, GMAP or IDM elective		3.0
	Term Credits	13.0
Term 12		
COM 335	Electronic Publishing	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
Business elective *		4.0
Social science elective		3.0
Free elective		3.0
	Term Credits	14.0
Total Credit: 185.0		

(2.) Cinema and Television Concentration

Term 1			Credits
EAM 130	Overview of Entertainment and Arts Management	3.0	
ECON 201	Principles of Microeconomics	4.0	
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0	
MATH 101	Introduction to Analysis I	4.0	
UNIV A101	The Drexel Experience	1.0	
	Term Credits	15.0	
Term 2			
ACCT 110	Accounting for Professionals	4.0	
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0	
MATH 102	Introduction to Analysis II	4.0	
UNIV A101	The Drexel Experience	1.0	
Arts and Humanities elective		3.0	
	Term Credits	15.0	
Term 3			

CIVC 101	Introduction to Civic Engagement	1.0
EAM 211	Strategic Management for Entertainment and Arts Management	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Free elective		6.0
Social science elective		3.0
Term Credits		16.0
Term 4		
BLAW 201	Business Law I	4.0
COOP 101	Career Management and Professional Development	0.0
DSMR 100	Computer Imaging I	3.0
EAM 391 [WI]	Promotion, Press and Publicity	3.0
PHYS 121 or BIO 100	Physical Science for Design I Applied Cells, Genetics & Physiology	4.0
Term Credits		14.0
Term 5		
COM 111	Principles of Communication	3.0
EAM 261	Copyrights and Trademarks	3.0
FMVD 110	Basic Shooting and Lighting	3.0
SCRIP 270 [WI]	Screenwriting I	3.0
PHYS 122 or BIO 101	Physical Science for Design II Applied Biological Diversity, Ecology & Evolution	4.0
Term Credits		16.0
Term 6		
COM 150	Mass Media and Society	3.0
COM 230	Techniques of Speaking	3.0
EAM 361	Law for Entertainment and Arts Management Managers	3.0
FMVD 115	Basic Editing	3.0
TVIE 290	Introduction to Money and the Media	3.0
Free elective		3.0
Term Credits		18.0
Term 7		
COM 240	New Technologies In Communication	3.0
EAM 365	Media and Entertainment Business	3.0
FMVD 120	Basic Sound	3.0
Business elective *		4.0
Cinema and Television elective *		3.0
Term Credits		16.0
Term 8		
MKTG 201	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
TVIE 285	Media Law and Ethics	3.0
Free elective		3.0
Arts and Humanities elective		3.0
Term Credits		17.0
Term 9		
EAM 340	Artist Representation and Management	3.0
MKTG 322	Advertising & Integrated Marketing Communications	4.0
Business elective *		4.0
Cinema and Television elective *		3.0
Term Credits		14.0
Term 10		
COM 270 [WI]	Business Communication	3.0
COM 335	Electronic Publishing	3.0
EAM 461	Entertainment Publishing	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
HRMT 323	Principles of Human Resource Administration	4.0
TVPR 212	TV Commercials and Promos	3.0
Term Credits		17.0
Term 11		
EAM 491	Entertainment and Arts Management Senior Project	1.0
Cinema and Television elective *		3.0
Social science elective		3.0

Free electives		6.0
Term Credits		13.0
Term 12		
EAM 491	Entertainment and Arts Management Senior Project	1.0
Social science elective		3.0
Business elective *		4.0
Free electives		6.0
Term Credits		14.0
Total Credit: 185.0		

(D.) Sports Entertainment Concentration

		Credits
Term 1		
EAM 130	Overview of Entertainment and Arts Management	3.0
ECON 201	Principles of Microeconomics	4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV A101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		
ACCT 110	Accounting for Professionals	4.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MATH 102	Introduction to Analysis II	4.0
UNIV A101	The Drexel Experience	1.0
Arts and Humanities elective		3.0
Term Credits		15.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
EAM 211	Strategic Management for Entertainment and Arts Management	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Free elective		3.0
Social science elective		6.0
Term Credits		16.0
Term 4		
BLAW 201	Business Law I	4.0
COOP 101	Career Management and Professional Development	0.0
DSMR 100	Computer Imaging I	3.0
PHYS 121 or BIO 100	Physical Science for Design I Applied Cells, Genetics & Physiology	4.0
SMT 110	The Business of Sport	4.0
TVPR 100	TV Studio: Basic Operations	3.0
Term Credits		18.0
Term 5		
COM 111	Principles of Communication	3.0
EAM 261	Copyrights and Trademarks	3.0
EAM 391 [WI]	Promotion, Press and Publicity	3.0
FMVD 110	Basic Shooting and Lighting	3.0
PHYS 122 or BIO 101	Physical Science for Design II Applied Biological Diversity, Ecology & Evolution	4.0
Term Credits		16.0
Term 6		
COM 150	Mass Media and Society	3.0
COM 230	Techniques of Speaking	3.0
EAM 361	Law for Entertainment and Arts Management Managers	3.0
FMVD 115	Basic Editing	3.0
FMVD 120	Basic Sound	3.0
Free Elective		3.0
Term Credits		18.0
Term 7		
COM 240	New Technologies In Communication	3.0
EAM 365	Media and Entertainment Business	3.0

SMT 201	Sports Marketing, Promotion, and Public Relations	4.0
SMT 205	Sport Media Relations	4.0
TVPR 240	Producing for Television	3.0
Term Credits		17.0
Term 8		
MKTG 201	Introduction to Marketing Management	4.0
ORGB 300 [WI]	Organizational Behavior	4.0
TVPR 340	Remote TV Production	3.0
Arts and Humanities elective		3.0
Term Credits		14.0
Term 9		
EAM 340	Artist Representation and Management	3.0
Business elective		4.0
Sports Entertainment elective		3.0
Free electives		6.0
Term Credits		16.0
Term 10		
COM 270 [WI]	Business Communication	3.0
COM 335	Electronic Publishing	3.0
EAM 461	Entertainment Publishing	3.0
EAM 491	Entertainment and Arts Management Senior Project	1.0
HRMT 323	Principles of Human Resource Administration	4.0
SMT 215	Sports Ticket Sales & Operations	3.0
Term Credits		17.0
Term 11		
EAM 491	Entertainment and Arts Management Senior Project	1.0
Business elective		4.0
Free electives		3.0
Sports Entertainment elective		3.0
Social science elective		3.0
Term Credits		14.0
Term 12		
EAM 491	Entertainment and Arts Management Senior Project	1.0
Social science elective		3.0
Free electives		6.0
Business elective		4.0
Term Credits		14.0
Total Credit: 190.0		

* See degree requirements (p. 490).

Co-op/Career Opportunities

Entertainment and Arts Management prepares students for a variety of careers in both commercial and nonprofit organizations - from creative, hands-on positions to administrative and management roles.

The career possibilities in this field are extensive and include the following positions:

- Artistic or creative director
- Concert and live events manager
- Gallery owner
- Grant writer
- Marketing coordinator
- Production and development executive
- Promoter
- Publicist
- Talent agent

Examples of Past Co-op Jobs

EAM students work at many of the leading entertainment and arts companies in the country.

Example co-op jobs where EAM students have worked:

- Showtime
- Dick Clark Productions
- Live Nation
- AEG Live
- Data Garden
- Atlantic Records
- CBS 3 / CW Philly
- Disney
- Comcast
- NBC Universal - NYC
- The Onion
- Screen Actors Guild
- Sirius/XM Radio
- Abrams Artist Agency – NYC
- Red Light Management - NYC
- ACM Talent - NYC
- Melanie Briggs Casting
- Nashville Casting
- Rain Management Group
- The Trocadero
- XFINITY Live! Philadelphia
- Asbury Lanes
- Mann Performing Arts Center
- World Café Live!
- Kimmel Center for the Performing Arts
- Manhattan Theatre Club
- Sesame Workshop
- Upright Citizens Brigade
- Edinburgh Fringe Festival
- Webster Hall NYC
- Milk & Honey - LA
- Philadelphia Theatre Company
- Joffrey Ballet School
- Pennsylvania Ballet
- Arden Theatre Company

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

About the Accelerated Degree Program (BS/MBA)

Only available to students majoring in entertainment and arts management (4-year with co-op), this dual degree program combines study in the management of the arts and entertainment industries along with the MBA degree. The program is designed to allow students to complete both the bachelor's degree and the Master of Business Administration degree in five years.

Incoming freshmen selected for this program will generally have a minimum of 1350 on the SAT, a GPA of 3.5 or better, and rank in the top 10% of their high school graduating class. A strong candidate for this program will have taken significant AP coursework while in high school.

Degree requirements

BS in Entertainment and Arts Management (p. 490)

MBA Requirements (<http://catalog.drexel.edu/graduate/collegeofbusiness/businessadministration/#degreerequirementstext>)

BS/MBA students may be waived from three MBA Enterprise Management courses, assuming a grade of B or better is earned in specified undergraduate courses. Students can review the Waiver Policies for the Statement of Curriculum Standing (<http://www.lebow.drexel.edu/PDF/Docs/Grad/CurriculumStanding.pdf>) on the LeBow College's web site for additional information. Students who complete MIS 200 in their undergraduate program will, in addition, be waived from a fourth MBA course (MIS 611).

The above conditions hold only for fully accepted BS/MBA students as identified by Enrollment Management.

Additional requirements for the dual degree program

- A cumulative GPA of at least 3.2 is required throughout the program.
- Students must take the GMAT examination and achieve a minimum score of 570 prior to the end of the tenth term in order to continue in the program. It is recommended that students take the GMAT examination late in the student's third year.
- Students must submit an acceptable plan of study at least three terms before anticipated start of graduate part of the program.

Students should visit the Westphal College of Media Arts and Design (<http://www.drexel.edu/undergrad/academics/colleges-schools/westphal>) for more information.

College of Media Arts and Design Facilities

Our college offers high-quality facilities and resources to its students including a state-of-the-art black-box theatre, HD film screening rooms, rehearsal studios, event venues, and more. The following are some links for more information about some of our facilities.

- Robert and Penny Fox Historic Costume Collection (<http://www.drexel.edu/westphal/resources/FHCC>)
- Design and Imaging Studios (<http://www.drexel.edu/westphal/student-resources/technology>)
- DUTV (<http://www.dutv.org>), (Paul F. Harron Studios) student-run cable television station
- Leonard Pearlstein Gallery (<http://www.drexel.edu/westphal/resources/LeonardPearlsteinGallery>)
- MAD Dragon Media Group (<http://maddragonrecords.com>)
- Mandell Theater (<http://www.drexel.edu/performingarts/about/facilities/mandell-theater>)
- Rudman Institute for Entertainment Industry Studies (<http://www.drexel.edu/westphal/resources/Rudman>)
- WKDU (<http://www.wkdu.org>), Drexel's student-run radio station

Entertainment and Arts Management Faculty

Rick Dorfman Adjunct Instructor. Artist representation.

Lawrence Epstein, MBA (*Cornell University*) *Interim Department Head, Arts & Entertainment Enterprise*. Teaching Professor. Media Finance, Station Group Management Media Analytics, Financial, Technical and Strategic Planning. Technology Assessment and Management, New Venture Management

Julie Hawkins, MFA (*Temple University*) *Program Director, MS in Arts Administration*. Assistant Professor. Cultural policy, political activism in the arts, changes in economic and social policy, arts sector changes.

Brian Moore, MS, MFA (*Drexel University; Louisiana State University*) *Program Director, BS in Entertainment and Arts Management*. Assistant Teaching Professor. Commercial entertainment: film, theatre, television. Nonprofit organizations: theatre, general fund development; strategic planning; communications and marketing; executive management.

Amy Scheidegger, MS (*Drexel University*). Adjunct Instructor. Working artist teaching audience development, advocacy and strategic management. Creator of the *Artistic Rebuttal Book Project*

Scott Schwartz, JD (*University of Buffalo*). Adjunct Professor. General counsel at Dansko, LLC; teaches Copyright & Trademarks.

Neville Vakharia, MS (*Drexel University*) *Research Director*. Assistant Professor. Technology in the arts, strategic planning and evaluation, management and leadership, innovation and entrepreneurship.

David Weiss Adjunct Instructor. VP at Freeman's Auction House, Host of *Antiques Roadshow* on PBS; Teaches Fine Art Market Development

Brannon Wiles, JD (*Columbia University School of Law*). Assistant Professor. Producing for commercial theatre, law and the arts, contract negotiation, labor relations, budgeting and company management.

Justin Wineburgh, JD (*Widener University*). Adjunct Professor. Teaching Law for Entertainment and Arts Management. CEO of Alkemy-X production company.

Fashion Design

Major: Fashion Design

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 183.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 50.0407

Standard Occupational Classification (SOC) code: 27-1022

About the Program

The Fashion Design Program at Drexel University's Antoinette Westphal College (<http://www.drexel.edu/westphal/undergraduate/FASH>) of Media Arts & Design educates and trains visionary designers to use an integrated approach toward the creation of contemporary fashion within the context of an expanding, yet converging global economy and society. The fusion of art, design, science and technology serves as a springboard for the production of unique apparel for the 21st century, and represents a trans-disciplinary approach that requires flexibility and focus. Over the

past two decades, Drexel's Fashion Design program has developed a stellar, international reputation and is ranked in the top five nationally and 16th worldwide. That is due in part, to a passionate and experienced faculty, novel approaches to pedagogy, and participation in national and international competitions. Faculty and alumni connections to industry leaders strongly augment and catalyze the program, the strength of which is closely linked to the philosophy that each student has a distinct vision and a unique aesthetic that must be cultivated on an individual basis.

Within the beautiful new studios and specialized labs in the URBN Center, students learn to master skills and push the boundaries using those skills. Students can engage in collaborative University wide research through the use of the exCITe Center (<http://drexel.edu/excite>) located next door and the Hybrid Making Lab (http://www.drexel.edu/westphal/resources/making_spaces/HybridMakingLab) located on the URBN Center's first floor. They acquire detailed knowledge about industrial productions, advanced technologies in design, collaborative design, materials and processes, and the marketing and merchandising of clothing. Accordingly, our future fashion designers, both undergraduates and graduates alike, develop an intuitive and practical understanding of design through a fine arts foundation, while studying the psychological, social and historical contexts of fashion through the world-renowned Robert and Penny Fox Historic Costume Collection (<http://www.drexel.edu/foxcollection>) (FHCC). Importantly, the students are provided with commercial studio/ atelier training that goes hand-in-hand with classroom instruction through the University's cooperative education program (<http://www.drexel.edu/westphal/forStudents/co-op>). Cooperative education offers invaluable opportunities for students to observe and participate in the fashion industry at the ground level. Critiques by visiting professionals are included in all upper level courses and provide valuable "real world" input, as well as future career connections. A large percentage of students spend a term studying abroad (<http://www.drexel.edu/studyabroad>) in the world's great fashion capitals, including London (https://studyabroad.drexel.edu/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=10070&Type=O&sType=O), England and Florence (https://studyabroad.drexel.edu/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=40220), Italy. Upon graduation, students show their collections (<http://www.drexel.edu/westphal/creative/fash>) in the annual fashion show.

For more information about this major, visit the College's Fashion Design (<http://drexel.edu/westphal/academics/undergraduate/FASH>) page.

Degree Requirements

General education requirements

CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
PHYS 121	Physical Science for Design I	4.0
PHYS 122	Physical Science for Design II	4.0
UNIV A101	The Drexel Experience	2.0
Required Arts and humanities-students elect a minimum of 9.0 credits		9.0
Required Social science-students elect a minimum of 9.0 credits		9.0
Free electives		24.0

Visual studies requirements

ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0

VSST 101	Design I	4.0
VSST 102	Design II	4.0
VSST 103	Design III	4.0
VSST 110	Introductory Drawing	3.0
VSST 111	Figure Drawing I	3.0
VSST 112	Figure Drawing II	3.0
VSST 301	Painting I	4.0
VSST 304	Materials Exploration	4.0
Select one of the following Multimedia courses:		4.0
VSST 201	Multimedia: Performance	
VSST 202	Multimedia: Space	
VSST 203	Multimedia: Materials	
Fashion design requirements		
ARTH 335 [WI]	History of Costume I: Preclassical to Directoire	3.0
ARTH 336 [WI]	History of Costume II: Directoire to World War I	3.0
FASH 201	Survey of the Fashion Industry	3.0
FASH 211	Fashion Drawing I	3.0
FASH 212	Fashion Drawing II	3.0
FASH 230	Textiles for Fashion Design	3.0
FASH 241	Construction Skills	4.0
FASH 310	Presentation Techniques	3.0
FASH 311	Textile Design	3.0
FASH 313	Fashion Drawing for Industry	3.0
FASH 314	Fashion Presentation Drawing	3.0
FASH 315	Computer Aided Design for Patternmaking	3.0
or FASH 316	Computer Aided Design for Fashion Design	
FASH 341	Flat Pattern Design	4.0
FASH 342	Draping Design	4.0
FASH 343	Tailoring	4.0
FASH 349	Fashion Design I	4.0
FASH 350	Fashion Design II	4.0
FASH 351	Fashion Design III	4.0
FASH 352	Fashion Design IV	4.0
FASH 464	Professional Portfolio	3.0
FASH 491	Collection I	4.0
FASH 492	Collection II	3.0
Total Credits		183.0

Sample Plans of Study

Standard Plan

(See below for Study Abroad plan of study)

Term 1		Credits
FASH 201	Survey of the Fashion Industry	3.0
PHYS 121	Physical Science for Design I	4.0
UNIV A101	The Drexel Experience	1.0
VSST 101	Design I	4.0
VSST 110	Introductory Drawing	3.0
Term Credits		15.0
Term 2		
FASH 241	Construction Skills	4.0
PHYS 122	Physical Science for Design II	4.0
UNIV A101	The Drexel Experience	1.0
VSST 102	Design II	4.0
VSST 111	Figure Drawing I	3.0
Term Credits		16.0
Term 3		
CIVC 101	Introduction to Civic Engagement	1.0
FASH 341	Flat Pattern Design	4.0
MATH 119	Mathematical Foundations for Design	4.0

VSST 103	Design III	4.0
VSST 112	Figure Drawing II	3.0
Term Credits		16.0

Term 4

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FASH 211	Fashion Drawing I	3.0
FASH 310	Presentation Techniques	3.0
FASH 342	Draping Design	4.0
VSST 304	Materials Exploration	4.0
Term Credits		17.0

Term 5

ARTH 101	History of Art I: Ancient to Medieval	3.0
COOP 101	Career Management and Professional Development	0.0
FASH 212	Fashion Drawing II	3.0
FASH 230	Textiles for Fashion Design	3.0
FASH 311	Textile Design	3.0
FASH 349	Fashion Design I	4.0
Term Credits		16.0

Term 6

ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FASH 313	Fashion Drawing for Industry	3.0
FASH 350	Fashion Design II	4.0
Free elective		3.0
Term Credits		16.0

Term 7

ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
VSST 301	Painting I	4.0
Select one of the following:		4.0
VSST 201	Multimedia: Performance	
VSST 203	Multimedia: Materials	
VSST 202	Multimedia: Space	
Social science elective		3.0
Term Credits		14.0

Term 8

ARTH 103	History of Art: Modern Art	3.0
ARTH 335 [WI]	History of Costume I: Preclassical to Directoire	3.0
FASH 343	Tailoring	4.0
Arts and Humanities elective		3.0
FASH 315	Computer Aided Design for Patternmaking (or elective)	3.0
Term Credits		16.0

Term 9

ARTH 336 [WI]	History of Costume II: Directoire to World War I	3.0
FASH 314	Fashion Presentation Drawing	3.0
FASH 351	Fashion Design III	4.0
Arts and Humanities elective		3.0
Term Credits		13.0

Term 10

FASH 352	Fashion Design IV	4.0
FASH 464	Professional Portfolio	3.0
Free elective		3.0
Arts and Humanities elective		3.0
Social science elective		3.0
Term Credits		16.0

Term 11

FASH 491	Collection I	4.0
FASH 316	Computer Aided Design for Fashion Design (or elective)	3.0
Free elective		3.0
Social science elective		3.0
Term Credits		13.0

Term 12

FASH 492	Collection II	3.0
Free electives		12.0
Term Credits		15.0

Total Credit: 183.0

Study Abroad

Term 1		Credits
FASH 201	Survey of the Fashion Industry	3.0
PHYS 121	Physical Science for Design I	4.0
UNIV A101	The Drexel Experience	1.0
VSST 101	Design I	4.0
VSST 110	Introductory Drawing	3.0
Term Credits		15.0

Term 2

FASH 241	Construction Skills	4.0
PHYS 122	Physical Science for Design II	4.0
UNIV A101	The Drexel Experience	1.0
VSST 102	Design II	4.0
VSST 111	Figure Drawing I	3.0
Term Credits		16.0

Term 3

CIVC 101	Introduction to Civic Engagement	1.0
FASH 341	Flat Pattern Design	4.0
MATH 119	Mathematical Foundations for Design	4.0
VSST 103	Design III	4.0
VSST 112	Figure Drawing II	3.0
Term Credits		16.0

Term 4

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FASH 211	Fashion Drawing I	3.0
FASH 310	Presentation Techniques	3.0
FASH 342	Draping Design	4.0
VSST 304	Materials Exploration	4.0
Term Credits		17.0

Term 5

ARTH 101	History of Art I: Ancient to Medieval	3.0
FASH 212	Fashion Drawing II	3.0
FASH 230	Textiles for Fashion Design	3.0
FASH 311	Textile Design	3.0
FASH 349	Fashion Design I	4.0
Term Credits		16.0

Term 6

ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FASH 313	Fashion Drawing for Industry	3.0
FASH 350	Fashion Design II	4.0
Select one of the following:		4.0
VSST 201	Multimedia: Performance	
VSST 203	Multimedia: Materials	
VSST 202	Multimedia: Space	
COOP 101	Career Management and Professional Development	0.0
Term Credits		17.0

Term 7

Free elective		12.0
Term Credits		12.0

Term 8

ARTH 103	History of Art: Modern Art	3.0
ARTH 335 [WI]	History of Costume I: Preclassical to Directoire	3.0
FASH 343	Tailoring	4.0

FASH 315	Computer Aided Design for Patternmaking (or elective)	3.0
Arts and Humanities elective		3.0
Term Credits		16.0
Term 9		
ARTH 336 [WI]	History of Costume II: Directoire to World War I	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FASH 314	Fashion Presentation Drawing	3.0
FASH 351	Fashion Design III	4.0
Arts and Humanities elective		3.0
Term Credits		16.0
Term 10		
FASH 352	Fashion Design IV	4.0
FASH 464	Professional Portfolio	3.0
Social science elective		3.0
Arts and Humanities elective		3.0
Free elective		3.0
Term Credits		16.0
Term 11		
FASH 491	Collection I	4.0
VSST 301	Painting I	4.0
FASH 316	Computer Aided Design for Fashion Design (or elective)	3.0
Social Science elective		3.0
Term Credits		14.0
Term 12		
FASH 492	Collection II	3.0
Social science elective		3.0
Free elective		6.0
Term Credits		12.0

Total Credit: 183.0

Co-op/Career Opportunities

Drexel Co-op is a renowned collegiate program. Students spend a minimum of 6 months either in the US (<http://www.drexel.edu/westphal/academics/co-op>) or abroad (<http://www.drexel.edu/scdc/co-op/international>) where they can apply their skills in the challenging and exciting fashion industry. Areas of opportunity include garment design, concept design, product development, production, textile design, costume design, technical design, CAD, publishing, curatorial work, promotion and marketing. During the cooperative education program students apply their industry knowledge and gain experience in the diverse, fast paced global world of fashion. Students forge long lasting relationships with alumni and other industry professionals.

Co-op Experiences

Some past co-op employers of fashion design students include:

- A Wish Come True, Greater Philadelphia Area
- Abercrombie & Fitch, Ohio
- Althea Harper, New York
- Amsale, New York
- Austin Scarlett, New York
- Australian Internships - Bec & Bridge
- Beijing Yu Wen Hua Apparel Company
- BCBG Max Azria, California
- Bioko Biodiversity Protection Program, Equatorial Guinea
- Blazina International, Philadelphia
- Calvin Klein, New York

- Carole Hochman Design Group, New York
- Charlotte Ronson, New York
- Dennis Basso/Stallion Inc., New York
- Derek Lam, New York
- Destination Maternity Corporation, Philadelphia, PA
- DYLANLEX, Philadelphia, PA
- Elite Sportswear, L.P., Reading, PA
- Elie Tahari, New York
- Elixir Fashion Apparel & Alicia Lee Designs, China
- Gelmart International, New York
- Hanky Panky, LTD, New York
- Haute Hippie, New York
- Jill Stuart International, New York
- Joe Fresh, New York
- Jordache Enterprises, New York
- Junko Yoshioka, New York
- Lilly Pulitzer, Greater Philadelphia Area
- Lori Coulter, LLC, St. Louis, MO
- Maggie Norris Couture, New York
- Marios Schwab Ltd., London, UK
- Michael Kors, New York
- Milly LLC, New York
- Naeem Khan LTD, New York
- Nanette Lepore, New York
- Ohne Titel, New York
- PARIGI Group, Greater Philadelphia Area
- Parker, New York
- Peter Pilotto, London, UK
- Priscilla Costa, Greater Philadelphia Area
- Sally Lapointe, New York
- Shehu, Philadelphia, PA
- Shima Seiki USA, Inc., South New Jersey
- SOTU Productions, New York
- Thakoon, New York
- The Tailory, Philadelphia, PA
- Timo Weiland, New York
- Top Hat Formal Wear, Puerto Rico
- Urban Outfitters, Philadelphia, PA
- Veda, New York
- VF Sportswear, New York
- Yes Master for IMAGO Creations, Ltd, Middlesex, UK
- Zac Posen, New York

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Facilities

Drexel University's Antoinette Westphal College of Media Arts & Design is located in the new URBN Center at 3501 Market Street in Philadelphia. The URBN Center is a 140,000 square foot state-of-the-art facility where the Fashion Design studios are located on the 3rd floor. Classes are held in fully equipped studios for design and construction, pattern drafting, CAD design, and textile design including a dedicated

senior and graduate design studio. Other studios on the 3rd floor include a specialty equipment lab, computer lab, knitwear studio, a fabric dying and research lab, fashion drawing studio, and the Charles Evans Library. The R (<http://www.drexel.edu/westphal/resources/FHCC>)obert and Penny Fox Historic Costume Collection (<http://www.drexel.edu/foxcollection>) (FHCC), currently estimated to hold more than 12,000 objects, is located on the first floor and is an invaluable library, archive and educational tool for our students as well as scholars, historians, artists and designers in the national and international community. Also located on the first floor is the Hybrid Making Lab (http://www.drexel.edu/westphal/about/overview/making_spaces/HybridMakingLab). This lab provides collaborative design and research opportunities both within Westphal College and University wide. The exCITe Center (<http://drexel.edu/excite>) (Expressive and Creative Interaction Technologies), located next door at 3401 Market Street, welcomes students and faculty from across the University as well as the community.

The open environment of the URBN Center provides opportunity for collaboration with all of the programs at the Westphal College. Design & Merchandising is on the first floor, opposite the main lobby where work from all of the College's students is regularly displayed. Digital Media, Animation & Visual Effects, Game Art & Production, Web Development & Interaction Design, Product Design, Graphic Design, Interiors, and Architecture's studios and labs are also located in the URBN Center. The Center encourages anyone interested to schedule a visit (<http://www.drexel.edu/westphal/about/contact>) to experience the creativity, technology, innovation and resulting excitement.

Fashion Design Faculty

Renee Weiss Chase, MS (*Drexel University*). Professor. Fashion designer; computer-aided design systems for the fashion curriculum.

Anita Dennis, AST (*Art Institute of Philadelphia*) *Fashion Laboratory Technician*. Assistant Teaching Professor. Fashion designer and technician; construction skills.

Genevieve Dion, MFA (*University of the Arts*) *Director, Shima Seiki Haute Technology Lab, ExCITe Center*. Associate Professor. Industrial designer, wearable artist, new materials technology research.

Cynthia Golebuski, MS (*Drexel University*) *Associate Program Director, Fashion Design*. Associate Teaching Professor. Fashion designer, illustrator, computer aided design.

Roberta Gruber, MS (*Drexel University*) *Head of the Department of Design*. Associate Professor. Fashion designer and illustrator; wearable artist, merchandiser, special events.

Lisa L. Hayes, BFA (*Syracuse University*) *Program Director, Fashion Design*. Associate Professor. Fashion designer, product designer, pattern design.

Jaeyoon Jeong, MS (*Drexel University*). Assistant Teaching Professor. Owner/Designer Jaeyoon Jeong Collection

Jan Marshall, BA (*Long Island University*). Assistant Teaching Professor. Fashion designer, knitwear, product development, fashion analysis.

Kathi Martin, MSIS (*Drexel University*) *Associate Director of the Graduate Program in Fashion Design*. Associate Professor. Fashion and textile designer; textile artist; computer-aided design, best practices online databases and graphic interfaces for fashion and historic costume, virtual characters for fashion design.

Alphonso McClendon, MS (*Drexel University*) *Program Director, Design & Merchandising*. Associate Professor. Fashion designer, product and business development, computer aided planning and design.

Clare Sauro, MA (*Fashion Institute of Technology*) *Curator, Historic Costume Collection*. Associate Teaching Professor. Costume history.

Courses

FASH 201 Survey of the Fashion Industry 3.0 Credits

Introduces the materials and methods used to design, develop, and market the fashion product, including current vocabulary and foundation of knowledge about industry practices and career opportunities.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FASH 210 Presentation Techniques in Fashion 3.0 Credits

Introduces the presentation techniques and skills used for communication in the fashion industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]) and FASH 201 [Min Grade: D]

FASH 211 Fashion Drawing I 3.0 Credits

Examines the fashion figure, fabrication, and conceptual design through the use of black, white, and gray media. Includes classroom drawing from a live model and weekly critiques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 111 [Min Grade: D]

FASH 212 Fashion Drawing II 3.0 Credits

Examines fashion forms, fabrication, and conceptual design through the use of color and mixed media. Works toward the development of a personal "fashion look" and an understanding of drawing as it relates to the fashion industry. Includes live model.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 211 [Min Grade: D]

FASH 220 Textile Design 3.0 Credits

Instructs the student in both traditional and digital techniques of textile design. Investigates layout, repeats, and coordinated fabric groups.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]

FASH 230 Textiles for Fashion Design 3.0 Credits

Examines the textile manufacturing industry and the fundamental processes involved in producing fabrics made of natural or manufactured fibers. Includes basic textile terminology and production processes as well as selection and evaluation of fabrics based on aesthetics, performance and care characteristics.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FASH.

FASH 241 Construction Skills 4.0 Credits

Develops a proficiency in basic garment construction. Emphasizes facility with industrial equipment. Introduces production techniques and an overall awareness of standards of quality.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FASH 251 Fashion Design I 4.0 Credits

Poses fashion problems to be solved, with an emphasis on elements of design. Explores use of half-scale experimentation and development of "studies" as an aid in developing design ideas.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 304 [Min Grade: D]

FASH 252 Fashion Design II 4.0 Credits

Explores sources of inspiration and requires students to translate and develop source material into creative garments. Stresses the extension and elaboration of ideas within a specific market.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 251 [Min Grade: D]

FASH 310 Presentation Techniques 3.0 Credits

Introduces the presentation techniques and skills used for communication in the fashion industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]) and FASH 201 [Min Grade: D]

FASH 311 Textile Design 3.0 Credits

Instructs the student in both traditional and digital techniques of textile design. Investigates layout, repeats, and coordinated fabric groups.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]

FASH 313 Fashion Drawing for Industry 3.0 Credits

Covers sketching and specification drawing for the professional designer. Emphasizes communicating with manufacturers, pattern-makers, and assistants, regarding, garment construction, detailing, and fabrication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 210 [Min Grade: D]

FASH 314 Fashion Presentation Drawing 3.0 Credits

Requires the creation of a portfolio of original designs executed in a medium of choice. Explores various market segments of the industry and includes project reviews by critics who are specialists in these areas.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

FASH 315 Computer Aided Design for Patternmaking 3.0 Credits

Develops skills in patternmaking, markermaking, and grading, using the computer as a tool.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 342 [Min Grade: D]

FASH 316 Computer Aided Design for Fashion Design 3.0 Credits

Explores the use of computers in the fashion industry and develops presentation skills using industrial and commercial software.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 313 [Min Grade: D]

FASH 317 Technical Design 3.0 Credits

Technical Design is crucial in managing technical information internally and externally within a fashion design company. The student is trained in the essential skills of creating technical packages using data programs and sketching, conducting fittings, maintaining specs, and grading patterns and how to communicate information efficiently in a global fashion industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FASH.

Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: FASH 342 [Min Grade: D]

FASH 341 Flat Pattern Design 4.0 Credits

Explores basic patternmaking techniques and manipulations and establishes comparisons between drafting and draping techniques in the development of standard slopers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 241 [Min Grade: D]

FASH 342 Draping Design 4.0 Credits

Covers garment development by the draping method. Advances skills of FASH 341.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 341 [Min Grade: D]

FASH 343 Tailoring 4.0 Credits

Provides intensive investigation of materials and construction techniques used in tailoring. Uses a combination of garment production methods, including a strong emphasis on couture practices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 342 [Min Grade: D]

FASH 349 Fashion Design I 4.0 Credits

Poses fashion problems to be solved, with an emphasis on elements of design. Explores use of half-scale experimentation and development of "studies" as an aid in developing design ideas.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 204 [Min Grade: D] or VSST 304 [Min Grade: D]

FASH 350 Fashion Design II 4.0 Credits

Explores sources of inspiration and requires students to translate and develop source material into creative garments. Stresses the extension and elaboration of ideas within a specific market.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 251 [Min Grade: D] or FASH 349 [Min Grade: D]

FASH 351 Fashion Design III 4.0 Credits

Requires development of original designs and execution incorporating draping, drafting, and flat-pattern techniques. Facilitates the development of a realistic approach to garment design in terms of industrial restrictions, and market segmentations. Includes professional critiques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 252 [Min Grade: D] and FASH 343 [Min Grade: D]

FASH 352 Fashion Design IV 4.0 Credits

Expands and broadens technical skills and lays the groundwork for development of the senior collection. Includes couture evening wear techniques and research processes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 351 [Min Grade: D]

FASH 399 Independent Study in Fashion Design 0.5-12.0 Credits

Provides individualized study in fashion design in a specialized area of study. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

FASH 433 Couture Techniques 3.0 Credits

Expands and broadens technical skills and lays the groundwork for development of the senior collection. Includes couture evening wear techniques and research processes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 351 [Min Grade: D]

FASH 450 Machine Knitting 3.0 Credits

Machine Knitting is an introduction to knitwear design specialization. Students learn to style and draw knit garments to develop a professional portfolio. Technical information regarding yarn analysis, stitch construction, pattern and garment construction are the focus of this class.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is FASH.

Prerequisites: FASH 241 [Min Grade: D] and VSST 112 [Min Grade: D]

FASH 451 Accessory Design 3.0 Credits

This course provides students with concepts and skills to design traditional and contemporary fashion accessories with emphasis in embroidery; applique; hand painting; and clay, plastic and ceramic work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 241 [Min Grade: D]

FASH 452 Millinery Design 3.0 Credits

Familiarizes students with the techniques and processes involved in hat making. Emphasis will be placed on historical perspectives and materials.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 241 [Min Grade: D]

FASH 453 Intimate Apparel Design 3.0 Credits

This course will offer an introduction to the foundations and sleepwear marketplace. Primary focus will be on the design and execution of two pieces for this market. Students will learn how to construct a bra (molded cups) and how to incorporate these details into their final looks for this market. In addition, students will learn the safe operation of the specialty sewing machines for knit construction.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 251 [Min Grade: D]

FASH 454 Advanced Fashion Drawing 3.0 Credits

Through in-class creative assignments with experimental techniques, students learn to respond rapidly, originally, and with increased focus to resolve drawing and design problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 212 [Min Grade: D]

FASH 464 Professional Portfolio 3.0 Credits

This course will involve preparation and execution of a finished designer portfolio for couture, 7th Avenue or the boutique American market. Included in the preparation is research of their chosen entry into the market via history, visuals and customer profile.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FASH and classification is Senior.

Prerequisites: FASH 314 [Min Grade: D]

FASH 465 [WI] Special Topics in Fashion Design 0.5-12.0 Credits

Provides study in fashion design on a special topic or on an experimental basis. May be repeated for credit if topics vary. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

FASH 466 Business of Fashion 3.0 Credits

Presents the following topics in seminar fashion merchandising, retail distribution, interpreting consumer demand, merchandise assortment planning, unit and inventory control and pricing, fashion marketing and manufacturing, including the marketing process, components of the fashion industry, market evaluation, demographic and psychological factors, manufacturing components and processes, and case studies.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if major is FASH and classification is Senior.

FASH 467 Style and the Media 3.0 Credits

Fashion Journalism is reading and writing about all aspects of fashion, including reporting, criticism and commentary about photography related to fashion published in newspapers or magazines, displayed on websites, aired on radio and/or TV. The style of the writers and also the aspects of dress they found significant is examined.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FASH 477 Fashion Design Seminar 3.0 Credits

Provides reading and discussion of pertinent topics of current concern in the professional area of fashion design.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if classification is Junior or Senior.

FASH 491 Collection I 4.0 Credits

The second of a three-part series in which the student develops the senior collection. Requires the student to demonstrate the synthesis of a personal aesthetic and technical acumen.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if classification is Senior.
Prerequisites: FASH 352 [Min Grade: D]

FASH 492 Collection II 3.0 Credits

Requires completion of senior collection and presentation in student fashion show.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Cannot enroll if classification is Freshman
Prerequisites: FASH 491 [Min Grade: D]

FASH I199 Independent Study in Fashion Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

FASH I299 Independent Study in Fashion Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

FASH I399 Independent Study in Fashion Design 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

FASH I499 Independent Study in Fashion Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

FASH T180 Special Topics in Fashion Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

FASH T280 Special Topics in Fashion Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

FASH T380 Special Topics in Fashion Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

FASH T480 Special Topics in Fashion Design 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

Film & Video

Major: Film & Video

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 186.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Program (CIP) code: 50.0602

Standard Occupational Classification (SOC) code: 27-2012; 27-4031; 27-4032

About the Program

The film and video major offers a balance of technical craft and artistic vision that prepares students to pursue professional careers in the film industry. The program is hands-on with ample production opportunities from the first year of study supported by a strong emphasis in the liberal arts and foundations of design. There is also substantial coursework in screenwriting and film studies.

This highly competitive program, with only sixty-four freshmen accepted annually, features smaller classes that foster student-faculty interaction and mentoring, as well as ample access to excellent equipment. The unique Drexel co-op and Los Angeles Summer Program enhance education by providing students with professional employment experience.

The Film and Video program also offers minors in Film Studies and Video Production.

Additional Information

For more information about this program, contact the program director:

Tom Quinn
 Film & Video
 Department of Cinema and Television
 Antoinette Westphal College of Media Arts and Design
 teq23@drexel.edu

For more details, visit the College's Film and Video (<http://www.drexel.edu/westphal/academics/undergraduate/FMVD>) page.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
UNIV A101	The Drexel Experience	2.0
Required Arts and Humanities-students select a minimum of 12 credits		12.0
Required Natural Science-students select a minimum of 8 credits		8.0
Required Social Science-students select a minimum of 9 credits		9.0
Electives		24.0
Co-operative education (two terms)		0.0

AWCOMAD Requirements

ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
IDM 100	Introduction to Web Development	3.0
PHTO 110	Photography	3.0
VSST 108	Design I for Media	3.0
VSST 109	Design II for Media	3.0

Film and Video Core Courses

FMST 101	Film History I: Emergence	3.0
FMST 102	Film History II: New Waves	3.0
FMST 103	Film History III: Trends	3.0
FMST 250	The Documentary Tradition	3.0
FMST 304	Film Voice and Style	3.0
FMVD 110	Basic Shooting and Lighting	3.0
FMVD 115	Basic Editing	3.0
FMVD 120	Basic Sound	3.0
FMVD 200	Acting for the Screen	3.0
FMVD 202	Directing for the Screen	3.0
FMVD 210	Documentary Video Production	3.0
FMVD 215	Narrative Video Production	3.0
FMVD 218	Intermediate Cinematography	3.0
FMVD 220	Experimental Video Production	3.0
FMVD 226	Intermediate Sound	3.0
FMVD 228	Visual Storytelling	3.0
FMVD 235	Intermediate Lighting	3.0
FMVD 237	Intermediate Editing	3.0
FMVD 286	Producing for Features	3.0
FMVD 322	Production Workshop I	3.0
FMVD 323	Production Workshop II	3.0
FMVD 495	Senior Project in Film and Video (3 semesters at 3.0 credits)	9.0
SCRIP 270 [WI]	Screenwriting I	3.0
SCRIP 280 [WI]	Writing the Short Film	3.0
SCRIP 370	Screenplay Story Development	3.0
TVPR 100	TV Studio: Basic Operations	3.0
Four Advanced Production Choice Courses		12.0

Includes TVPR-TV Studio 200 level course and any non-required TVPR or FMVD course at 300 level or above. Also includes SCRIP courses at 300 level or above. Does not include FMVD 399 or FMVD 490.

Film Studies or Television Studies Course	3.0
Select any Film Studies (FMST) or Television Studies (TVST) course not already listed as required.	
Total Credits	186.0

Sample Plans of Study

Co-op Cycle A

(See below this plan for Co-op Cycle B)

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FMST 101	Film History I: Emergence	3.0
FMVD 110	Basic Shooting and Lighting	3.0
IDM 100	Introduction to Web Development	3.0
UNIV A101	The Drexel Experience	1.0
VSST 108	Design I for Media	3.0
Term Credits		16.0
Term 2		
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FMST 102	Film History II: New Waves	3.0
FMVD 120	Basic Sound	3.0
SCRIP 270 [WI]	Screenwriting I	3.0
UNIV A101	The Drexel Experience	1.0
VSST 109	Design II for Media	3.0
Term Credits		16.0
Term 3		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FMVD 115	Basic Editing	3.0
MATH 119	Mathematical Foundations for Design	4.0
TVPR 100	TV Studio: Basic Operations	3.0
Term Credits		17.0
Term 4		
ARTH 103	History of Art: Modern Art	3.0
FMST 250	The Documentary Tradition	3.0
FMVD 200	Acting for the Screen	3.0
FMVD 210	Documentary Video Production	3.0
FMVD 218	Intermediate Cinematography	3.0
FMVD 228	Visual Storytelling	3.0
Term Credits		18.0
Term 5		
COOP 101	Career Management and Professional Development	0.0
FMVD 202	Directing for the Screen	3.0
FMVD 226	Intermediate Sound	3.0
FMVD 237	Intermediate Editing	3.0
PHTO 110	Photography	3.0
SCRIP 280 [WI]	Writing the Short Film	3.0
Term Credits		15.0
Term 6		
FMST 103	Film History III: Trends	3.0
FMVD 215	Narrative Video Production	3.0
FMVD 235	Intermediate Lighting	3.0
FMVD 286	Producing for Features	3.0
Natural science elective		4.0
Term Credits		16.0
Term 7		

Advanced Production elective	3.0
Arts and humanities elective	3.0
Film/Television Studies elective	3.0
Social science elective	3.0
Elective	3.0
Term Credits	15.0
Term 8	
FMST 304 Film Voice and Style	3.0
FMVD 220 Experimental Video Production	3.0
FMVD 322 Production Workshop I	3.0
SCRP 370 Screenplay Story Development	3.0
Advanced Production elective	3.0
Term Credits	15.0
Term 9	
FMVD 323 Production Workshop II	3.0
Arts and humanities elective	3.0
Social science elective	3.0
Free elective	3.0
Natural Science elective	4.0
Term Credits	16.0
Term 10	
FMVD 495 Senior Project in Film and Video	3.0
Advanced Production elective *	3.0
Social Science elective	3.0
Free electives	6.0
Term Credits	15.0
Term 11	
FMVD 495 Senior Project in Film and Video	3.0
Advanced Production elective *	3.0
Arts and humanities elective	6.0
Free elective	3.0
Term Credits	15.0
Term 12	
FMVD 495 Senior Project in Film and Video	3.0
Free electives	9.0
Term Credits	12.0

Total Credit: 186.0

Co-op Cycle B

Term	Credits
Term 1	
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FMST 101 Film History I: Emergence	3.0
FMVD 110 Basic Shooting and Lighting	3.0
FMVD 120 Basic Sound	3.0
TVPR 100 TV Studio: Basic Operations	3.0
UNIV A101 The Drexel Experience	1.0
Term Credits	16.0
Term 2	
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FMST 102 Film History II: New Waves	3.0
IDM 100 Introduction to Web Development	3.0
SCRP 270 [WI] Screenwriting I	3.0
UNIV A101 The Drexel Experience	1.0
VSST 108 Design I for Media	3.0
Term Credits	16.0
Term 3	
ARTH 102 History of Art II: Renaissance to Romanticism	3.0
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
FMVD 115 Basic Editing	3.0

MATH 119 Mathematical Foundations for Design	4.0
VSST 109 Design II for Media	3.0
Term Credits	17.0
Term 4	
FMST 250 The Documentary Tradition	3.0
FMVD 202 Directing for the Screen	3.0
FMVD 237 Intermediate Editing	3.0
FMVD 286 Producing for Features	3.0
SCRP 280 [WI] Writing the Short Film	3.0
Arts and Humanities elective	3.0
Term Credits	18.0
Term 5	
FMVD 215 Narrative Video Production	3.0
FMVD 235 Intermediate Lighting	3.0
FMVD 226 Intermediate Sound	3.0
FMVD 228 Visual Storytelling	3.0
PHTO 110 Photography	3.0
Term Credits	15.0
Term 6	
ARTH 103 History of Art: Modern Art	3.0
COOP 101 Career Management and Professional Development	0.0
FMST 103 Film History III: Trends	3.0
FMVD 210 Documentary Video Production	3.0
FMVD 200 Acting for the Screen	3.0
FMVD 218 Intermediate Cinematography	3.0
Term Credits	15.0
Term 7	
Advanced Production elective	3.0
Arts and humanities elective	3.0
Film Studies/Television Studies elective	3.0
Social science elective	3.0
Elective	3.0
Term Credits	15.0
Term 8	
FMST 304 Film Voice and Style	3.0
FMVD 220 Experimental Video Production	3.0
FMVD 322 Production Workshop I	3.0
SCRP 370 Screenplay Story Development	3.0
Social science elective	3.0
Term Credits	15.0
Term 9	
FMVD 323 Production Workshop II	3.0
Advanced Production elective *	3.0
Arts and humanities elective	3.0
Social science elective	3.0
Natural Science elective	4.0
Term Credits	16.0
Term 10	
FMVD 495 Senior Project in Film and Video	3.0
Advanced Production elective *	3.0
Arts and humanities elective	3.0
Free elective	3.0
Natural Science elective	4.0
Term Credits	16.0
Term 11	
FMVD 495 Senior Project in Film and Video	3.0
Advanced Production elective *	3.0
Free electives	9.0
Term Credits	15.0
Term 12	
FMVD 495 Senior Project in Film and Video	3.0

Free electives	9.0
Term Credits	12.0
Total Credit: 186.0	

* See degree requirements (p. 507).

Co-Op/Career Opportunities

Opportunities

Students who study film and video can move on to careers as film or video directors, producers, video or film editors, directors of photography (film), camerawork, as well as grips and special effects coordinators.

Co-Op Experiences

Some past co-op employers of film and video students include:

- USA Network, New York
- Comcast, Philadelphia
- Bad Robot, Los Angeles
- ICM, Los Angeles
- Focus Features, New York
- Law & Order, New York
- NFL Films, Mount Laurel, New Jersey
- Tribeca Film Center, New York
- National Geographic Television, Washington DC
- NBC, New York
- Paramount Studios, Los Angeles
- MTV, New York

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Facilities

Film and Video facilities include a shooting studio with green screen; two screening rooms; a fully equipped HD television studio; post-production labs for editing, color correction and audio recording & mixing; specially outfitted multimedia rooms; state of the art film production equipment including cameras, steadicams, lighting and audio equipment.

Additionally, the college operates DUTV (<http://www.dutv.org>), a HD cable television station reaching over 350,000 households.

Minor in Film Studies

The Minor in Film Studies comprises courses that cover the major artistic and institutional developments in cinema from its late-nineteenth-century origins to the present. As these courses cover a variety of critical topics that are essential to any film studies curriculum - such as the study of major genres and auteurs, the technologies and techniques contributing to the development of the medium, as well as the historical circumstances that influenced the cinema's evolution since its inception - they will establish a sound critical foundation for students to choose and to flourish in the subsequent courses required for the minor.

The Minor in Film Studies is open to all University students.

Required Courses:

FMST 101	Film History I: Emergence	3.0
FMST 102	Film History II: New Waves	3.0

FMST 103	Film History III: Trends	3.0
Select five of the following:		15.0
FMST 250	The Documentary Tradition	
FMST 255	Hitchcock	
FMST 260	The Western	
FMST 262	Film Comedy	
FMST 263	Rock - N - Roll Cinema	
FMST 265	Special Topics in Cinema Studies	
FMST 266	The Cinematographer's Art	
FMST 270	Controversial Films	
FMST 275	Breakthroughs of Contemporary Film Directors	
FMST 276	Great Years in Cinema: 1999	
FMST 290	Hollywoodland I	
FMST 291	Hollywoodland II	
FMST 340	French New Wave	
FMST 345	Italian Neo Realism	
FMST 352	The Horror Film	
FMST 355	Contemporary Cinema	
Total credits		24.0

Minor in Video Production

The Minor in Video Production provides a thorough foundation in filmmaking craft. Once core required courses are completed, students have the opportunity to apply newly acquired skills in their choice of several advanced film production courses or to explore television studio production.

The Minor in Video Production is open to all University students.

Required Courses

FMVD 110	Basic Shooting and Lighting	3.0
FMVD 115	Basic Editing	3.0
FMVD 120	Basic Sound	3.0
SCRIP 270 [WI]	Screenwriting I	3.0
Four of the following courses:		12.0
FMVD 210	Documentary Video Production	
FMVD 215	Narrative Video Production	
FMVD 220	Experimental Video Production	
FMVD 235	Intermediate Lighting	
FMVD 305	Special Effects Make-up	
FMVD 365	Special Topics in Production	
SCRIP 280 [WI]	Writing the Short Film	
TVPR 100	TV Studio: Basic Operations	
TVPR 200	TV Studio: Live Directing	
Total Credits		24.0

Film & Video Faculty

Ian N. Abrams, BA (*Duke University*). Associate Professor. Screenwriting, movies, film, Hollywood.

John Avarese, BS (*Drexel University*). Assistant Teaching Professor. Composer, film and video scores, mixing and sound design.

Alison Bagnall, BA (*Yale University*). Visiting Professor. Filmmaker

David Culver, AS (*Graham Junior College*) *Manager of the Paul F. Harron Studios/DUTV*. Associate Teaching Professor. Film, Video, Station Management, Emerging Media Technology

David Deneen, BFA (*Philadelphia College of Art*). Assistant Teaching Professor. Film & video.

Gerard M. Hooper, MFA (*Temple University*). Associate Teaching Professor. Film and video; European and non-western cinema.

D. B. Jones, PhD (*Stanford University*). Professor. Film and video; cinema studies.

Matthew Kaufhold, MA (*University of North Carolina*) Program Director, Screenwriting and Playwriting. Associate Teaching Professor. Screenwriter, Producer.

Karin P. Kelly, MFA (*New York University*) Department Head, Cinema and Television. Associate Professor. Film and video; filmmaker and author.

Yvonne D. Leach, MFA (*Temple University*). Associate Professor. Television studies.

Thomas Quinn, MFA (*Temple University*) Program Director, Film & Video. Assistant Professor. Writer, Director, filmmaker.

Philip W. Salas, BS (*Temple University*). Assistant Teaching Professor. Utilization of advanced set top box data to measure fragmented viewing behavior. Impact of new television distribution technologies on traditional broadcasters and multichannel program providers.

David A. Schwartz, BA (*Rider University*). Associate Teaching Professor. Steadicam operator; cameraman.

Andrew Susskind, BA (*Harvard University*) Program Director of TV Production & Media Management. Associate Teaching Professor. Producing for Television, The Sitcom, Directing Single and Multi-Camera

Jocelyn Tarquini-Motter, MFA (*American Film Institute*). Assistant Teaching Professor. Editing.

Albert S. Tedesco, MA (*University of Pennsylvania*) Director of the Paul F. Harron Graduate Program in Television Management. Teaching Professor. Media Management, Organizational Structure, Research Methods, Media Ethics, Media Law, The Regulatory Environment, Technology Assessment, Media Theory, Media Analytics

Gregory S. Wolmart, MFA (*University of Pennsylvania*). Assistant Professor. Cinema studies; film history.

Game Design and Production

Major: *Game Design and Production*

Degree Awarded: *Bachelor of Science (BS)*

Calendar Type: *Quarter*

Total Credit Hours: *186.0*

Co-op Options: *One Co-op (Four years)*

Classification of Instructional Programs (CIP) code: *36.0113*

Standard Occupational Classification (SOC) code: *15-1131*

About the Program

Drexel's nationally-ranked Game Design and Production program combines a strong comprehension of animation and interactivity, along with an understanding of design, programming, production and team work.

The major mirrors a sector that has seen an explosion in gaming, not just in homes, but throughout industry and the corporate world. The gaming industry has grown from just a source of entertainment to one that also encompasses the use of serious gaming, where gaming technologies are used in education and training.

Fully immersive games now use new methods of interaction, such as multi-touch displays, motion control and haptic devices. To best prepare themselves for the demands of careers in these cutting-edge disciplines, students pursue a foundation of design and technology, taking core courses in all aspects of digital media, completing a six month co-op and delving into rigorous coursework in many areas of specialization.

To complement the creative focus of the new Game Design & Production major, a sister concentration in game programming and development (<http://catalog.drexel.edu/undergraduate/collegeofcomputingandinformatics/gameprogramminganddevelopment>) is offered as part of Drexel's major in computer science (<http://catalog.drexel.edu/undergraduate/collegeofcomputingandinformatics/computerscience>).

Additional Information

To find out more about this major, visit the Westphal College's Game Design and Production Major (<http://www.drexel.edu/westphal/undergraduate/GDAP>) page.

Degree Requirements

General education requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
PHYS 121	Physical Science for Design I	4.0
PHYS 122	Physical Science for Design II	4.0
UNIV A101	The Drexel Experience	2.0

Art and art history requirements

Arts and humanities elective	3.0
History (HIST) elective	3.0
Literature (ENGL) elective	3.0
Social sciences electives	9.0

Free electives

ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
ARTH 300 [WI]	History of Modern Design	3.0
VSST 108	Design I for Media	3.0
VSST 109	Design II for Media	3.0
VSST 110	Introductory Drawing	3.0
VSST 111	Figure Drawing I	3.0

Media and computer science requirements

CS 140	Introduction to Multimedia Programming	3.0
GMAP 231	Scripting for Game Design	3.0
FMVD 110	Basic Shooting and Lighting	3.0
FMVD 206	Audio Production and Post	3.0
SCRIP 270 [WI]	Screenwriting I	3.0

Digital media core requirements

ANIM 140	Computer Graphics Imagery I	3.0
ANIM 141	Computer Graphics Imagery II	3.0
ANIM 152	Multimedia Timeline Design	3.0
ANIM 211	Animation I	3.0
DIGM 100	Digital Design Tools	3.0
DIGM 105	Overview of Digital Media	3.0
DIGM 223	Creative Concept Design	3.0
DIGM 250	Professional Practices	3.0

DIGM 350 [WI]	Digital Storytelling	3.0
DIGM 451 [WI]	Explorations in New Media	3.0
DIGM 475 [WI]	Seminar: The Future of Digital Media	3.0
DIGM 490	Digital Media Senior Project	9.0
DIGM 491	Digital Media Senior Project Studio	3.0
GMAP 260	Overview of Computer Gaming	3.0
IDM 100	Introduction to Web Development	3.0
IDM 211	User Interface Design I	3.0
Gaming requirements		
ANIM 212	Animation II	3.0
ANIM 215	History of Animation	3.0
ANIM 388	Spatial Data Capture	3.0
GMAP 345	Game Development Foundations	3.0
GMAP 377	Game Development: Workshop I	3.0
GMAP 378	Game Development: Workshop II	3.0
GMAP 421	Advanced Game Design and Production	3.0
Select two of the following Gaming electives		6.0
GMAP 347 Serious Games		
GMAP 348 Experimental Games		
GMAP 367 Character Animation for Gaming		
GMAP 368 Artificial Intelligence in Gaming		
GMAP 369 Mobile Game Development		
Total Credits		186.0

Sample Plan of Study

Term		Credits
Term 1		
DIGM 100	Digital Design Tools	3.0
DIGM 105	Overview of Digital Media	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PHYS 121	Physical Science for Design I	4.0
UNIV A101	The Drexel Experience	1.0
VSST 110	Introductory Drawing	3.0
Term Credits		17.0
Term 2		
ANIM 140	Computer Graphics Imagery I	3.0
ANIM 152	Multimedia Timeline Design	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHYS 122	Physical Science for Design II	4.0
UNIV 101	The Drexel Experience	1.0
VSST 108	Design I for Media	3.0
Term Credits		17.0
Term 3		
ANIM 141	Computer Graphics Imagery II	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FMVD 110	Basic Shooting and Lighting	3.0
MATH 101	Introduction to Analysis I	4.0
VSST 109	Design II for Media	3.0
Term Credits		17.0
Term 4		
ANIM 211	Animation I	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
CS 140	Introduction to Multimedia Programming	3.0
DIGM 223	Creative Concept Design	3.0
IDM 211	User Interface Design I	3.0
Term Credits		15.0
Term 5		
ANIM 212	Animation II	3.0
ANIM 215	History of Animation	3.0
COOP 101	Career Management and Professional Development	0.0

DIGM 250	Professional Practices	3.0
GMAP 231	Scripting for Game Design	3.0
IDM 100	Introduction to Web Development	3.0
Term Credits		15.0
Term 6		
ARTH 103	History of Art: Modern Art	3.0
FMVD 206	Audio Production and Post	3.0
GMAP 260	Overview of Computer Gaming	3.0
SCRIP 270 [WI]	Screenwriting I	3.0
Term Credits		12.0
Term 7		
ANIM 388	Spatial Data Capture	3.0
COM 230	Techniques of Speaking	3.0
DIGM 350 [WI]	Digital Storytelling	3.0
GMAP 345	Game Development Foundations	3.0
VSST 111	Figure Drawing I	3.0
Term Credits		15.0
Term 8		
ARTH 300 [WI]	History of Modern Design	3.0
DIGM 451 [WI]	Explorations in New Media	3.0
GMAP 377	Game Development: Workshop I	3.0
Free elective		3.0
Gaming elective		3.0
Term Credits		15.0
Term 9		
GMAP 378	Game Development: Workshop II	3.0
Social science elective		3.0
Arts and Humanities elective		3.0
Gaming elective		3.0
Free elective		3.0
Term Credits		15.0
Term 10		
DIGM 490	Digital Media Senior Project	3.0
DIGM 491	Digital Media Senior Project Studio	1.0
GMAP 421	Advanced Game Design and Production	3.0
Social science elective		3.0
Literature elective		3.0
Free elective		3.0
Term Credits		16.0
Term 11		
DIGM 490	Digital Media Senior Project	3.0
DIGM 491	Digital Media Senior Project Studio	1.0
Social science elective		3.0
Free electives		9.0
Term Credits		16.0
Term 12		
DIGM 490	Digital Media Senior Project	3.0
DIGM 491	Digital Media Senior Project Studio	1.0
DIGM 475 [WI]	Seminar: The Future of Digital Media	3.0
History elective		3.0
Free electives		6.0
Term Credits		16.0

Total Credit: 186.0

Co-op/Career Opportunities

Drexel students have broad training in all areas of game design and production, and our students have career opportunities in both entertainment gaming and the broader simulation/training industries.

Co-op Experiences

In an industry where the process of building a career often begins with a few key contacts, the co-op program gives Drexel students the chance to begin meeting people and networking. A recent co-op student at Microsoft Studios worked with producers on several different titles and was offered a job in his junior year that was waiting for him after he completed his senior year.

In addition to the large entertainment companies, students have opportunities to explore how game design is applicable to many local industries ranging from pharmaceuticals to aircraft.

Career Experiences

Our students work in leading entertainment companies including Microsoft Studios, Disney, EA Games, Blizzard, Zynga, 343 Industries, Midway, and NCsoft. Other students chose smaller studios or launch their own companies. Many students chose to work outside of the leading studios by applying their game production skills to more serious endeavors for companies including Lockheed, Comcast, Vanguard, and The Ride Works.

Jobs titles range from Technical Artist, Lead Cinematic Animator, Program Manager, Associate Producer, Marketing Manager, Animator, Facial Capture Artist, Motion Capture Associate, Simulation Developer, etc.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities, or Drexel's RePlay Lab careers (<http://www.replay.drexel.edu/careers.html>) page.

Dual Accelerated Degrees

BS/MS in Digital Media

The accelerated degree programs enable academically qualified students to earn both a bachelor's and a master's degree in five years instead of six — graduating sooner than they would in traditional programs. In addition, the graduate-level courses students take in their junior and senior years are included in their undergraduate tuition, which saves almost a year's worth of their MS tuition.

Current Drexel students may apply for the an accelerated degree programs through the Graduate College of Drexel University (<http://drexel.edu/graduatecollege>) after completing 90.0 credits, but no more than 120.0 credits. Many of our accelerated students have gone on to careers at leading companies including Pixar, Microsoft Studios, Dreamworks, NCSoft, and Disney.

Game Design and Production Faculty

Theo Artz, BFA (*Tyler School of Art, Temple University*). Associate Professor. Digital media.

Paul Diefenbach, PhD (*University of Pennsylvania*). Assistant Professor. Game development, real-time rendering.

Jeremy Fernsler, BA (*Pennsylvania State University*) Program Director, *Game Design & Production*. Assistant Teaching Professor. Digital effects artist; compositor and animator for the feature film visual effects industry.

Troy Finamore, MS (*Drexel University*) Program Director, *Interactive Digital Media*. Assistant Teaching Professor. Advertising, design and interactivity.

Nick Jushchyshyn, MFA (*Academy of Art University*) Program Director, *Animation and Visual Effects*. Assistant Teaching Professor. Visual effects, digital media and animation.

Frank J. Lee, PhD (*Carnegie Mellon University*). Associate Professor. Human-computer interaction; cognitive engineering and science; intelligent software agents for games and education.

Robert Lloyd, MFA (*Temple University*). Assistant Teaching Professor. Game development, themed entertainment and motion simulation.

David Mauriello, BA (*Lafayette College*). Assistant Professor. 3D modeling and animation.

Glen Muschio, PhD (*Temple University*). Associate Professor. Digital media, society, communication.

Stefan Rank, PhD (*Vienna University of Technology*). Assistant Professor. Artificial intelligence, game design and human-computer interaction.

Jervis Thompson, BS (*Drexel University*). Associate Teaching Professor. Digital media, interactive multimedia.

Jichen Zhu, PhD (*Georgia Institute of Technology*). Assistant Professor. Developing humanistic and interpretive framework of computational technology, particularly artificial intelligence (AI), and constructing AI-based cultural artifacts; interactive storytelling, games and software studies.

Graphic Design

Major: Graphic Design

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 183.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 50.0409

Standard Occupational Classification (SOC) code: 27-1024

About the Program

Westphal College's Graphic Design curriculum provides a balance of traditional and technical artistic studies enhanced by general education coursework in the humanities and the physical and social sciences. Students develop a sophisticated approach to creative problem solving and hone skills in typography, image generation, corporate identity, web design, information graphics, three-dimensional design, and motion graphics. Working in both two and three-dimensional projects, students utilize the latest electronic applications and emerging technologies to stay current with the industry.

Graphic Design students can also pursue advanced elective coursework in web & motion graphic design, environmental graphic design (wayfinding systems, exhibition design, identity graphics), experimental publication design and other interdisciplinary special topics projects.

Additional Information

For more information about the major, visit the Graphic Design (<http://www.drexel.edu/westphal/academics/undergraduate/VSCM>) program web page.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
PHYS 121	Physical Science for Design I	4.0
UNIV A101	The Drexel Experience	2.0
Required Arts and Humanities-students elect a minimum of 9.0 credits		9.0
Required Natural Science-students elect a minimum of 4.0 credits		4.0
Required Social Science-students elect a minimum of 9.0 credits		9.0
Free electives		23.0
Co-operative education (two terms)		0.0

Visual Studies Requirements

ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
PHTO 110	Photography	3.0
VSST 101	Design I	4.0
VSST 102	Design II	4.0
VSST 103	Design III	4.0
VSST 110	Introductory Drawing	3.0
VSST 111	Figure Drawing I	3.0
VSST 301	Painting I	4.0
VSST 321	Screenprint I	4.0
Visual Studies (VSST) elective		4.0

Graphic Design Requirements

ARTH 300 [WI]	History of Modern Design	3.0
PHTO 210	Intermediate Photography	3.0
VSCM 100	Computer Imaging I	3.0
VSCM 200	Computer Imaging II	3.0
VSCM 230	Visual Communication I	4.0
VSCM 231	Visual Communication II	4.0
VSCM 232	Visual Communication III	4.0
VSCM 240	Typography I	3.0
VSCM 241	Production	3.0
VSCM 242	Typography II	3.0
VSCM 330	Visual Communication IV	4.0
VSCM 331	Visual Communication V	4.0
VSCM 340	Typography III	3.0
VSCM 350 [WI]	Graphic Design: 20th Century and Beyond	3.0
VSCM 430	Visual Communication VI	4.0
VSCM 440	Book Design	4.0
VSCM 450	Professional Portfolio	3.0
VSCM 460	Professional Practice	3.0
VSCM 496	Senior Thesis Graphic Design	3.0
WMGD 210	Motion Graphics I	4.0
WMGD 220	Web Graphics I	4.0
WMGD 330	Web Graphics II	4.0

Total Credits 183.0

Sample Plan of Study

BS in Graphic Design: General Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PHYS 121	Physical Science for Design I	4.0
UNIV A101	The Drexel Experience	1.0
VSST 101	Design I	4.0

VSST 110	Introductory Drawing	3.0
Term Credits		15.0

Term 2

ARTH 101	History of Art I: Ancient to Medieval	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
UNIV A101	The Drexel Experience	1.0
VSST 102	Design II	4.0
Natural science elective		4.0
Term Credits		15.0

Term 3

ARTH 102	History of Art II: Renaissance to Romanticism	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
VSCM 100	Computer Imaging I	3.0
VSST 103	Design III	4.0
Term Credits		18.0

Term 4

ARTH 103	History of Art: Modern Art	3.0
PHTO 110	Photography	3.0
VSCM 200	Computer Imaging II	3.0
VSCM 230	Visual Communication I	4.0
VSCM 240	Typography I	3.0
Term Credits		16.0

Term 5

COOP 101	Career Management and Professional Development	0.0
PHTO 210	Intermediate Photography	3.0
VSCM 231	Visual Communication II	4.0
VSCM 242	Typography II	3.0
VSST 111	Figure Drawing I	3.0
Term Credits		13.0

Term 6

VSCM 232	Visual Communication III	4.0
VSCM 241	Production	3.0
WMGD 220	Web Graphics I	4.0
Free elective		3.0
Term Credits		14.0

Term 7

ARTH 300 [WI]	History of Modern Design	3.0
VSST 321	Screenprint I	4.0
WMGD 330	Web Graphics II	4.0
Arts and Humanities elective		3.0
Social Science elective		3.0
Term Credits		17.0

Term 8

VSCM 330	Visual Communication IV	4.0
VSCM 340	Typography III	3.0
WMGD 210	Motion Graphics I	4.0
Visual Studies (VSST) elective*		4.0
Arts and Humanities elective		3.0
Term Credits		18.0

Term 9

VSCM 331	Visual Communication V	4.0
VSCM 350 [WI]	Graphic Design: 20th Century and Beyond	3.0
VSST 301	Painting I	4.0
Social science elective		3.0
Arts and Humanities elective		3.0
Term Credits		17.0

Term 10

VSCM 430	Visual Communication VI	4.0
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VSCM 440	Book Design	4.0
Social science elective		3.0
Free elective		3.0
Term Credits		14.0
Term 11		
VSCM 450	Professional Portfolio	3.0
Free electives		9.0
Term Credits		12.0
Term 12		
VSCM 460	Professional Practice	3.0
VSCM 496	Senior Thesis Graphic Design	3.0
Free electives		8.0
Term Credits		14.0

Total Credit: 183.0

See degree requirements (p. 512) for list of Graphic Design electives.

* Visual Studies (VSST) elective: choose from any upper-level VSST course.

Co-op/Career Opportunities

Potential employers include advertising agencies, publishers, printers, independent and in-house design studios, museums and galleries, magazines and newspapers, and television. Training in visual communication prepares an individual for careers in many fields because the problem-solving methods and organizational skills it builds are widely applicable.

Co-op Experiences

Some past co-op employers of graphic design students include:

- The Franklin Institute
- Philadelphia Museum of Art
- Quirk Books
- Esquire
- Intuitive Company
- Electronic Ink
- Razorfish
- WebLinc
- Happy Cog
- Philadelphia Union
- Hasbro
- Comcast
- National Constitution Center

Career Opportunities

Our Graphic Design alumni go on to successful careers in a range of positions including Lead Designer, Creative Director, Art Director, Interaction Designer, and Owner or Partner of firms. Some of the companies where our alumni can be found include:

- Facebook
- Ann Taylor Inc
- ESPN
- America's Test Kitchen
- Apple
- ex;it

- Comcast Corporation
- Intuitive Company
- Blue Cadet
- Time Inc.
- Hasbro
- Michael Graves Design Group
- Brooks Brothers
- Philadelphia Museum of Art
- Longwood Gardens
- Under Armour
- AgileCat
- Marvel Entertainment
- eCity Interactive
- Sesame Workshop
- National Constitution Center
- Bloomberg
- Saatchi & Saatchi
- Vera Bradley
- Kikkerland
- The Franklin Institute
- QVC

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Facilities

The Graphic Design studios are located on the fourth floor of the URBN Center in the Antoinette Westphal College of Media Arts and Design. There are five dedicated studios equipped with up-to-date electronic and traditional tools. Studios have work surfaces for traditional practices that will accommodate 15 students, and wall surfaces for critiques or posting examples of printed work. In addition, students have access to a dedicated, non-scheduled Graphic Design "Open Lab" equipped with all necessary technology and work surfaces.

Graphic Design Faculty

Jack Cliggett, MFA (*Syracuse University*). Associate Professor. Graphic design; logo design, corporate identity, Chinese propaganda, and thesis.

Joshua Gdovin, BS (*Drexel University*). Visiting Teaching Professor. Graphic design; web graphics; motion graphics, and thesis.

Jody Graff, BS (*Drexel University*) Program Director, *Graphic Design*. Associate Professor. Graphic design; publication design, annual report design, three-dimensional graphics and packaging, environmental graphic design (exhibition and wayfinding), and thesis.

Eric Karnes, MFA (*Virginia Commonwealth University*). Assistant Professor. Graphic design; logo design, corporate identity, typography, advanced typography, publication design, book design, professional portfolio, thesis.

David Raizman, PhD (*University of Pittsburgh*). Professor. Graphic design; History of Modern Design, Graphic Design; 20th Century & Beyond

William Rees, BS (*Drexel University*) Associate Program Director, *Graphic Design*. Associate Teaching Professor. Graphic design; logo design, corporate identity, publication design, electronic imaging, print production, professional portfolio, and thesis.

Sandra Stewart, BFA (*Tyler School of Art, Temple University*) Academic Associate Dean, *Antoinette Westphal College of Media Arts and Design*. Associate Professor. Graphic design; logo design, corporate identity, publication design, three-dimensional graphics and packaging, and thesis.

Mark Willie, MFA (*Boston Museum School of Fine Arts*). Teaching Professor. Graphic design; typography, logo design, corporate identity, publication design, book design, professional portfolio, and thesis.

Shushi Yoshinaga, BFA (*Philadelphia College of the Arts*). Associate Professor. Graphic design; letterform, typography, and thesis.

Interactive Digital Media

Major: Interactive Digital Media

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 186.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 11.0801

Standard Occupational Classification (SOC) code: 15-1134; 27-1014

About the Major

We design for people, not screens. We are the evangelists of interactivity. We focus on humans and their behavior; on verbs, not nouns. We are empathetic. We care about the user experience. Great content and great design are the tip of the iceberg when it comes to interactive products that engage the mind, heart and body. We aim for design that engages and delights. We are passionate. We create digital products that promote and inspire human activity, and which adapt to individual choice and deliver personalized content. Our products and processes are agile. They can change gracefully over time and still retain their own unique identity. We are future-proof.

Here, we understand that the past is just as important as the future. We learn the core principles to define and stay ahead of the curve. We are flexible and versatile. We know that in an industry of constant change our work is never done and our education never stops. We prepare for this change by building upon a solid foundation in order to discover the trends of tomorrow. To us, work and play have the same definition. We are curious.

We believe that discoveries are made through experimentation and that magical things happen through collaboration. Desktops, laptops, mobile devices, glasses and watches are only the beginning. We know that anything that can be connected will be connected. We are adaptable. While others focus on technology, we choose to focus on creativity. We believe that design and code are inseparable. They are the tools that we use to render the intent of our imagination.

Additional Information

To find out more, visit the Westphal College's Interactive Digital Media major (<http://www.drexel.edu/westphal/academics/undergraduate/WBDV>) web page.

Degree Requirements

General Education Requirements

CIVC 101	Introduction to Civic Engagement	1.0
COM 230	Techniques of Speaking	3.0
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
PHYS 121	Physical Science for Design I	4.0
PHYS 122	Physical Science for Design II	4.0
UNIV A101	The Drexel Experience	2.0
Arts and humanities elective		3.0
History (HIST) elective		3.0
Literature (ENGL) elective		3.0
Social science electives		9.0
Free electives		24.0
Art and Art History Requirements		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
ARTH 300 [WI]	History of Modern Design	3.0
VSST 108	Design I for Media	3.0
VSST 109	Design II for Media	3.0
VSST 110	Introductory Drawing	3.0
Media and Information Science Requirements		
DIGM 220	Digital Still Imaging I	3.0
FMVD 110	Basic Shooting and Lighting	3.0
FMVD 206	Audio Production and Post	3.0
IDM 211	User Interface Design I	3.0
IDM 212	User Interface Design II	3.0
IDM 231	Scripting for Interactive Digital Media I	3.0
IDM 232	Scripting for Interactive Digital Media II	3.0
Digital Media Core Requirements		
ANIM 140	Computer Graphics Imagery I	3.0
ANIM 152	Multimedia Timeline Design	3.0
DIGM 100	Digital Design Tools	3.0
DIGM 105	Overview of Digital Media	3.0
DIGM 223	Creative Concept Design	3.0
DIGM 250	Professional Practices	3.0
DIGM 350 [WI]	Digital Storytelling	3.0
DIGM 451 [WI]	Explorations in New Media	3.0
DIGM 475 [WI]	Seminar: The Future of Digital Media	3.0
DIGM 490	Digital Media Senior Project	9.0
DIGM 491	Digital Media Senior Project Studio	3.0
GMAP 260	Overview of Computer Gaming	3.0
IDM 221	Web Design I	3.0
Interactive Digital Media Requirements		
IDM 101	History of Web Development	3.0
IDM 215	User Experience Design	3.0
IDM 222	Web Design II	3.0
IDM 240	Interactive Graphics	3.0
IDM 245	Web Game Design	3.0
IDM 250	Content Management Systems	3.0
IDM 361	Interactive App Design I	3.0
IDM 371	Interactive Digital Media Workshop I	3.0
IDM 372	Interactive Digital Media Workshop II	3.0
Select two of the following:		6.0
IDM 362	Interactive App Design II	
IDM 380	Special Topics in Interactive Digital Media	
IDM 381	Experimental Interactive Technologies	
IDM 399	Independent Project in Interactive Digital Media	
Total Credits		186.0

Sample Plan of Study

Term	Credits
Term 1	
DIGM 100 Digital Design Tools	3.0
DIGM 105 Overview of Digital Media	3.0
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PHYS 121 Physical Science for Design I	4.0
UNIV A101 The Drexel Experience	1.0
VSST 110 Introductory Drawing	3.0
Term Credits	17.0
Term 2	
ANIM 140 Computer Graphics Imagery I	3.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FMVD 110 Basic Shooting and Lighting	3.0
PHYS 122 Physical Science for Design II	4.0
UNIV A101 The Drexel Experience	1.0
VSST 108 Design I for Media	3.0
Term Credits	17.0
Term 3	
ANIM 152 Multimedia Timeline Design	3.0
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
IDM 101 History of Web Development	3.0
MATH 101 Introduction to Analysis I	4.0
VSST 109 Design II for Media	3.0
Term Credits	17.0
Term 4	
DIGM 220 Digital Still Imaging I	3.0
DIGM 223 Creative Concept Design	3.0
GMAP 260 Overview of Computer Gaming	3.0
IDM 211 User Interface Design I	3.0
IDM 221 Web Design I	3.0
Term Credits	15.0
Term 5	
ARTH 102 History of Art II: Renaissance to Romanticism	3.0
IDM 212 User Interface Design II	3.0
IDM 222 Web Design II	3.0
IDM 231 Scripting for Interactive Digital Media I	3.0
Term Credits	12.0
Term 6	
ARTH 103 History of Art: Modern Art	3.0
FMVD 206 Audio Production and Post	3.0
IDM 215 User Experience Design	3.0
IDM 232 Scripting for Interactive Digital Media II	3.0
IDM 240 Interactive Graphics	3.0
Term Credits	15.0
Term 7	
COM 230 Techniques of Speaking	3.0
COOP 101 Career Management and Professional Development	0.0
DIGM 250 Professional Practices	3.0
IDM 245 Web Game Design	3.0
IDM 250 Content Management Systems	3.0
Free Elective	3.0
Term Credits	15.0
Term 8	
ARTH 300 [WI] History of Modern Design	3.0
DIGM 451 [WI] Explorations in New Media	3.0
IDM 361 Interactive App Design I	3.0
IDM 371 Interactive Digital Media Workshop I	3.0

Arts and Humanities elective	3.0
Term Credits	15.0
Term 9	
DIGM 350 [WI] Digital Storytelling	3.0
IDM 372 Interactive Digital Media Workshop II	3.0
Free elective	3.0
History (HIST) Elective	3.0
IDM Elective	3.0
Term Credits	15.0
Term 10	
DIGM 490 Digital Media Senior Project	3.0
DIGM 491 Digital Media Senior Project Studio	1.0
Free Elective	3.0
IDM Elective	3.0
Literature (ENGL) Elective	3.0
Social Science Elective	3.0
Term Credits	16.0
Term 11	
DIGM 490 Digital Media Senior Project	3.0
DIGM 491 Digital Media Senior Project Studio	1.0
Free Electives	9.0
Social Science Elective	3.0
Term Credits	16.0
Term 12	
DIGM 475 [WI] Seminar: The Future of Digital Media	3.0
DIGM 490 Digital Media Senior Project	3.0
DIGM 491 Digital Media Senior Project Studio	1.0
Free electives	6.0
Social Science Elective	3.0
Term Credits	16.0
Total Credit: 186.0	

Co-op/Career Opportunities

Students who study interactive digital media can move on to careers as web designers, graphic designers, digital media designers, user research & experience specialists, multimedia artists, interactive designers, web programmers, and web user interface designers.

Co-op Experiences

Some past co-op employers of film and video students include:

- Brownstein Group
- Comcast
- Digitas Health
- eCity Interactive
- Electronic Ink
- Happy Cog

Visit the Drexel Steinbright Career Development Center (<http://drexel.edu/scdc>) web page for more detailed information on co-op and post-graduate opportunities.

Dual Accelerated Degree

The accelerated degree program enables academically qualified students to earn both their bachelor's degree and a master's degree in digital media — graduating sooner than they would in traditional programs.

Current Drexel digital media students may apply for the accelerated BS/MS degree through the Graduate College after completing 90.0 credits,

but no more than 120.0 credits. Contact the Graduate College (<http://www.drexel.edu/graduatecollege>) for further information.

Minor in Interactive Digital Media

The Interactive Digital Media Minor requires the completion of eight courses (minimum 24 credits). The minor provides basic foundations in interactivity, including: design and development of websites and mobile applications with the opportunity for individualized tailoring according to the student's interests. It is open to all University students and is administered and advised by the Digital Media program.

Required Courses

DIGM 100	Digital Design Tools	3.0
IDM 221	Web Design I	3.0
Select six of the following:		18.0
IDM 100	Introduction to Web Development	
IDM 101	History of Web Development	
IDM 211	User Interface Design I	
IDM 212	User Interface Design II	
IDM 215	User Experience Design	
IDM 222	Web Design II	
IDM 231	Scripting for Interactive Digital Media I	
IDM 232	Scripting for Interactive Digital Media II	
IDM 240	Interactive Graphics	
IDM 245	Web Game Design	
IDM 250	Content Management Systems	
IDM 361	Interactive App Design I	
IDM 362	Interactive App Design II	
IDM 371	Interactive Digital Media Workshop I	
IDM 372	Interactive Digital Media Workshop II	
IDM 380	Special Topics in Interactive Digital Media	
IDM 381	Experimental Interactive Technologies	
INFO 110	Human-Computer Interaction I	
INFO 151	Web Systems and Services I	
INFO 152	Web Systems and Services II	
Total Credits		24.0

Facilities

Digital media program facilities include a motion capture and green screen studio, a screening room, DSLR digital still cameras, HD video cameras and lighting equipment, triple boot PowerMac stations (Mac / Windows / Unix) with dual monitors, wacom tablets, game consoles, mobile devices, and 2 undergraduate open labs with 24/7 access.

Additionally, the program houses the RePlay Lab (<http://replay.drexel.edu/facilities.html>) in the URBN Center which is a collaborative effort between the Digital Media program and the Computer Science department (in the College of Computing & Informatics). At Drexel University, game development does not "live" in solely one department, and so mirrors the true nature of game development in commercial settings.

Interactive Digital Media Faculty

Theo Artz, BFA (*Tyler School of Art, Temple University*). Associate Professor. Digital media.

Kurt Aspland, BFA (*Art Center College of Design*). Adjunct Instructor. Illustrator, graphic designer and creative director

John Berton Assistant Professor. Visual effects, lighting and rendering Computer-Generated Imagery (CGI)

Chester Cunan, BS (*Drexel University*). Adjunct Instructor.

Paul Diefenbach, PhD (*University of Pennsylvania*). Assistant Professor. Game development, real-time rendering.

Christopher Fernandez, BS (*Drexel University*). Adjunct Instructor. Designer and illustrator in the world of interactive design creating innovative, exciting digital campaigns and solutions

Jeremy Fernsler, BA (*Pennsylvania State University*) Program Director, *Game Design & Production*. Assistant Teaching Professor. Digital effects artist; compositor and animator for the feature film visual effects industry.

Troy Finamore, MS (*Drexel University*) Program Director, *Interactive Digital Media*. Assistant Teaching Professor. Advertising, design and interactivity.

Bernard Flakoff, BS (*Temple University*). Adjunct Instructor. Creative content and strategic analytics for innovative and advanced technology platforms

Kevin Gross, MS (*Drexel University*). Adjunct Instructor.

Nick Jushchyshyn, MFA (*Academy of Art University*) Program Director, *Animation and Visual Effects*. Assistant Teaching Professor. Visual effects, digital media and animation.

Jason Kirk, MS (*Drexel University*). Adjunct Instructor.

Frank J. Lee, PhD (*Carnegie Mellon University*). Associate Professor. Human-computer interaction; cognitive engineering and science; intelligent software agents for games and education.

Robert Lloyd, MFA (*Temple University*). Assistant Teaching Professor. Game development, themed entertainment and motion simulation.

David Mauriello, BA (*Lafayette College*). Assistant Professor. 3D modeling and animation.

Glen Muschio, PhD (*Temple University*). Associate Professor. Digital media, society, communication.

Kenneth Oum, MS (*Drexel University*). Professor. Computer interface gaming, web development, video production.

Mark Petrovich, MS (*Drexel University*). Adjunct Instructor.

Stefan Rank, PhD (*Vienna University of Technology*). Assistant Professor. Artificial intelligence, game design and human-computer interaction.

Ryan Reed, BS (*Drexel University*). Adjunct Instructor.

Patrick Richardson, MS (*Drexel University*). Professor. Applied physics, electronics, software scripting, and physical computing.

Philip Sinatra, BS (*Drexel University*). Professor. Website/application programming.

Jervis Thompson, BS (*Drexel University*). Associate Teaching Professor. Digital media, interactive multimedia.

Michael Wagner, PhD (*Vienna University of Technology*) Program Director, *Digital Media*. Associate Professor. Educational use of digital media and computer games.

Ed Yakovich, MS (*Philadelphia University*). Professor. HTML/CSS/JS architecture and best practices.

Kenneth Yanoviak, BA (*Temple University*). Adjunct Instructor. Digital photographer

Diane Zatz Adjunct Instructor.

Jichen Zhu, PhD (*Georgia Institute of Technology*). Assistant Professor. Developing humanistic and interpretive framework of computational technology, particularly artificial intelligence (AI), and constructing AI-based cultural artifacts; interactive storytelling, games and software studies.

Interior Design

Major: Interior Design

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 189.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 50.0408

Standard Occupational Classification (SOC) code: 27-1025

About the Program

The undergraduate interior design program explores the behavioral, technological, environmental and aesthetic aspects of interior design within the context of increasingly more complex design projects. Combined with art and art history and general education requirements, a core of interior design courses creates a unique education at the forefront of design. Through academics grounded in problem-solving design studios, cooperative employment, and a dedicated faculty, the Interior Design program prepares students for leadership positions in the industry. The Interior Design program is ranked in the Top10 by DesignIntelligence, America's Best Architecture & Design Programs.

The BS interior design program is CIDA (Council for Interior Design Accreditation) and NASAD (National Association of Schools of Art & Design) accredited.

Program Philosophy and Mission

The interior design program at the Antoinette Westphal College of Media Arts & Design is committed to developing the leaders of tomorrow. We believe that combining a studio-based, sequential interior design curriculum, with broad liberal arts study and the experiential learning of a well-established co-op program develops skillful designers, creative thinkers and potential leaders. We offer each student the opportunity for intellectual and personal growth through a hands-on approach to teaching, advising and collaborating. Developing skilled designers, creative thinkers, responsible citizens and professional leaders through academic, experiential and professional learning is the mission of the interior design program. We seek to cultivate students who acknowledge their responsibilities to the safety and well-being of the public and the stewardship of the environment and who can lead in a multifaceted profession and ever-changing world.

For more information about this major, visit the College's Interior Design (<http://www.drexel.edu/westphal/academics/undergraduate/INTR>) page.

Degree Requirements

General education requirements

CIVC 101	Introduction to Civic Engagement	1.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0

ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
PHYS 182	Applied Physics I	3.0
SOC 101	Introduction to Sociology	3.0
UNIV A101	The Drexel Experience	2.0
Arts and humanities electives		9.0
Natural science elective		4.0
Social science electives		6.0
Free electives		24.0
Visual studies requirements		
ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
VSST 101	Design I	4.0
VSST 102	Design II	4.0
VSST 103	Design III	4.0
VSST 110	Introductory Drawing	3.0
VSST 201	Multimedia: Performance	4.0
or VSST 202	Multimedia: Space	
VSST 203	Multimedia: Materials	4.0
VSST 301	Painting I	4.0
VSST 311	Sculpture I	4.0
Interior design requirements		
INTR 160	Visualization I: Computer Imaging	3.0
INTR 200	History of Modern Architecture and Interiors	3.0
INTR 211	Textiles for Interiors	3.0
INTR 220	Visualization II: Orthographic	3.0
INTR 225	Environmental Design Theory	3.0
INTR 231	Structure	4.0
INTR 232	Interior Studio I	4.0
INTR 233	Interior Studio II	4.0
INTR 241	Visualization III: Digital	3.0
INTR 245	Visualization IV: 3D Modeling	3.0
INTR 250	Interior Materials	3.0
INTR 300 [WI]	Visual Culture: Interiors	3.0
INTR 305 [WI]	Visual Culture: Furniture	3.0
INTR 331	Residential Design Studio	4.0
INTR 341	Visualization V: Methods	3.0
INTR 350	Interior Detailing	3.0
INTR 351	Interior Lighting	3.0
INTR 430	Commercial Design Studio	4.0
INTR 442	Hospitality Design Studio	4.0
INTR 445	Contract Documentation for Interior Design	3.0
INTR 450 [WI]	Professional Practice	3.0
INTR 451	Interior Systems	3.0
INTR 491	Senior Project I	3.0
INTR 492	Senior Project II	3.0
INTR 493	Senior Project III	3.0
Interior Design elective		3.0
Total Credits		189.0

Sample Plans of Study

Interior Design: Cycle A

(See Below for Study Abroad plan of study)

Term 1		Credits
ARTH 101	History of Art I: Ancient to Medieval	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0

UNIV A101	The Drexel Experience	1.0
VSST 101	Design I	4.0
Term Credits		15.0
Term 2		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
UNIV A101	The Drexel Experience	1.0
VSST 102	Design II	4.0
VSST 110	Introductory Drawing	3.0
Term Credits		14.0
Term 3		
ARTH 103	History of Art: Modern Art	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
INTR 160	Visualization I: Computer Imaging	3.0
INTR 200	History of Modern Architecture and Interiors	3.0
VSST 103	Design III	4.0
Term Credits		17.0
Term 4		
INTR 220	Visualization II: Orthographic	3.0
INTR 225	Environmental Design Theory	3.0
INTR 231	Structure	4.0
INTR 250	Interior Materials	3.0
PHYS 182	Applied Physics I	3.0
Term Credits		16.0
Term 5		
COOP 101	Career Management and Professional Development	0.0
INTR 232	Interior Studio I	4.0
INTR 241	Visualization III: Digital	3.0
INTR 300 [WI]	Visual Culture: Interiors	3.0
SOC 101	Introduction to Sociology	3.0
Interior Design elective		3.0
Term Credits		16.0
Term 6		
INTR 211	Textiles for Interiors	3.0
INTR 233	Interior Studio II	4.0
INTR 245	Visualization IV: 3D Modeling	3.0
Natural science elective		4.0
Free elective		3.0
Term Credits		17.0
Term 7		
INTR 305 [WI]	Visual Culture: Furniture	3.0
INTR 331	Residential Design Studio	4.0
INTR 341	Visualization V: Methods	3.0
INTR 350	Interior Detailing	3.0
VSST 202 or 201	Multimedia: Space Multimedia: Performance	4.0
Term Credits		17.0
Term 8		
INTR 351	Interior Lighting	3.0
INTR 430	Commercial Design Studio	4.0
INTR 451	Interior Systems	3.0
Arts and humanities elective		3.0
Social science elective		3.0
Term Credits		16.0
Term 9		
VSST 203	Multimedia: Materials	4.0
Arts and humanities elective		3.0
Social science elective		3.0
Free electives		6.0
Term Credits		16.0

Term 10		
INTR 442	Hospitality Design Studio	4.0
INTR 450 [WI]	Professional Practice	3.0
INTR 491	Senior Project I	3.0
VSST 301	Painting I	4.0
Free elective		3.0
Term Credits		17.0
Term 11		
INTR 445	Contract Documentation for Interior Design	3.0
INTR 492	Senior Project II	3.0
Arts and humanities elective		3.0
Free electives		6.0
Term Credits		15.0
Term 12		
INTR 493	Senior Project III	3.0
VSST 311	Sculpture I	4.0
Free electives		6.0
Term Credits		13.0
Total Credit: 189.0		

Interior Design: Cycle A with Study Abroad

		Credits
Term 1		
ARTH 101	History of Art I: Ancient to Medieval	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 101	Introduction to Analysis I	4.0
UNIV A101	The Drexel Experience	1.0
VSST 101	Design I	4.0
Term Credits		15.0
Term 2		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
UNIV A101	The Drexel Experience	1.0
VSST 102	Design II	4.0
VSST 110	Introductory Drawing	3.0
Term Credits		14.0
Term 3		
ARTH 103	History of Art: Modern Art	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
INTR 160	Visualization I: Computer Imaging	3.0
INTR 200	History of Modern Architecture and Interiors	3.0
VSST 103	Design III	4.0
Term Credits		17.0
Term 4		
INTR 220	Visualization II: Orthographic	3.0
INTR 225	Environmental Design Theory	3.0
INTR 231	Structure	4.0
INTR 250	Interior Materials	3.0
PHYS 182	Applied Physics I	3.0
Term Credits		16.0
Term 5		
COOP 101	Career Management and Professional Development	0.0
INTR 232	Interior Studio I	4.0
INTR 241	Visualization III: Digital	3.0
INTR 300 [WI]	Visual Culture: Interiors	3.0
SOC 101	Introduction to Sociology	3.0
Interior Design elective		3.0
Term Credits		16.0
Term 6		
INTR 211	Textiles for Interiors	3.0

INTR 233	Interior Studio II	4.0
INTR 245	Visualization IV: 3D Modeling	3.0
Arts and humanities elective		3.0
Natural science elective		4.0
Term Credits		17.0
Term 7		
INTR 305 [WI]	Visual Culture: Furniture	3.0
INTR 331	Residential Design Studio	4.0
INTR 341	Visualization V: Methods	3.0
INTR 350	Interior Detailing	3.0
VSST 203	Multimedia: Materials	4.0
Term Credits		17.0
Term 8		
INTR 351	Interior Lighting	3.0
INTR 430	Commercial Design Studio	4.0
INTR 451	Interior Systems	3.0
VSST 202 or 201	Multimedia: Space Multimedia: Performance	4.0
Social science elective		3.0
Term Credits		17.0
Term 9		
Free electives (Study Abroad)		18.0
Term Credits		18.0
Term 10		
INTR 442	Hospitality Design Studio	4.0
INTR 450 [WI]	Professional Practice	3.0
INTR 491	Senior Project I	3.0
VSST 301	Painting I	4.0
Term Credits		14.0
Term 11		
INTR 445	Contract Documentation for Interior Design	3.0
INTR 492	Senior Project II	3.0
Arts and humanities elective		3.0
Free elective		3.0
Social science elective		3.0
Term Credits		15.0
Term 12		
INTR 493	Senior Project III	3.0
VSST 311	Sculpture I	4.0
Arts and humanities elective		3.0
Free elective		3.0
Term Credits		13.0
Total Credit: 189.0		

Co-op/Career Opportunities

Interior design is a multi-faceted field and includes careers with interior design firms, architectural firms, and facilities management organizations; in governmental agencies; and in the furniture and textile industries. Full-time paid employment in the profession is an integral component of the program at Drexel. The six-month co-operative education, undertaken in the junior year, provides project-based experience as well as the daily operation of a design firm. Students may opt to do their co-op in Philadelphia or in another location of their choosing. Through a required course and career advisement services offered by the Steinbright Career Development Center, students develop the ability to market themselves and obtain jobs in leading firms, worldwide.

Co-op Experiences

Some past co-op employers of interior design students include:

- Ballinger

- Children's Hospital of Philadelphia Facilities
- Daroff Design
- DAS
- Disney
- Eberlein Design Consultants
- Ewing Cole
- Floss Barber Inc.
- Gensler
- Hillier Lewis
- Herman Miller
- HOK
- Jacobs Associates
- Knoll International
- L2 Partridge
- Marguerite Rogers
- Nelson
- Perkins Eastman
- RJMJ
- Stantec
- University of Pennsylvania
- West Chester University

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

About the Accelerated Degree Program

Qualified students in Interior Design have the option of continuing into the graduate Interior Architecture + Design program to obtain a dual BS/MS degree. This program allows highly motivated students to graduate with both degrees in a total of five years. Students apply for this accelerated program when they complete 90.0 credits of coursework, and before completing 120.0 credits.

Additional requirements for acceptance into the Dual Degree Program:

1. Overall GPA of undergraduate coursework – 3.2 minimum
2. Overall GPA of interior design studio coursework – 3.5 minimum
3. Portfolio Review: interior studio work and foundation visual work
4. Essay: reason for application, professional goals and leadership qualities you possess
5. Two letters of recommendation speaking to your work ethic and leadership skills

Evaluation Process

A committee of interiors faculty reviews the applications and discusses the merits of the student to undergo the intensity and rigor of the final two years of the program. The Committee consists of no less than three members – Director of the Interiors programs, Associate Director BS Interior Design program and the Associate Director MS Interior Architecture & Design program.

Students should visit the Westphal College of Media Arts and Design (<http://www.drexel.edu/westphal>) for more information.

Facilities

The interior design program is housed in the URBN Center, a state of the art design and arts facility on Drexel's campus. The URBN Center officially opened in September 2012. A hub for creative minds to gather, share ideas and work together to bring those ideas from the mind to the page, and into the world of tomorrow, interiors students benefit from a wide-range of resources including interior design studios, the interior design resource library, a hybrid making lab, wood shop and computer laboratories. The Hybrid Making Lab (http://drexel.edu/westphal/about/overview/making_spaces/HybridMakingLab) is open to all Westphal students and has state-of-the-art fabricating equipment including 3-d printers, laser cutters and CNC Router. The Westphal Print Center (http://drexel.edu/westphal/about/overview/making_spaces/WestphalPrintCenter) is a full-service, low-cost facility and is accessible to students from on and off campus.

The URBN Annex houses a black box theater, screening room and the Leonard Pearlstein Gallery (<http://www.drexel.edu/pearlsteingallery>). Additional studio and classroom space in the Peck Problem Solving and Research Center and the Design Arts Annex accommodate photography, basic design, painting, sculpture and a full woodworking shop with industrial-quality equipment.

Philadelphia, one of the nation's major design centers, gives interior design students the vitality of the contemporary arts at local galleries; easy access to many museums, libraries, renowned buildings, as well as design centers located in Philadelphia, New York City and Washington, D.C.

Architecture & Interiors Faculty

David Ade, AIA, LEED A.P., NCARB, BArch (*Drexel University*). Adjunct Associate Professor. Principal, SMP Architects, sustainable design

Ulrike Altenmuller-Lewis, AIA, Dr.-Ing. (*Bauhaus Universitat Weimar*). Associate Professor. Research on educational environments; translations of architectural theory texts.

Jason Austin, LEED A.P., MLA Landscape Architecture (*University of Pennsylvania*). Assistant Teaching Professor. Principal, Austin + Mergold; architecture, research, landscape architecture, urban design.

Stephen Bonitatibus, AIA, MArch (*University of Pennsylvania*). Adjunct Professor. Principal, Bonitatibus Associates; traditional residential architecture.

Anthony Bracali, AIA, LEED A.P., BArch (*Drexel University*). Adjunct Associate Professor. President, Friday Architects; civic, non-profit and community-based architecture.

Mark Brack, PhD (*University of California at Berkeley*). Associate Professor. British and American architecture from 1700 to the present; Hispanic colonial architecture in the American Southwest; vernacular architecture; historic preservation.

Daniel Chung, RA, PE, MArch, MSE (*Yale University, Princeton University*). Assistant Professor. Building performance and exterior envelope systems.

Jon Coddington, AIA, MArch (*University of Pennsylvania*). Professor. Architecture, urban design and planning.

Rena Cumby, BArch, MS (*Drexel University*) *Department Head, Department of Architecture & Interiors*. Associate Professor. Interior designer; foundation studies and design education.

John DeFazio, AIA, BArch (*New York Institute of Technology*). Adjunct Professor. Architecture in film.

Katherine Dowdell, AIA, BS Interior Design (*Drexel University*). Adjunct Assistant Professor. Principal, Farragut Street Architects; historic preservation

Eugenia Ellis, RA, PhD (*Virginia Polytechnic State University*). Associate Professor. Extended-care facilities design, research on spatial visualization, perception and imagination.

Dyer Alfred "Lyndsay" Falck, RA, ARCUK, ARIBA, NCARB, M.URP (*University of Capetown, South Africa*). Adjunct Professor. Building technology

Jeff Fama, MArch (*State University of New York at Buffalo*). Adjunct Associate Professor. Retail, entertainment, and theater design.

Susan Feenan, BArch (*Temple University*). Adjunct Assistant Teaching Professor. Institutional and commercial architecture.

Gary Garofalo, BS Arch Eng (*Pennsylvania State University*). Adjunct Assistant Professor. Principal Lighting Design Collaborative; lighting expert, lighting design.

Alan Greenberger, FAIA, BArch (*Rensselaer Polytechnic Institute*) *Distinguished Visiting Lindy Institute for Urban Innovation Fellow*. Distinguished Teaching Professor. Urban planning and policy.

Don Jones, FAIA, LEED DD+C, MArch (*University of Pennsylvania*). Adjunct Professor. Principal, Director of Sustainable Design, Ewing Cole; sports venues.

Tim Kearney, AIA, MArch (*University of Pennsylvania*). Adjunct Professor. Principal, CuetoKEARNEY design; sustainable design

Nicole Koltick, MArch (*University of California*) *Director, Design Futures Lab*. Assistant Professor. Researching possibilities for architecture and design through the use of unexpected and innovative interdisciplinary models. Foundation design studios, fabrication and technology seminars.

Jeffrey Krieger, AIA, LEED AP, MArch (*Carnegie Mellon University*). Adjunct Associate Professor. President, Krieger and Associates Architects; residential design.

Karin Kuenstler, MS (*Bank Street College of Education and Parsons*) *Associate Dean for Research and Graduate Studies*. Associate Professor. Interior design for corporate and commercial facilities.

Maria Kuttruff, MS (*Drexel University*). Adjunct Assistant Professor. Owner/Principal, Viola Interior Design, LLC. Residential interior design.

Robert Nalls, AIA, NCARB, MArch (*University of Pennsylvania*). Adjunct Professor. Principal, Nalls Architecture Inc.; institutional and educational buildings.

Diana S. Nicholas, RA, AIA, NCARB, MFA (*University of the Arts, Philadelphia*) *Associate Director of MS Interior Architecture and Design, Director, Sustainability in the Built Environment minor*. Assistant Professor. Coordinator, Sustainability in the Built Environment

Jacklynn Niemiec, LEED BD+C, MArch (*University of Pennsylvania*). Assistant Teaching Professor. Graphic representation

Karen Pelzer, NCIDQ, BS Interior Design (*Drexel University*). Assistant Teaching Professor. President, Karen Pelzer Interiors; hospitality design.

Marilynne L. Rose, NCIDQ, MS (*Drexel University*). Associate Teaching Professor. Residential and commercial design.

James Rowe, AIA, MArch (*University of Pennsylvania*). Adjunct Associate Professor. Principal, Studio Agoos Lovera; institutional, recreation, corporate, civic and residential design.

Debra Ruben, MS, IDEC, LEED AP, NCIDQ (*Drexel University*) *Director of Interiors Programs*. Associate Professor. Research on user participation and the design process.

Paul Salvaggio, AIA, LEED AP, NCARB, BArch, BS Arch (*Pennsylvania State University*). Adjunct Assistant Professor. Principal, Arcus Design Group; residential architecture.

Rachel Schade, AIA, MArch (*University of Pennsylvania*) *Program, Architecture, Associate Director for Student Placement*. Associate Teaching Professor. Principal, Rachel Simmons Schade Architect. Work-study placement; residential, graphic representation.

Harris Steinberg, FAIA, MArch (*University of Pennsylvania*) *Executive Director, Lindy Institute for Urban Innovation*. Distinguished Teaching Professor. Urban design and civic engagement.

Simon Tickell, AIA, MArch (*University of Pennsylvania*). Associate Teaching Professor. Principal, Simon J Tickell Architect; educational and museum buildings, residential design

Nancy Trainer, FAIA, AICP, LEED, AFAAR, MArch (*University of Pennsylvania*) *Associate Vice President of Design & Planning at Drexel*. Adjunct Teaching Professor. Planning, institutional design.

Ada Tremonte, NCIDQ, BS (*Drexel University*) *Associate Director, BS Interior Design*. Associate Teaching Professor. President, ada Design Associates; corporate/commercial design.

Emeritus Faculty

Judith Bing, MArch (*Yale University*). Professor Emeritus. Research on traditional architecture of the Balkins and Anatolia

Sylvia Clark, MArch (*University of Pennsylvania*). Professor Emeritus.

Paul M. Hirshorn, FAIA, MArch, MCP, (*University of Pennsylvania*). Professor Emeritus.

Marjorie Kriebel, BArch (*University of Pennsylvania*). Professor Emeritus.

Music Industry

Major: Music Industry

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 187.0 - 188.0

Co-op Options: Two Co-ops (Four years)

Classification of Instructional Programs (CIP) code: 50.1003

Standard Occupational Classification (SOC) code: 27-2041

About the Program

The degree in music industry offers the highly motivated student a program of study that combines education in music, music industry practices, and music technology with career preparation. Two concentrations are offered—Music Industry Business and Recording Arts (MIBU) and Music Production (RAMP)—providing hands-on experience and a strong academic foundation in relevant areas of this rapidly changing industry. The music industry curriculum is divided into four areas which are combined with cooperative experience: general education, music core, music industry core, and concentration requirements.

In an industry where the process of career building often begins with a few key contacts, the cooperative education program provides Drexel students the opportunity to meet industry professionals and network. The program prepares students for careers in the music industry in such diverse positions as recording engineer, music producer, sound designer, music lawyer, business manager or music publisher. The co-op experience during the sophomore and junior year summer terms involves full-time career-related employment, during which students gain valuable insight into how the entertainment industry works.

About the Concentrations

The major offers two concentrations: Music Industry Business and Recording Arts (MIBU) and Music Production (RAMP):

- The **Music Industry Business (MIBU)** concentration provides a rigorous academic foundation complemented by a real-world hands-on, highly-intensive business experience. This mission is realized through the students' participation in the MAD Dragon Music Group, a group of student-run enterprises including: MAD Dragon Records, DraKO Booking Agency, MAD Dragon Publishing, MADKo Concert Promotions and a BANTIC media.
- The **Recording Arts and Music Production (RAMP)** concentration focuses on the techniques and technologies of music and audio production. As well as providing the technology-oriented student with the necessary skills to perform as an audio engineer or record producer, the concentration teaches students a full range of industry functions including post-production audio, live sound engineering, and music and audio freelancing skills. The concentration encourages the technology student to interact with the students in the business concentration by recording, mixing and mastering the music for MAD Dragon Music Group projects, and engaging in live performance production.

All Music Industry students qualify to apply for a minor in business administration after completing their music industry core requirements. This emphasis on business courses as part of the core requirements is one of the foundations of the program.

Special Admissions Considerations

Students wishing to be admitted to the music industry major must meet or exceed the general requirements for admission to the University and the College of Media Arts and Design.

The program no longer accepts hard-copy portfolios. However, when applying to the Music Industry program, applicants are encouraged to use the portfolio portal provided on the Admissions Instructions webpage to upload electronic examples of pertinent activities (music and/or business

and entrepreneurial), as well as a resume of music industry related experience.

In their major-specific essays, applicants should address their reasons for selecting the music industry major at Drexel and share their passion for this unique area of study.

For more information about this major, visit the College's Music Industry (<http://www.drexel.edu/westphal/academics/undergraduate/MIP>) page.

Degree Requirements

All students take the same general education, music industry core and business courses. Students choose their concentration at the time of admission; however it is possible to switch as late as the beginning of junior year.

Concentrations:

- Music Industry: Business (MIBU) Concentration
- Music Industry: Recording Arts & Music Production (RAMP) Concentration

Students are also able to take courses in any other concentration as long as they fulfill the prerequisite requirement(s) and there is room in the class to accommodate the student.

Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
COM 230	Techniques of Speaking	3.0
MATH 101	Introduction to Analysis I	4.0
or MATH 121	Calculus I	
MATH 102	Introduction to Analysis II	4.0
or MATH 122	Calculus II	
CIVC 101	Introduction to Civic Engagement	1.0
UNIV A101	The Drexel Experience	1.0
Required Arts and Humanities-students elect a minimum of 9 credits		9.0
Required Natural Science-students elect a minimum of 3 credits *		3.0
Required Social Science-students elect a minimum of 9 credits		9.0
Music core requirements		15.0
Music Industry core requirements		63.0
Concentration requirements		33.0-34.0
Concentration electives		9.0
Free electives **		24.0
Total Credits		187.0-188.0

* PHYS 107 - Acoustics is recommended.

** MKTG 301, PHIL 301, PSY 101 and/or PSY 150 are recommended.

Music Core Requirements

MUSC 121	Music Theory I	3.0
or MUSC 122	Music Theory II	
MUSC 125	Ear Training I	1.0
MUSC 130	Introduction to Music	3.0
MUSC 190	Class Piano I	2.0
or MUSC 191	Class Guitar I	
MUSC 323	Songwriting	3.0
Music Elective (Select one)		3.0
MUSC 231	Music History I	
MUSC 232	Music History II	
MUSC 234	The Beatles	

MUSC 236	Rock Music Through the Mid-60s	
MUSC 238	Rock Music Since the Mid-60s	
MUSC 331	World Musics	
MUSC 333	Afro-American Music USA	
MUSC 336	History of Jazz	
MUSC 338 [WI]	American Popular Music	
MUSC T380	Special Topics in Music	
Total Credits		15.0

Music Industry Core Requirements

ACCT 110	Accounting for Professionals	4.0
BLAW 201	Business Law I	4.0
ECON 201	Principles of Microeconomics	4.0
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
MIP 132	Survey of the Recording Industry	3.0
MIP 133	Digital Audio Workstations I	3.0
MIP 161	Copyrights in the Music Industry	3.0
MIP 179	Introduction to Sound Recording	2.0
MIP 227	Listening Techniques	1.0
MIP 270	Live Music Industry	3.0
MIP 293	Survey of Music Production	3.0
MIP 361	Music Publishing	3.0
MIP 374	Entrepreneurship in the Music Industry	3.0
MIP 375 [WI]	Marketing and Promo in Music Industry	3.0
MIP 491	Senior Project in Music Industry *	9.0
STAT 201	Introduction to Business Statistics	4.0
WEST 100	Introduction to Digital Design Tools	3.0
Total Credits		63.0

* Repeated over three terms.

Music Industry: Business Concentration Requirements

MIP 276	Sound Recording for Business Concentration *	3.0
MIP 336	Contracts and Legal Issues in the Music Industry	3.0
MIP 376	MAD Dragon Music Group (Taken three terms)	9.0
MIP 394	Big Data In The Music Industry	3.0
MIP 395	Digital Revenue & Creative Destruction	3.0
MIP 396	International Recording Business	3.0
MIP 426	Global Trends in the Music Industry	3.0
MIP 467	Artist Representation	3.0
MIP 468	Music Industry E-Commerce	3.0
Select Three of the following Business Concentration Electives		9.0

MIP 170	Radio Management	
MIP 263	Media Promotion	
MIP 318	Music Merchandising	
MIP 331	Music Venues and Concerts	
MIP 341	Touring and Booking	
MIP 365	Cities of Music and Culture	
MIP 366	Music Supervision	
Total Credits		42.0

* MUSI Business Concentration Students who would like to continue taking more advanced recording studio and music production courses should take MIP 279 Sound Recording I instead of MIP 276 Sound Recording for Business Concentration.

Music Industry: Recording Arts & Music Production (RAMP) Concentration Requirements

MIP 233	Digital Audio Workstations II	3.0
MIP 279	Sound Recording I	3.0
MIP 333	Digital Audio Workstations III	3.0

MIP 338	Audio Seminar	2.0
MIP 379	Sound Recording II	3.0
MIP 381	Audio for Video	3.0
MIP 388	Music and Audio Freelancing	2.0
MIP 389	Sound Reinforcement	3.0
MIP 477	Music Production	3.0
MIP 481	Mixing and Mastering	3.0
MUSC 122	Music Theory II	3.0
MUSC 229	Modern Arranging Techniques	3.0
Select Three of the following RAMP Concentration electives:		9.0
MIP 358	Electronic Music Production	
MIP 382	Scoring to Picture	
MIP 384	Synthesis and Sampling	
MIP 386	Commercial Music Production	
MIP 387	Studio Maintenance	
MIP 390	Video Game Music and Audio	
MIP 391	Analog Recording	
MIP 392	Music Production Master Class	
MIP 433	Digital Audio Workstations IV	
Total Credits		43.0

About the Accelerated Degree Program

The BS in Music Industry/MBA program offers students a program that combines an undergraduate degree in music business and technology with an MBA degree awarded by the Drexel LeBow College of Business. The program is designed to allow students to complete both the bachelor's degree and the Master of Business Administration degree in five years.

The program is offered to qualified students who apply for this option prior to the end of freshmen year or prior to the completion of 90 credits. All students who apply for this option must take the GMAT entrance exam.

Students selected for this program will generally have a minimum of 1350 on the SAT, a GPA of 3.5 or better, and rank in the top 10% of their high school graduating class. A strong candidate for this program will have taken significant AP coursework while in high school.

BS/MBA students may be waived from two MBA Enterprise Management courses, assuming a grade of B or better is earned in specified undergraduate courses. Students can review the Waiver Policies for the Statement of Curriculum Standing on the LeBow College's website for additional information.

The above conditions hold only for fully accepted BS/MBA students as identified by Enrollment Management.

Additional requirements for the dual degree program:

- A minimum of 3.2 cumulative GPA must be maintained throughout the entire undergraduate portion of this program or the student will not be able continue on to the MBA.
- Students must take the GMAT examination and achieve a minimum score of 570 prior to the end of the tenth term in order to continue in the program. It is recommended that students take the GMAT examination late in the student's third year.
- Students must submit an acceptable plan of study at least three terms before anticipated start of graduate part of the program.

Sample Plans of Study

Music Industry: Recording Arts & Music Production Concentration

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MIP 132	Survey of the Recording Industry	3.0
MIP 179	Introduction to Sound Recording	2.0
MIP 227	Listening Techniques	1.0
MUSC 121	Music Theory I	3.0
MUSC 190 or 191	Class Piano I Class Guitar I	2.0
UNIV A101	The Drexel Experience	1.0
Term Credits		15.0
Term 2		Credits
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MIP 133	Digital Audio Workstations I	3.0
MIP 161	Copyrights in the Music Industry	3.0
MUSC 130	Introduction to Music	3.0
WEST 100	Introduction to Digital Design Tools	3.0
Term Credits		16.0
Term 3		Credits
ACCT 110	Accounting for Professionals	4.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MIP 233	Digital Audio Workstations II	3.0
MIP 270	Live Music Industry	3.0
MUSC 122	Music Theory II	3.0
MUSC 125	Ear Training I	1.0
Term Credits		17.0
Term 4		Credits
COOP 101	Career Management and Professional Development	0.0
MATH 101 or 121	Introduction to Analysis I Calculus I	4.0
MIP 333	Digital Audio Workstations III	3.0
MIP 361	Music Publishing	3.0
MIP 375 [WI]	Marketing and Promo in Music Industry	3.0
Free elective		3.0
Term Credits		16.0
Term 5		Credits
ECON 201	Principles of Microeconomics	4.0
MATH 102 or 122	Introduction to Analysis II Calculus II	4.0
MIP 279 or 293	Sound Recording I Survey of Music Production	3.0
Free electives		6.0
Term Credits		17.0
Term 6		Credits
BLAW 201	Business Law I	4.0
MIP 279 or PHYS 107	Sound Recording I Acoustics	3.0
MUSC 229	Modern Arranging Techniques	3.0
MUSC 323	Songwriting	3.0
STAT 201	Introduction to Business Statistics	4.0
Term Credits		17.0
Term 7		Credits
ECON 202	Principles of Macroeconomics	4.0
FIN 301	Introduction to Finance	4.0
MIP 379	Sound Recording II	3.0
MIP 381	Audio for Video	3.0

Arts & Humanities elective	3.0
Term Credits	17.0
Term 8	
MIP 338 Audio Seminar	2.0
MIP 374 Entrepreneurship in the Music Industry	3.0
MIP 389 Sound Reinforcement	3.0
MIP RAMP Concentration elective	3.0
Social Science elective	3.0
Term Credits	14.0
Term 9	
COM 230 Techniques of Speaking	3.0
MIP 388 Music and Audio Freelancing	2.0
MIP 481 Mixing and Mastering	3.0
Social Science elective Or	3.0
PHYS 107 Acoustics	
Free elective	3.0
Term Credits	14.0
Term 10	
MIP 491 Senior Project in Music Industry	3.0
MIP RA&MP Concentration elective	3.0
Arts and Humanities elective	3.0
MUSC elective	3.0
Free elective	3.0
Term Credits	15.0
Term 11	
MIP 477 Music Production	3.0
MIP 491 Senior Project in Music Industry	3.0
Social Science elective	3.0
Free electives	6.0
Term Credits	15.0
Term 12	
MIP 491 Senior Project in Music Industry	3.0
MIP RA&MP Concentration elective	3.0
Arts and Humanities elective	3.0
Free elective	6.0
Term Credits	15.0
Total Credit: 188.0	

Music Industry: Business Concentration

	Credits
Term 1	
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MIP 132 Survey of the Recording Industry	3.0
MIP 179 Introduction to Sound Recording	2.0
MIP 227 Listening Techniques	1.0
MUSC 121 Music Theory I	3.0
MUSC 190 Class Piano I	2.0
or 191 Class Guitar I	
UNIV A101 The Drexel Experience	1.0
Term Credits	15.0
Term 2	
CIVC 101 Introduction to Civic Engagement	1.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
MIP 133 Digital Audio Workstations I	3.0
MIP 161 Copyrights in the Music Industry	3.0
MUSC 130 Introduction to Music	3.0
WEST 100 Introduction to Digital Design Tools	3.0
Term Credits	16.0
Term 3	
ACCT 110 Accounting for Professionals	4.0
COM 230 Techniques of Speaking	3.0

ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
MIP 270 Live Music Industry	3.0
MIP 276** Sound Recording for Business Concentration	3.0
MUSC 125 Ear Training I	1.0
Term Credits	17.0
Term 4	
COOP 101 Career Management and Professional Development	0.0
MATH 101 Introduction to Analysis I	4.0
MIP 361 Music Publishing	3.0
MIP 375 [WI] Marketing and Promo in Music Industry	3.0
Natural science elective	3.0
Free elective	3.0
Term Credits	16.0
Term 5	
BLAW 201 Business Law I	4.0
ECON 201 Principles of Microeconomics	4.0
MATH 102 Introduction to Analysis II	4.0
MIP 239 Survey of Music Production	3.0
Social Science elective	3.0
Term Credits	18.0
Term 6	
MIP 336 Contracts and Legal Issues in the Music Industry	3.0
MIP 467 Artist Representation	3.0
MUSC 323 Songwriting	3.0
STAT 201 Introduction to Business Statistics	4.0
Social Science elective	3.0
Term Credits	16.0
Term 7	
ECON 202 Principles of Macroeconomics	4.0
FIN 301 Introduction to Finance	4.0
MIP 376 MAD Dragon Music Group	3.0
MIP 395 Digital Revenue & Creative Destruction	3.0
MIP Business Concentration elective	3.0
Term Credits	17.0
Term 8	
MIP 374 Entrepreneurship in the Music Industry	3.0
MIP 376 MAD Dragon Music Group	3.0
MIP 394 Big Data In The Music Industry	3.0
Free electives	6.0
Term Credits	15.0
Term 9	
MIP 376 MAD Dragon Music Group	3.0
MIP 426 Global Trends in the Music Industry	3.0
MIP 468 Music Industry E-Commerce	3.0
Arts & Humanities elective	3.0
Free elective	3.0
Term Credits	15.0
Term 10	
MIP 396 International Recording Business	3.0
MIP 491 Senior Project in Music Industry	3.0
Arts and Humanities elective	3.0
MUSC elective	3.0
Free elective	3.0
Term Credits	15.0
Term 11	
MIP 491 Senior Project in Music Industry	3.0
MIP Business Concentration elective	3.0
Social science elective	3.0
Free electives	6.0
Term Credits	15.0
Term 12	

MIP 491	Senior Project in Music Industry	3.0
MIP Business Concentration elective		3.0
Arts and Humanities elective		3.0
Free electives		3.0
Term Credits		12.0
Total Credit: 187.0		

* See degree requirements (p. 523).

** MUSI Business Concentration Students who would like to continue taking more advanced recording studio and music production courses should take MIP 279 Sound Recording I instead of MIP 276 Sound Recording for Business Concentration. Take MIP 279 in Terms 4 or 5 by swapping an elective in Term 3.

Music Industry Faculty

James L. Klein, BA (*Oberlin College*). Associate Professor. Music technologist, sound and recording engineer, songwriter for film, TV and radio music.

Marc Offenback, BA (*CUNY*). Assistant Teaching Professor. Recognized leader and innovator in label management, digital and traditional marketing and artist development.

Ryan Schwabe, BA (*Drexel University*). Assistant Teaching Professor. Musician, producer, sound engineer, programmer and upright bass player. Owner of RareMP3s LLC and guest lecturer at Curtis Institute of Music.

John Seay, BMus (*James Madison University*). Associate Professor. Sound and recording engineer, music technologist, music producer and studio technician.

Cyrille Taillandier Associate Teaching Professor. Recording engineer, music producer and digital editor.

Darren Walters, BA (*University of Delaware*). Associate Teaching Professor. General Manager of Mad Dragon Records and co-owner and President of Jade Tree, an independent record label.

Robert Weitzner, MBA (*Harvard Business School*). Assistant Professor. Has over 20 years of industry experience at the nexus of music, digital media, and technology. Founding Director of the American Association of Independent Music (A2IM) and currently the Head of North America for Consolidated Independent (CI) a London based digital supply chain and asset management solutions provider for the global independent music industry.

Photography

Major: *Photography*

Degree Awarded: *Bachelor of Science (BS)*

Calendar Type: *Quarter*

Total Credit Hours: *180.0*

Co-op Options: *One Co-op (Four years)*

Classification of Instructional Programs (CIP) code: *50.0605*

Standard Occupational Classification (SOC) code: *27-4021*

About the Program

The Drexel University Photography program teaches students how to develop a unique photographic vision using a combination of aesthetics and technology. Using both applied and theoretical teaching methods and blending traditional processes with current digital technologies, the

photography curriculum provides aspiring photographers with the breadth of experience and knowledge required to succeed in today's marketplace.

The photography foundation courses are the same for each student until their third year, at which point they design a custom path of study that culminates in their senior thesis portfolio. Our alumni's achievements reflect the diversity built into our program. They own successful photography studios, teach in high school and college programs, serve as curators, work as magazine photo editors and operate their own digital illustration firms.

The College's extensive photographic facilities (<http://www.drexel.edu/westphal/undergraduate/PHTO/Facilities>) are available to every photography major at Drexel.

Additional Information

For more information about this major, visit the College's Photography (<http://www.drexel.edu/westphal/undergraduate/PHTO>) website.

Degree Requirements

General education requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
PHYS 121	Physical Science for Design I	4.0
COOP 101	Career Management and Professional Development	0.0
UNIV A101	The Drexel Experience	2.0
Required Arts and Humanities-students elect a minimum of 9 credits		9.0
Required Natural Science-students elect a minimum of 3 credits		3.0-4.0
Required Social Science-students elect a minimum of 9 credits		9.0
Free electives		27.0

Visual Studies requirements

ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
VSST 101	Design I	4.0
VSST 102	Design II	4.0
VSST 110	Introductory Drawing	3.0
VSST 111	Figure Drawing I	3.0

Visual Studies electives

Students select three additional visual studies (VSST) courses as electives.

Photography requirements

PHTO 110	Photography	3.0
PHTO 140	Digital Photography I	4.0
PHTO 210	Intermediate Photography	3.0
PHTO 231	Color Photography	4.0
PHTO 233	Large Format Photography	4.0
PHTO 234	Studio Photography	4.0
PHTO 236	Photojournalism	4.0
PHTO 240	Digital Photography II	4.0
PHTO 253	Fine Black & White Printing	3.0
PHTO 275 [WI]	History of Photography I	3.0
PHTO 276	History of Photography II	3.0
PHTO 334	Advanced Studio Photography	4.0
PHTO 340	Digital Photography III	4.0
PHTO 361	Advanced Photography	4.0
PHTO 392	Junior Project in Photography	3.0
PHTO 451	Photography and Business	3.0
PHTO 452 [WI]	History of Contemporary Photography	3.0

PHTO 492	Senior Thesis in Photography I	3.0
PHTO 493	Senior Thesis in Photography II	3.0
PHTO 495	Senior Thesis in Photography III	3.0
Photography electives		9.0
Students select three courses from the following:		
PHTO 335	Portraiture	
PHTO 453	Photography Production	
PHTO 455	Landscape Photography	
PHTO 456	Fashion Photography	
PHTO 457	Palladium Printing	
PHTO 458	Advertising Portfolio Development	
PHTO 459	Marketing for Photographers	
Total Credits		181.0

Sample Plan of Study

		Credits
Term 1		
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PHYS 121	Physical Science for Design I	4.0
PHTO 140	Digital Photography I	4.0
VSST 101	Design I	4.0
UNIV A101	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
ARTH 101	History of Art I: Ancient to Medieval	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
PHTO 110	Photography	3.0
VSST 102	Design II	4.0
UNIV A101	The Drexel Experience	1.0
Term Credits		14.0
Term 3		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
PHTO 210	Intermediate Photography	3.0
Natural science elective		3.0-4.0
Term Credits		16.0-17.0
Term 4		
PHTO 253	Fine Black & White Printing	3.0
ARTH 103	History of Art: Modern Art	3.0
PHTO 233	Large Format Photography	4.0
VSST 110	Introductory Drawing	3.0
Free elective		3.0
Term Credits		16.0
Term 5		
COOP 101	Career Management and Professional Development	0.0
PHTO 240	Digital Photography II	4.0
PHTO 234	Studio Photography	4.0
VSST 111	Figure Drawing I	3.0
Social science elective		3.0
Free elective		3.0
Term Credits		17.0
Term 6		
PHTO 231	Color Photography	4.0
PHTO 275 [WI]	History of Photography I	3.0
Arts and Humanities elective		3.0
Social science elective		3.0
Term Credits		13.0
Term 7		
PHTO 236	Photojournalism	4.0
PHTO 276	History of Photography II	3.0

PHTO 451	Photography and Business	3.0
VSST elective*		4.0
Free elective		3.0
Term Credits		17.0
Term 8		
PHTO 334	Advanced Studio Photography	4.0
PHTO 361	Advanced Photography	4.0
PHTO 392	Junior Project in Photography	3.0
Arts and Humanities elective		3.0
VSST elective*		4.0
Term Credits		18.0
Term 9		
Arts and Humanities elective		3.0
Free elective		3.0
Social science elective		3.0
VSST elective*		4.0
Term Credits		13.0
Term 10		
PHTO 452 [WI]	History of Contemporary Photography	3.0
PHTO 492	Senior Thesis in Photography I	3.0
Photography elective*		3.0
Free electives		6.0
Term Credits		15.0
Term 11		
Photography elective*		3.0
Free electives		6.0
PHTO 493	Senior Thesis in Photography II	3.0
Term Credits		12.0
Term 12		
PHTO 340	Digital Photography III	4.0
PHTO 495	Senior Thesis in Photography III	3.0
Photography elective*		3.0
Free elective		3.0
Term Credits		13.0

Total Credit: 180.0-181.0

* See degree requirements (p. 526).

Co-op/Career Opportunities

Photographers pursue careers in a wide variety of fields. Primary choices among Drexel graduates include journalism, illustration, fashion and advertising, and fine arts.

Recent co-op placements have included:

- Micheal Creagh, New York City
- The Edywnn Houk Gallery, New York City
- Jonathan Pushnik, Advertising Photographer, Philadelphia, PA
- Philadelphia Magazine, Philadelphia, PA
- Jason Varney, Editorial Photographer, Philadelphia
- Saturday Night Live, New York City

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Photography

The minor in photography gives students a thorough understanding of photographic practices using a combination of aesthetics and technology. This flexible minor has been developed to accommodate both Antoinette

Westphal College of Media Arts and Design majors as well as majors from any other college. It is an excellent choice for students who are majoring in marketing, communications and journalism. Many employers in these fields are now routinely request that candidates have a good working knowledge of Photoshop and photographic practices.

PHTO 110	Photography	3.0
PHTO 140	Digital Photography I	4.0
PHTO 210	Intermediate Photography	3.0
PHTO 231	Color Photography	4.0
PHTO 240	Digital Photography II	4.0
PHTO 234	Studio Photography	4.0
PHTO 236	Photojournalism	4.0
Additional Suggested Electives (Optional)		
PHTO 275 [WJ]	History of Photography I	
PHTO 276	History of Photography II	
PHTO 451	Photography and Business	
PHTO 452 [WJ]	History of Contemporary Photography	
Total Credits		26.0

Photography Faculty

Cali Capodici, BA (*Montclair State University*). Adjunct Instructor. Advertising portfolio development; photography production and photography & business.

Joanne Carrick, M.Ed (*Tyler School of Art, Temple University*). Adjunct Instructor. Photography and intermediate photography

Julia Cybularz, MFA (*The School of Visual Arts*). Adjunct Instructor. Photography; color photography, junior project in photography, advanced DSLR.

Trevor Dixon, BFA (*University of the Arts*). Adjunct Instructor. Advanced studio photography.

Michael Froio, BS (*Drexel University*). Adjunct Instructor. Photography; intermediate photography and fine black and white printing.

Niko Kallianiotis, MFA (*School of Visual Arts*). Adjunct Instructor. Photography; intermediate photography and photojournalism.

George McCardle, BS (*Drexel University*). Adjunct Instructor. Digital Photography III

Andrea Modica, MFA (*Yale University*). Professor. Photography; portraiture, photojournalism, palladium printing, and thesis.

Benjamin Riley, BS (*Drexel University*). Adjunct Instructor. Photography; intermediate photography and studio photography.

Stuart Rome, MFA (*Arizona State University*). Professor. Photography; color photography, junior project, and thesis.

Diana Rossi, M.Ed (*Arcadia University*). Adjunct Instructor. Photography and intermediate photography.

Paul Runyon, BFA (*The University of New Mexico*) Program Director, *Photography*. Associate Professor. Studio photography, view-camera photography, studio lighting, business aspects of photography.

Ashley Smith, MFA (*School of Visual Arts*). Adjunct Instructor. Photography

Amanda Tinker, MFA (*Temple University*). Assistant Teaching Professor. Photography, history of photography, historical and alternative processes, and intermediate photography.

Jason Varney, BS (*Drexel University*). Adjunct Instructor. Studio photography

L. Kylie Wright, BA (*University of Virginia*). Assistant Teaching Professor. Photography; digital photography, and master printing.

Product Design

Major: Product Design

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 187.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 50.0404

Standard Occupational Classification (SOC) code: 27-1021

About the Program

Product design combines the fields of art, business, and engineering to design the products people use every day. The program in product design focuses creativity and intellect, and prepares students for careers in a range of product design fields including corporate product design, design consulting, entrepreneurial endeavors, sustainable product development, and global design initiatives.

The major in product design is centered on teaching students the skills to develop and design products for a vast array of industries, specializing in multidisciplinary design research focused on product development and commercialization. It will also encourage collaboration in green design, sustainability and innovation in product development, facilitating and combining the fields of art, business, engineering and technology.

Students have the opportunity to create products ranging from furniture and toys to medical devices and consumer electronics in design competitions and *charrettes*. Students learn in state-of-the-art facilities that include a modeling shop and studio, laser cutters, 3D printers, rapid prototypers and molding clays and tools. The modeling shop and studio are large design-centered spaces, built to promote and sustain the studio culture students will enter upon graduation.

Students enrolled in the product design major will be expected to pursue a minor outside of product design that will allow them to apply their design capabilities toward a specific area of expertise.

For more information about this major, visit the College's Product Design (<http://www.drexel.edu/westphal/academics/undergraduate/PROD>) page.

Degree Requirements

In addition to the following requirements for graduation, students enrolled in the Product Design major will be expected to pursue a minor outside of product design that will allow them to apply their design capabilities toward a specific area of expertise.

General education requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
CHEM 201	Why Things Work: Everyday Chemistry	3.0
COM 220	Qualitative Research Methods	3.0

MATH 101	Introduction to Analysis I	4.0
PHYS 103	General Physics I	4.0
PSY 101	General Psychology I	3.0
PSY 332	Human Factors and Cognitive Engineering	3.0
CIVC 101	Introduction to Civic Engagement	1.0
UNIV A101	The Drexel Experience	1.0
Arts and humanities electives		9.0
Free electives		27.0
Visual studies requirements		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
ARTH 300 [WI]	History of Modern Design	3.0
DIGM 100	Digital Design Tools	3.0
PHTO 110	Photography	3.0
PHTO 234	Studio Photography	4.0
VSCM 230	Visual Communication I	4.0
VSCM 240	Typography I	3.0
VSST 101	Design I	4.0
VSST 102	Design II	4.0
VSST 103	Design III	4.0
VSST 110	Introductory Drawing	3.0
VSST 111	Figure Drawing I	3.0
Select one of the following:		4.0
VSST 201	Multimedia: Performance	
VSST 202	Multimedia: Space	
VSST 203	Multimedia: Materials	
Product Design requirements		
ECON 201	Principles of Microeconomics	4.0
ENGR 220	Fundamentals of Materials	4.0
DSMR 201	Analysis of Product	3.0
MEM 201	Foundations of Computer Aided Design	3.0
MGMT 260	Introduction to Entrepreneurship	4.0
PROD 101	History and Analysis of Product Design	3.0
PROD 205	Applied Making I	3.0
PROD 210	Introduction to Product Design	3.0
PROD 220	Product Design Form Studio	4.0
PROD 225	Computer Aided Imagining in Product Design	3.0
PROD 230	Product Design Process Studio	4.0
PROD 235	Applied Design Visualization	3.0
PROD 245	Seminar Professional Landscape	3.0
PROD 255	Applied Materials in Product Design	3.0
PROD 340	Interdisciplinary Product Design Studio	4.0
PROD 345	Applied Human Centered Design	3.0
PROD 425	Applied Design Research	3.0
PROD 460	Research Synthesis Studio	4.0
PROD 470	Create Build Studio	4.0
PROD 475	Professional Practice in Product Design	3.0
PROD 480	Exhibition Studio	4.0
Optional Product Design electives		
PROD 215	Design Thinking in Product Design	
PROD 350	Sponsored Product Design Studio	
PROD 399	Independent Study in Product Design	
PROD 465	Special Topics in Product Design	
Total Credits		187.0

Sample Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PROD 101	History and Analysis of Product Design	3.0
UNIV A101	The Drexel Experience	1.0
VSST 101	Design I	4.0

VSST 110	Introductory Drawing	3.0
Term Credits		14.0
Term 2		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
CIVC 101	Introduction to Civic Engagement	1.0
DIGM 100	Digital Design Tools	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
VSST 102	Design II	4.0
Arts and Humanities elective		3.0
Term Credits		17.0
Term 3		
ARTH 103	History of Art: Modern Art	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 101	Introduction to Analysis I	4.0
VSST 103	Design III	4.0
VSST 111	Figure Drawing I	3.0
Term Credits		17.0
Term 4		
PHYS 103	General Physics I	4.0
PROD 205	Applied Making I	3.0
PROD 210	Introduction to Product Design	3.0
PROD 235	Applied Design Visualization	3.0
VSCM 240	Typography I	3.0
Term Credits		16.0
Term 5		
COOP 101	Career Management and Professional Development	0.0
ECON 201	Principles of Microeconomics	4.0
MEM 201	Foundations of Computer Aided Design	3.0
PROD 220	Product Design Form Studio	4.0
VSCM 230	Visual Communication I	4.0
Term Credits		15.0
Term 6		
CHEM 201	Why Things Work: Everyday Chemistry	3.0
DSMR 201	Analysis of Product	3.0
ENGR 220	Fundamentals of Materials	4.0
PROD 225	Computer Aided Imagining in Product Design	3.0
PROD 230	Product Design Process Studio	4.0
Term Credits		17.0
Term 7		
PHTO 110	Photography	3.0
PROD 245	Seminar Professional Landscape	3.0
PROD 255	Applied Materials in Product Design	3.0
Select one of the following:		4.0
VSST 202	Multimedia: Space	
VSST 201	Multimedia: Performance	
VSST 203	Multimedia: Materials	
Free elective		3.0
Term Credits		16.0
Term 8		
PHTO 234	Studio Photography	4.0
PROD 340	Interdisciplinary Product Design Studio	4.0
PSY 101	General Psychology I	3.0
Arts and Humanities elective		3.0
Free elective		3.0
Term Credits		17.0
Term 9		
COM 220	Qualitative Research Methods	3.0
PROD 345	Applied Human Centered Design	3.0
PSY 332	Human Factors and Cognitive Engineering	3.0
Social science elective		3.0

Free elective		3.0
Term Credits		15.0
Term 10		
ARTH 300 [WI]	History of Modern Design	3.0
PROD 425	Applied Design Research	3.0
PROD 460	Research Synthesis Studio	4.0
Free electives		6.0
Term Credits		16.0
Term 11		
MGMT 260	Introduction to Entrepreneurship	4.0
PROD 470	Create Build Studio	4.0
Free electives		6.0
Term Credits		14.0
Term 12		
PROD 475	Professional Practice in Product Design	3.0
PROD 480	Exhibition Studio	4.0
Free electives		6.0
Term Credits		13.0
Total Credit: 187.0		

Co-op/Career Opportunities

Product designers have careers in a wide range of industries including consumer electronics, housewares, furniture, fashion accessories, medical devices, toys, automotive and transportation. The work of product designers improves the usefulness and appearance of countless products that contribute to the quality of our work and personal lives.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Minor in Product Design

Students in this minor—through a combination of three studio courses and four applied lecture courses—learn to combine skills in creative problem solving with a visual product design process. Students develop product concepts and collaborate on the development of product ideas, including the creation and integration of new technologies, sustainability, health-care and socially responsible design, all of which are beneficial for design professionals.

The minor is specifically created to offer students a unique multi-disciplinary studio experience. Students will develop skills in the rapid visualization of ideas, creative problem solving, transformative design thinking and an understanding of the product development process in a collaborative setting. This minor is offered to all students having an interest in developing product ideas, including students from the College of Engineering, the LeBow College of Business, and the School of Biomedical Engineering as well as College of Media Arts and Design students who would like to add a product focus to their design degree.

Academic requirements

To be eligible for the minor in product design, a student must have completed a minimum of 30.0 undergraduate credits, have declared a major, and have a minimum GPA of 2.7. No pre-requisite courses are required. Students may be encouraged to augment or prepare for this minor. Only upon review by the faculty advisor for the minor will students with design credits from other institutions or departments be allowed to apply these to the requirements.

Required courses

PROD 101	History and Analysis of Product Design	3.0
PROD 205	Applied Making I	3.0
PROD 210	Introduction to Product Design	3.0
PROD 215	Design Thinking in Product Design	4.0
PROD 230	Product Design Process Studio	4.0
PROD 235	Applied Design Visualization	3.0
PROD 340	Interdisciplinary Product Design Studio	4.0
Total Credits		24.0

Product Design Faculty

Michael Glaser, MFA (*Ohio State University*) Program Director for Product Design. Associate Professor. Westphal College of Media Arts & Design Quantifying the designer's intuition; the interplay between digital and physical forms; human desire to shape our surroundings.

Josh Longo, BA (*Pratt Institute*) Fabrication Shop Manager, Department of Design.

Erik Sundquist, MA (*Florida International University*) Hybrid Making Lab Director. Assistant Teaching Professor. Product design

Screenwriting and Playwriting

Major: Screenwriting and Playwriting

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 182.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 50.0504

Standard Occupational Classification (SOC) code: 27-3043

About the Program

The Westphal College Screenwriting & Playwriting program guides students in their pursuit of a career writing for the stage or screen. The program emphasizes the principles of dramatic writing through a practical hands-on approach to instruction. Our graduates take away the skills, experience, and confidence to gain an edge in a rewarding and competitive field.

Students first acquire the essential skills of dramatic story telling, then apply those abilities to the creation of scripts that conform to professional standards. Drexel's pioneering co-op affords hands-on experience in the field, working alongside professional artists. Drexel marks the beginning of the life-long process of developing a writer's eye that sees the world from a different angle and allows writers to tell their own uniquely compelling stories.

For more information about this major, visit the College's Screenwriting & Playwriting (<http://www.drexel.edu/westphal/academics/undergraduate/SCRIP>) page, or contact the Program Director, Matthew J. Kaufhold (<http://drexel.edu/westphal/about/directory/KaufholdMatthew>).

Degree Requirements

General education requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 119	Mathematical Foundations for Design	4.0
UNIV A101	The Drexel Experience	2.0

Required Arts and Humanities (excluding ENGL courses) - students elect a minimum of 9.0 credits	9.0
Required Natural Science-students elect a minimum of 8.0 credits	8.0
Required Social Science-students elect a minimum of 9.0 credits	9.0
Electives	31.0
Visual Studies Requirements	
ARTH 102 History of Art II: Renaissance to Romanticism	3.0
ARTH 103 History of Art: Modern Art	3.0
DIGM 220 Digital Still Imaging I	3.0
VSST 108 Design I for Media	3.0
Screenwriting and Playwriting Requirements	
Literature requirements	
ENGL 315 [WI] Shakespeare	3.0
Select one of the following:	3.0
ENGL 200 [WI] Classical to Medieval Literature or ENGL 20 Renaissance to the Enlightenment or ENGL 20 Romanticism to Modernism	
Select one of the following:	3.0
ENGL 203 [WI] Post-Colonial Literature I or ENGL 20 Post-Colonial Literature II	
Literature (ENGL) electives	6.0
Cinema studies/Theatre studies requirements	
ENGL 216 [WI] Readings in Drama	3.0
THTR 121 [WI] Dramatic Analysis	3.0
FMST 101 Film History I: Emergence	3.0
FMST 102 Film History II: New Waves	3.0
Theatre (THTR) choice elective (any advanced acting, directing or production course)	3.0
Cinema studies (FMST Film Studies or TVST Television Studies) elective	3.0
Methods requirements	
FMVD 110 Basic Shooting and Lighting	3.0
FMVD 115 Basic Editing	3.0
FMVD 120 Basic Sound	3.0
FMVD 215 Narrative Video Production	3.0
THTR 210 Acting: Fundamentals	3.0
THTR 211 Acting: Scene Study	2.0
THTR 240 Theatre Production I	3.0
THTR 320 Play Direction	3.0
Writing requirements	
SCRP 220 Playwriting I	3.0
SCRP 225 Playwriting II	3.0
SCRP 270 [WI] Screenwriting I	3.0
SCRP 275 [WI] Screenwriting II	3.0
SCRP 280 [WI] Writing the Short Film	3.0
SCRP 310 Literature for Screenwriters	3.0
SCRP 370 Screenplay Story Development	3.0
SCRP 495 Senior Project in Dramatic Writing I	3.0
SCRP 496 Senior Project in Dramatic Writing II	3.0
SCRP 497 Senior Project in Dramatic Writing III	3.0
WRIT 225 [WI] Creative Writing	3.0
Writing Choice: select one of the following courses:	3.0
COM 160 Introduction to Journalism	
COM 181 Public Relations Principles and Theory	
WRIT 220 [WI] Creative Nonfiction Writing	
Select one of the following two-course sequences:	6.0
SCRP 382 Playwriting Workshop I & SCR 383 and Playwriting Workshop II	
SCRP 380 Screenwriting Workshop I & SCR 381 and Screenwriting Workshop II	
Total Credits	182.0

CONCENTRATION OPTIONS

Concentration in Writing Comics & Graphic Novels

SCRP 260	Writing Comics	3.0
SCRP 263	Comic Book Editing	3.0
SCRP 266	Graphic Novel Art and Industry	3.0
SCRP 384	Comic/Graphic Novel Writing Workshop I	3.0
SCRP 385	Comic/Graphic Novel Writing Workshop II	3.0

Concentration in Narrative Game Writing

GMAP 260	Overview of Computer Gaming	3.0
SCRP 290	Game: Universe & Story	3.0
SCRP 295	Future of Narrative Games	3.0
SCRP 377	Game Writing Workshop I	3.0
SCRP 378	Game Writing Workshop II	3.0

Sample Plan of Study

Term 1		Credits
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FMST 101	Film History I: Emergence	3.0
SCRP 220	Playwriting I	3.0
THTR 121 [WI]	Dramatic Analysis	3.0
UNIV A101	The Drexel Experience	1.0
Term Credits		13.0
Term 2		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FMST 102	Film History II: New Waves	3.0
SCRP 270 [WI]	Screenwriting I	3.0
UNIV A101	The Drexel Experience	1.0
Natural science elective		4.0
Term Credits		17.0
Term 3		
ARTH 103	History of Art: Modern Art	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
FMVD 110	Basic Shooting and Lighting	3.0
MATH 119	Mathematical Foundations for Design	4.0
VSST 108	Design I for Media	3.0
Term Credits		16.0
Term 4		
FMVD 115	Basic Editing	3.0
SCRP 225	Playwriting II	3.0
ENGL 203 [WI]	Post-Colonial Literature I	3.0
or 204	Post-Colonial Literature II	
Literature (ENGL) elective		3.0
Free elective		3.0
Term Credits		15.0
Term 5		
COOP 101	Career Management and Professional Development	0.0
ENGL 216 [WI]	Readings in Drama	3.0
SCRP 275 [WI]	Screenwriting II	3.0
THTR 210	Acting: Fundamentals	3.0
Elective		3.0
Term Credits		12.0
Term 6		
FMVD 120	Basic Sound	3.0
SCRP 370	Screenplay Story Development	3.0
THTR 211	Acting: Scene Study	2.0
ENGL 200 [WI]	Classical to Medieval Literature	3.0
201,	Renaissance to the Enlightenment	
or 202 [WI]	Romanticism to Modernism	

Natural Science elective	4.0
Elective	3.0
Term Credits	18.0
Term 7	
DIGM 220 Digital Still Imaging I	3.0
SCRP 280 [WI] Writing the Short Film	3.0
SCRP 310 Literature for Screenwriters	3.0
Film Studies/Television Studies elective*	3.0
Free elective	3.0
Term Credits	15.0
Term 8	
ENGL 315 [WI] Shakespeare	3.0
THTR 240 Theatre Production I	3.0
THTR 320 Play Direction	3.0
Arts and Humanities elective (excluding ENGL courses)	3.0
SCRP 380 Screenwriting Workshop I or 382 Playwriting Workshop I	3.0
Term Credits	15.0
Term 9	
SCRP 381 Screenwriting Workshop II or 383 Playwriting Workshop II	3.0
Writing choice	3.0
Arts and Humanities elective (excluding ENGL courses)	3.0
Literature (ENGL) elective	3.0
Social science elective	3.0
Term Credits	15.0
Term 10	
FMVD 215 Narrative Video Production	3.0
SCRP 495 Senior Project in Dramatic Writing I	3.0
WRIT 225 [WI] Creative Writing	3.0
Free elective	3.0
Social science elective	3.0
Term Credits	15.0
Term 11	
SCRP 496 Senior Project in Dramatic Writing II	3.0
Free elective	3.0
Theatre elective*	3.0
Social science elective	3.0
Arts and Humanities elective	3.0
Term Credits	15.0
Term 12	
SCRP 497 Senior Project in Dramatic Writing III	3.0
Free electives	13.0
Term Credits	16.0
Total Credit: 182.0	

* See degree requirements.

Writing Comics and Graphic Novels Concentration

Term 1	Credits
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FMST 101 Film History I: Emergence	3.0
SCRP 220 Playwriting I	3.0
THTR 121 [WI] Dramatic Analysis	3.0
UNIV A101 The Drexel Experience	1.0
Term Credits	13.0
Term 2	
ARTH 102 History of Art II: Renaissance to Romanticism	3.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FMST 102 Film History II: New Waves	3.0

SCRP 270 [WI] Screenwriting I	3.0
UNIV 101 The Drexel Experience	1.0
Natural Science elective	4.0
Term Credits	17.0
Term 3	
ARTH 103 History of Art: Modern Art	3.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
FMVD 110 Basic Shooting and Lighting	3.0
MATH 119 Mathematical Foundations for Design	4.0
VSST 108 Design I for Media	3.0
Term Credits	16.0
Term 4	
ENGL 203 [WI] Post-Colonial Literature I or 204 Post-Colonial Literature II	3.0
FMVD 115 Basic Editing	3.0
SCRP 225 Playwriting II	3.0
Literature (ENGL) elective	3.0
Free elective	3.0
Term Credits	15.0
Term 5	
COOP 101 Career Management and Professional Development	0.0
ENGL 216 [WI] Readings in Drama	3.0
SCRP 260 Writing Comics	3.0
SCRP 275 [WI] Screenwriting II	3.0
THTR 210 Acting: Fundamentals	3.0
Term Credits	12.0
Term 6	
ENGL 200 [WI] , Classical to Medieval Literature 201, Renaissance to the Enlightenment or 202 [WI] Romanticism to Modernism	3.0
FMVD 120 Basic Sound	3.0
SCRP 263 Comic Book Editing	3.0
SCRP 370 Screenplay Story Development	3.0
THTR 211 Acting: Scene Study	2.0
Natural Science elective	4.0
Term Credits	18.0
Term 7	
DIGM 220 Digital Still Imaging I	3.0
SCRP 280 [WI] Writing the Short Film	3.0
SCRP 310 Literature for Screenwriters	3.0
FMST or TVST elective	3.0
Free elective	3.0
Term Credits	15.0
Term 8	
ENGL 315 [WI] Shakespeare	3.0
SCRP 384 Comic/Graphic Novel Writing Workshop I	3.0
THTR 240 Theatre Production I	3.0
THTR 320 Play Direction	3.0
Arts and Humanities elective	3.0
Term Credits	15.0
Term 9	
SCRP 385 Comic/Graphic Novel Writing Workshop II	3.0
Arts and Humanities elective	3.0
Literature (ENGL) elective	3.0
Social Science elective	3.0
Writing choice	3.0
Term Credits	15.0
Term 10	
FMVD 215 Narrative Video Production	3.0
SCRP 266 Graphic Novel Art and Industry	3.0
SCRP 495 Senior Project in Dramatic Writing I	3.0
WRIT 225 [WI] Creative Writing	3.0

Social Science elective	3.0
Term Credits	15.0
Term 11	
SCRP 496 Senior Project in Dramatic Writing II	3.0
Free elective	3.0
Social Science elective	3.0
THTR elective	3.0
Arts & Humanities Elective	3.0
Term Credits	15.0
Term 12	
SCRP 497 Senior Project in Dramatic Writing III	3.0
Free electives	13.0
Term Credits	16.0
Total Credit: 182.0	

Writing Narrative Games Concentration

	Credits
Term 1	
ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FMST 101 Film History I: Emergence	3.0
SCRP 220 Playwriting I	3.0
THTR 121 [WI] Dramatic Analysis	3.0
UNIV A101 The Drexel Experience	1.0
Term Credits	13.0
Term 2	
ARTH 102 History of Art II: Renaissance to Romanticism	3.0
ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FMST 102 Film History II: New Waves	3.0
SCRP 270 [WI] Screenwriting I	3.0
UNIV 101 The Drexel Experience	1.0
Natural Science elective	4.0
Term Credits	17.0
Term 3	
ARTH 103 History of Art: Modern Art	3.0
ENGL 103 Composition and Rhetoric III: Themes and Genres	3.0
FMVD 110 Basic Shooting and Lighting	3.0
MATH 119 Mathematical Foundations for Design	4.0
VSST 108 Design I for Media	3.0
Term Credits	16.0
Term 4	
ENGL 203 [WI] or 204 Post-Colonial Literature I or Post-Colonial Literature II	3.0
FMVD 115 Basic Editing	3.0
GMAP 260 Overview of Computer Gaming	3.0
SCRP 225 Playwriting II	3.0
English Elective	3.0
Term Credits	15.0
Term 5	
COOP 101 Career Management and Professional Development	0.0
ENGL 216 [WI] Readings in Drama	3.0
SCRP 275 [WI] Screenwriting II	3.0
SCRP 290 Game: Universe & Story	3.0
THTR 210 Acting: Fundamentals	3.0
Term Credits	12.0
Term 6	
ENGL 200 [WI], 201, or 202 [WI] Classical to Medieval Literature, Renaissance to the Enlightenment, or Romanticism to Modernism	3.0
FMVD 120 Basic Sound	3.0
SCRP 295 Future of Narrative Games	3.0
SCRP 370 Screenplay Story Development	3.0

THTR 211 Acting: Scene Study	2.0
Natural Science elective	4.0
Term Credits	18.0
Term 7	
DIGM 220 Digital Still Imaging I	3.0
SCRP 280 [WI] Writing the Short Film	3.0
SCRP 310 Literature for Screenwriters	3.0
FMST or TVST elective	3.0
Free elective	3.0
Term Credits	15.0
Term 8	
ENGL 315 [WI] Shakespeare	3.0
SCRP 377 Game Writing Workshop I	3.0
THTR 240 Theatre Production I	3.0
THTR 320 Play Direction	3.0
Arts & Humanities elective	3.0
Term Credits	15.0
Term 9	
SCRP 378 Game Writing Workshop II	3.0
Arts and Humanities elective	3.0
English Elective	3.0
Social Science elective	3.0
Writing elective	3.0
Term Credits	15.0
Term 10	
SCRP 495 Senior Project in Dramatic Writing I	3.0
FMVD 215 Narrative Video Production	3.0
WRIT 225 [WI] Creative Writing	3.0
Arts and Humanities elective	3.0
Social Science elective	3.0
Term Credits	15.0
Term 11	
SCRP 496 Senior Project in Dramatic Writing II	3.0
Free elective	3.0
Arts and Humanities elective	3.0
Social Science elective	3.0
THTR elective	3.0
Term Credits	15.0
Term 12	
SCRP 497 Senior Project in Dramatic Writing III	3.0
Free electives	13.0
Term Credits	16.0
Total Credit: 182.0	

Co-op/Career Opportunities

Dramatic writing is writing for production — work intended for performance on the stage or screen. These days, “screen” can mean movie, TV, or computer, and the work can be anything from full stage plays to 15-second commercials to video game scripts. As the entertainment industry changes, so do the outlets for our students and graduates.

Co-op Experiences

By working for film and television production companies, theater organizations, entertainment management companies, magazines, advertising and public relations firms, and other professional writers, Screenwriting & Playwriting students gain valuable insights into how the entertainment industry works. In an industry where the process of building a career often begins with a few key contacts, the co-op program gives Drexel students the chance to begin shaping their own professional networks.

Screenwriting and Playwriting students secured Co-op or post-graduation positions with:

- Disney Video Animation
- Marvel Comics
- Lionsgate Films
- Skyless Games
- Arden Theater Company
- Campbell's Soup
- Marvel Studios
- SyFy Network
- Nickelodeon
- Dynamite Entertainment
- prominent Hollywood talent managers
- The Playwright's Center
- Valiant Entertainment
- Sciencefiction.com
- Major League Baseball Productions
- Panels.net
- Voice of America
- Fantagraphics
- the editor and publisher of a screenwriters' magazine
- the production office of "Star Trek: Enterprise"

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Screenwriting and Playwriting Faculty

Ian N. Abrams, BA (*Duke University*). Associate Professor. Screenwriting, movies, film, Hollywood.

Bruce Graham, BA (*Indiana University of Pennsylvania*). Associate Teaching Professor. Playwright.

Matthew Kaufhold, MA (*University of North Carolina*) Program Director, *Screenwriting and Playwriting*. Associate Teaching Professor. Screenwriter, Producer.

Thomas Quinn, MFA (*Temple University*) Program Director, *Film & Video*. Assistant Professor. Writer, Director, filmmaker.

Andrew Susskind, BA (*Harvard University*) Program Director of TV *Production & Media Management*. Associate Teaching Professor. Producing for Television, The Sitcom, Directing Single and Multi-Camera

Courses

SCRP 220 Playwriting I 3.0 Credits

Introduces the basic tenets of playwriting and applies their use towards the writing of a 10-minute play.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

SCRP 225 Playwriting II 3.0 Credits

Builds on the writing tenets learned in Playwriting I. Requires students to write a one-act play.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 220 [Min Grade: D]

SCRP 230 Page to Stage 3.0 Credits

Students will write a short play and then go through the rewrite process while working with a director and student actors. The final scenes will be performed in front of an audience.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 9 credits

Prerequisites: SCRCP 225 [Min Grade: C]

SCRP 241 Writing TV Comedy 3.0 Credits

Teaches the essentials of situation comedy writing for TV. Students will be expected to conceive and write their own thirty-minute pilot script plus a 'bible' for their show.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 270 [Min Grade: D]

SCRP 242 Writing TV Drama 3.0 Credits

Teaches the essentials of writing the one-hour television drama. Students will be expected to conceive and write their own thirty-minute pilot script plus a 'bible' for their show.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 270 [Min Grade: D]

SCRP 250 Creating Stand-up Comedy 3.0 Credits

Deals with the conception, writing and performance of a stand-up comedy routine. Includes exploration of creating a comic persona, structuring an act, construction of jokes, and aspects relating to performance. "Final exam" will be given before a live audience at a public venue.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

SCRP 260 Writing Comics 3.0 Credits

This course will introduce the student to the history, theory, language and disciplines of writing the American comic book and graphic novel. Students will learn about comic script-writing formats, the collaborative relationship between writer and artist, and techniques to strengthen both their writing and critiquing abilities.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 270 [Min Grade: C]

SCRP 263 Comic Book Editing 3.0 Credits

Students will write original work and serve as editors for other students on their creative project -- all while learning the histories of the creative disciplines that facilitate the creation of a modern comic book.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 260 [Min Grade: C]

SCRP 266 Graphic Novel Art and Industry 3.0 Credits

This course serves as an comprehensive look at the medium of graphic novels: their history, how they're made, their diversity, how they are designed, sold and marketed. The course will mix reading and analysis of select titles, lecture and discussions with industry experts, including an artist, author, agent, editor, publisher, retailer, and designer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 260 [Min Grade: C]

SCRP 270 [WI] Screenwriting I 3.0 Credits

Workshop course that covers the fundamentals of writing scripts for film and television. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: HUM 106 [Min Grade: D] or ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D]

SCRP 275 [WI] Screenwriting II 3.0 Credits

Workshop course that builds on the fundamentals of screenwriting learned in Screenwriting I. Each student develops and completes a short dramatic screenplay. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 270 [Min Grade: D]

SCRP 280 [WI] Writing the Short Film 3.0 Credits

This course will focus on creating scripts for films under thirty minutes in length. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 270 [Min Grade: D]

SCRP 290 Game: Universe & Story 3.0 Credits

A non-technical course which examines the differences between film & TV works vs. games and interactive fiction forms, and the creative changes inherent in translating one to the other. Emphasis given to the creation of a vibrant, seductive, logically consistent game world. Course culminates in the design of a game based on an existing work of fiction.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 270 [Min Grade: C]

SCRP 295 Future of Narrative Games 3.0 Credits

Encourages students to use their knowledge of the current state of the art in gaming, and their technical and writing interests and expertise, to imagine games that go beyond those currently available. Of particular interest are ways to create branching narratives that deliver the story satisfaction and character development expected from traditional media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 270 [Min Grade: C]

SCRP 310 Literature for Screenwriters 3.0 Credits

This course provides exposure to literary traditions from the classics to pop culture, analyzing how the selected books have affected the film industry, both in terms of direct adaptations and by influencing generations of filmmakers and screenwriters.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 270 [Min Grade: D] or FMVD 270 [Min Grade: D]

SCRP 350 TV Comedy Practicum 3.0 Credits

Students will write episodes of an ongoing TV comedy series produced at Drexel. Following the network primetime model and working in collaboration, students will work under budget, production and deadline constraints similar to those in the real world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: SCR 241 [Min Grade: C]

SCRP 353 TV Drama Practicum 3.0 Credits

Students will write episodes of an ongoing TV drama series to be produced at Drexel. Following the network primetime model and working in collaboration, students will work under budget, production and deadline constraints similar to those in the real world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: SCR 242 [Min Grade: C]

SCRP 370 Screenplay Story Development 3.0 Credits

This course provides a thorough understanding of methods used to develop story ideas from initial concept to complete screen story, including pitching, structuring, and creating treatments. Students pitch and develop several stories which can then be used to create full-length scripts in advanced workshops.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 270 [Min Grade: D]

SCRP 377 Game Writing Workshop I 3.0 Credits

This course embeds Screenwriting students on a team developing a computer game from concept to design document and through production. Screenwriting majors will be expected to contribute heavily to the narrative, character and other non-technical aspects of game creation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 290 [Min Grade: C] and SCR 295 [Min Grade: C]

SCRP 378 Game Writing Workshop II 3.0 Credits

This course embeds Screenwriting students on a team developing a computer game from concept to design document and through production. Screenwriting majors will be expected to contribute heavily to the narrative, character and other non-technical aspects of game creation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 377 [Min Grade: C]

SCRP 380 Screenwriting Workshop I 3.0 Credits

The first of a two-course sequence in which students write a feature film script, telefilm, or television pilot.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 275 [Min Grade: D]

SCRP 381 Screenwriting Workshop II 3.0 Credits

The second of a two-course sequence in which students write a feature film script, telefilm, or television pilot.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 380 [Min Grade: D]

SCRP 382 Playwriting Workshop I 3.0 Credits

The first of a two-course sequence in which students write a 90-minute, two-act play.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 225 [Min Grade: D]

SCRP 383 Playwriting Workshop II 3.0 Credits

The second of a two-course sequence in which students write a 90-minute, two-act play.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: SCR 382 [Min Grade: D]

SCRP 384 Comic/Graphic Novel Writing Workshop I 3.0 Credits

This two-term workshop will lead you through the process of developing and writing at least one draft of the script for either several issues of an original comic or a complete graphic novel. The finished script will be expected to conform to professional standards in everything from length to plot structure to formatting. You will be expected to utilize skills taught in the prerequisite course, SCR 260 (Comic Book Writing), as well as narrative skills learned in SCR 270 (Screenwriting I), including, but not limited to, thinking visually, establishing characters through behavior, writing effective dialogue, the basics of story structure, and related topics.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 266 [Min Grade: C]

SCRP 385 Comic/Graphic Novel Writing Workshop II 3.0 Credits

This two-term workshop will lead you through the process of developing and writing at least one draft of the script for either several issues of an original comic or a complete graphic novel. The finished script will be expected to conform to professional standards in everything from length to plot structure to formatting. You will be expected to utilize skills taught in the prerequisite course, SCR 260 (Comic Book Writing), as well as narrative skills learned in SCR 270 (Screenwriting I), including, but not limited to, thinking visually, establishing characters through behavior, writing effective dialogue, the basics of story structure, and related topics.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 384 [Min Grade: C]

SCRP 399 Independent Study in SCR 0.5-12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRP 465 Special Topics in SCR 3.0 Credits

Examines a particular genre in dramatic writing (comedy, the thriller, etc.) or issues of particular interest to students interested in writing for the stage or screen (e.g., Literature for Screenwriters). The course, but not the same topics, may be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

SCRP 495 Senior Project in Dramatic Writing I 3.0 Credits

The first of a three-course sequence in which students write a feature film script, telefilm, full-length stage play, television pilot, at least two spec episodes of an existing one-hour TV drama or four of an existing TV comedy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 381 [Min Grade: D] or SCR 383 [Min Grade: D]

SCRP 496 Senior Project in Dramatic Writing II 3.0 Credits

The second of a three-course sequence in which students write a feature film script, telefilm, television pilot, at least two spec episodes of an existing one-hour TV drama or four of an existing TV comedy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 495 [Min Grade: D]

SCRP 497 Senior Project in Dramatic Writing III 3.0 Credits

The third of a three-course sequence in which students write a feature film script, telefilm, full-length stage play, television pilot, at least two spec episodes of an existing one-hour TV drama or four of an existing TV comedy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 496 [Min Grade: D]

SCRP I199 Independent Study in Screenwriting & Playwriting 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRP I299 Independent Study in Screenwriting & Playwriting 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRIP I399 Independent Study in Screenwriting & Playwriting 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRIP I499 Independent Study in Screenwriting & Playwriting 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRIP T180 Special Topics in Screenwriting & Playwriting 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRIP T280 Special Topics in Screenwriting & Playwriting 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRIP T380 Special Topics in Screenwriting & Playwriting 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRIP T480 Special Topics in Screenwriting & Playwriting 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TV Production & Media Management

Major: TV Production and Media Management

Degree Awarded: Bachelor of Science (BS)

Calendar Type: Quarter

Total Credit Hours: 186.0

Co-op Options: One Co-op (Four years)

Classification of Instructional Programs (CIP) code: 10.0202

Standard Occupational Classification (SOC) code: 27-2012

About the Program

The TV Production and Media Management program educates students to conceive, produce, and market entertainment through current and evolving television platforms. The program addresses the creative aspects, the craft, and the business of producing fictional and nonfictional content, and prepares students to work in all distribution formats.

The TV Production and Media Management program combines the resources of DUTV, Drexel's fully-equipped, high-definition television station, with a comprehensive academic program to provide students with foundational experiences in the development, writing, production, editing,

programming, multi-platform distribution, management, and promotion of television and internet content.

The major offers a course of study of 186.0 credits distributed over courses focused on development, production and post-production, business, and history. Students are taught by and work with a faculty of notable industry professionals whose experience, passion, and contacts help prepare them to enter and navigate the competitive world of television.

The major is designed as a four year, co-op program. For more information about this major, visit the College's TV Production and Media Management (<http://www.drexel.edu/westphal/academics/undergraduate/TELE>) page.

Degree Requirements

All TV Production & Media Management majors take the same core courses for the first five terms (through the winter term of their sophomore year). These core courses encompass production fundamentals, digital media fundamentals, an introduction to television industry and enterprise, and beginning screenwriting. Finally, there is an introductory TV studio course, TV field course, and television studies course. The core requirements build a foundation for further advanced and specialized courses, taught in the student's area of concentration.

By the spring term their sophomore year, students select one of the following concentrations:

- TV Comedy & Drama:** Students who choose this track gain an education in fictional programming. They will further hone their production skills in lighting and editing; they will be introduced to acting so they can better understand directing actors.
- TV Industry & Enterprise:** Students choosing this track gain an education in the business of television, completing three courses in the LeBow College of Business: business law, entrepreneurship, and marketing. They learn about the financial aspects of television and are introduced to managing the IT area as it relates to television.
- TV News & Non-Fiction Production:** Students who choose this track gain an education in documentary, news and nonfiction programming. They will hone their production skills in lighting and editing; they will learn how to direct TV studio programs and remote programs using multiple cameras.

Degree Requirements

Written Analysis and Communication Requirements		
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
Mathematics and Natural Sciences Requirements		
MATH 101	Introduction to Analysis I	4.0
Required Natural Science-students elect a minimum of 8 credits		8.0
Arts/Humanities Requirements		
Required Arts and Humanities-students elect a minimum of 9 credits		9.0
Social Science Requirements		
Required Social Science-students elect a minimum of 9 credits		9.0
University Seminar Requirements		
CIVC 101	Introduction to Civic Engagement	1.0
COOP 101	Career Management and Professional Development	0.0
UNIV A101	The Drexel Experience	2.0

Free electives		24.0
Visual Studies Requirements		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ARTH 103	History of Art: Modern Art	3.0
IDM 100	Introduction to Web Development	3.0
VSST 108	Design I for Media	3.0
VSST 109	Design II for Media	3.0
Communications Requirements		
COM 150	Mass Media and Society	3.0
COM 230	Techniques of Speaking	3.0
Television Core Requirements		
BLAW 201	Business Law I	4.0
FMVD 110	Basic Shooting and Lighting	3.0
FMVD 115	Basic Editing	3.0
FMVD 120	Basic Sound	3.0
FMVD 237	Intermediate Editing	3.0
MGMT 260	Introduction to Entrepreneurship	4.0
MKTG 201	Introduction to Marketing Management	4.0
SCRP 270 [WI]	Screenwriting I	3.0
TVIE 180	TV Industry Overview	3.0
TVIE 280	Research, Sales and Programming	3.0
TVIE 285	Media Law and Ethics	3.0
TVPR 100	TV Studio: Basic Operations	3.0
TVPR 200	TV Studio: Live Directing	3.0
TVPR 210	TV Studio: Narrative	3.0
TVPR 212	TV Commercials and Promos	3.0
TVPR 236	Reality TV Production	3.0
TVPR 240	Producing for Television	3.0
TVST 260	History of Television	3.0
TVPR 495	Senior Project: TV Production I	3.0
TVPR 496	Senior Project: TV Production II	3.0
TVPR 497	Senior Project: TV Production III	3.0
Select one course from each of the pair below:		9.0
TVPR 354	TV Series I	
	or TVPR 35 TV Series II	
TVPR 356	DNews	
	or TVPR 35DNews II	
TVST 361	Art of TV Comedy	
	or TVST 36:Art of TV Drama	
Select eight courses from the following TV Production & Media Management electives:		24.0
EAM 365	Media and Entertainment Business	
FMST 250	The Documentary Tradition	
FMST 290	Hollywoodland I	
FMST 291	Hollywoodland II	
FMVD 200	Acting for the Screen	
FMVD 202	Directing for the Screen	
FMVD 210	Documentary Video Production	
FMVD 215	Narrative Video Production	
FMVD 235	Intermediate Lighting	
FMVD 315	Audio Post Production	
FMVD 400	Advanced Directing	
SCRP 353	TV Drama Practicum	
SCRP 370	Screenplay Story Development	
TVIE 290	Introduction to Money and the Media	
TVPR 205	TV Studio: Advanced Live Directing	
TVPR 220	TV News Writing	
TVPR 221	TV News Production	
TVPR 230	Scripted TV Production	
TVPR 242	TV On-Camera Performance	
TVPR 291	Television Internship	
TVPR 315	Episodic Webisode Production	

TVPR 300	TV Series Editing	
TVST 261	History of TV Journalism	
Total Credits		186.0

Sample Plans of Study

TV Production & Media Management

Term 1		Credits
COM 150	Mass Media and Society	3.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
FMVD 110	Basic Shooting and Lighting	3.0
FMVD 120	Basic Sound	3.0
VSST 108	Design I for Media	3.0
UNIV A101	The Drexel Experience	1.0
Term Credits		16.0
Term 2		
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
FMVD 115	Basic Editing	3.0
TVPR 100	TV Studio: Basic Operations	3.0
UNIV A101	The Drexel Experience	1.0
VSST 109	Design II for Media	3.0
Term Credits		16.0
Term 3		
ARTH 103	History of Art: Modern Art	3.0
CIVC 101	Introduction to Civic Engagement	1.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
IDM 100	Introduction to Web Development	3.0
TVIE 180	TV Industry Overview	3.0
MATH 101	Introduction to Analysis I	4.0
Term Credits		17.0
Term 4		
SCRP 270 [WI]	Screenwriting I	3.0
TVIE 280	Research, Sales and Programming	3.0
TVPR 212	TV Commercials and Promos	3.0
Arts and Humanities elective		3.0
Social Science elective		3.0
Term Credits		15.0
Term 5		
COOP 101	Career Management and Professional Development	0.0
TVIE 285	Media Law and Ethics	3.0
TVPR 200	TV Studio: Live Directing	3.0
TVPR 240	Producing for Television (Social Science elective)	3.0
TVST 260	History of Television	3.0
Social Science elective		3.0
Term Credits		15.0
Term 6		
BLAW 201	Business Law I	4.0
COM 230	Techniques of Speaking	3.0
TVPR 210	TV Studio: Narrative	3.0
TVPR 236	Reality TV Production	3.0
One of the following:		
TVST 361	Art of TV Comedy	3.0
or 362	Art of TV Drama	
Term Credits		16.0
Term 7		
Arts and Humanities elective		3.0
Social Science elective		3.0
Elective		3.0

TV Production & Media Management elective		3.0
Term Credits		12.0
Term 8		
MGMT 260	Introduction to Entrepreneurship	4.0
MKTG 201	Introduction to Marketing Management	4.0
One of the following:		
TVPR 354 or 356	TV Series I DNews	3.0
TV Production & Media Management elective		6.0
Term Credits		17.0
Term 9		
FMVD 237	Intermediate Editing	3.0
TV Production & Media Management elective		6.0
One of the following:		
TVPR 355 or 357	TV Series II DNews II	3.0
Natural Science elective		4.0
Term Credits		16.0
Term 10		
TVPR 495	Senior Project: TV Production I	3.0
Free elective		3.0
Natural Science elective		4.0
TV Production & Media Management elective		6.0
Term Credits		16.0
Term 11		
TVPR 496	Senior Project: TV Production II	3.0
Free electives		6.0
Arts and Humanities elective		3.0
TV Production & Media Management elective		3.0
Term Credits		15.0
Term 12		
TVPR 497	Senior Project: TV Production III	3.0
Free electives		12.0
Term Credits		15.0

Total Credit: 186.0

Co-op/Career Opportunities

As the fourth largest television market and home of Comcast, one of the most rapidly expanding cable companies in the United States, Philadelphia is a major national television center. The TV Production & Media Management program takes advantage of this in numerous ways, including adjunct faculty, guest speakers, scholarship possibilities, internships, co-op experiences, and joint ventures. The major interacts with the Paul F. Harron TV Studios, which houses DUTV (<http://dutv.drexel.edu/television/Main.html>)'s fully HD studio, where students produce projects as part of their course work.

TV majors have done internships and Co-ops in New York, Philadelphia, and Los Angeles, working for production companies, talent and casting agencies, and television stations.

Drexel also offers a graduate level program in Television Management, and some students in the undergraduate major may wish to apply to the graduate program.

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

Television Facilities

DUTV, an educational access channel operated by Drexel University, provides a laboratory for students majoring in Television. The Paul F. Harron TV Studios houses DUTV and its fully-HD shooting studio, providing students with work space as well as hands-on technical and management experience that is so essential to the program. Film and video facilities include a shooting studio with a green screen, large and small screening rooms, a fully equipped television studio; digital editing facilities; specially outfitted multimedia rooms for all courses; digital video camcorders; 16mm film cameras, and lighting and audio equipment.

TV Production & Media Management Faculty

Andrew Altrichter, MBA (*Drexel University*) Program Manager, *Drexel University's television station (DUTV)*. Videography, editing, production.

Jackie Borock, LLB (*Widener University*). Adjunct Instructor. Media law, intellectual property, first amendment

David Culver, AS (*Graham Junior College*) Manager of the Paul F. Harron Studios/DUTV. Associate Teaching Professor. Film, Video, Station Management, Emerging Media Technology

Karen Curry, BA (*Fordham University*) Executive Director, *Kal and Lucille Rudman Institute for Entertainment Industry Studies*. Global media, news production and management.

Yvonne D. Leach, MFA (*Temple University*). Associate Professor. Television studies.

Joe Marsini, BS, CPA (*University of Delaware*). Adjunct Professor. Media finance, strategic planning, financial reporting, contract negotiations, collective bargaining agreements.

Philip W. Salas, BS (*Temple University*). Assistant Teaching Professor. Utilization of advanced set top box data to measure fragmented viewing behavior. Impact of new television distribution technologies on traditional broadcasters and multichannel program providers.

Andrew Susskind, BA (*Harvard University*) Program Director of *TV Production & Media Management*. Associate Teaching Professor. Producing for Television, The Sitcom, Directing Single and Multi-Camera

Albert S. Tedesco, MA (*University of Pennsylvania*) Director of the Paul F. Harron Graduate Program in Television Management. Teaching Professor. Media Management, Organizational Structure, Research Methods, Media Ethics, Media Law, The Regulatory Environment, Technology Assessment, Media Theory, Media Analytics

Martin (Marty) Zied, BA (*Penn State*). Adjunct Instructor. Speech Communications, Producer/Director Television and Film

Westphal Studies Program

Major: *Westphal Studies*

Degree Awarded: *Bachelor of Science (BS)*

Calendar Type: *Quarter*

Total Credit Hours: *180.0*

Classification of Instructional Programs (CIP) code: *50.0101*

Standard Occupational Classification (SOC) code: *27-1019*

About the Program

The Westphal Studies program provides an individualized course of study initiated by a student. The student must have completed two terms of the junior year in an Antoinette Westphal College of Media Arts and Design major to be eligible for admission into this major.

A small number of students in the Antoinette Westphal College of Media Arts and Design decide that their goals lie at the periphery of the major or the intersection between several majors and would be served by more latitude than offered in the highly specified courses in their major. For these students, the Westphal Studies program major broadens future career goals and allows exploration combined with a focused exposure to a second field. It acknowledges the specialization that is characteristic of the majors in the College and the expectations of the professional fields for which our students are being prepared. Simultaneously, it recognizes the breadth and rapidly changing nature of many disciplines and permits a student who has acquired a basic working knowledge of a specific aspect of media arts and design to investigate a clearly defined alternative.

Admission to the program is limited to currently matriculated College of Media Arts and Design students who have completed the major-intensive sophomore year and experienced a co-op placement or completed their junior-year courses. The following items are required as part of the application:

- A student-generated, individualized plan of study, developed with and signed by a member of the Westphal Studies Program Advisors Committee
- A statement in writing of the student's goals in applying to the major and the rationale of how the proposed plan of study addresses those goals
- A definition of appropriate co-operative education placement if the student has not completed a six-month employment in the field of his or her major
- A letter from the student's current program director

Approval by the Westphal Studies Program Advisors Committee is required for admission to the major; it is not automatic upon request. The committee must be convinced by the validity of the applicant's reasons for applying, the proposed study plan, and accompanying documentation. Details about the application procedure may be obtained from the director of Westphal Studies Program.

Recommended Plan of Study

This program requires an individualized plan of study. Students sign off on this agreed-upon plan with the Director of the Studies of the Westphal Studies program. A student must have completed two terms of junior year in a College of Media Arts and Design major to be eligible for admission into this major.

The student, in consultation with her/his advisor and the director of the program, devises a personalized interdisciplinary study plan. The approved plan of study provides a rationale for the concentration and how the elective credits are to be used. This plan of study must be completed and approved before admission into the major.

Degree Requirements

General Education Requirements

General Education Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
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ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
UNIV A101	The Drexel Experience	2.0
Arts and humanities electives		9.0
Mathematics and natural science electives **		12.0
Social science electives		9.0
Co-operative education ***		0.0
Total Credits		41.0

* Students taking the Architecture Part-Time Evening program do not have this requirement.

** At least one course in mathematics and one course in natural science are required.

*** Not required if prior major did not require co-operative education experience.

Other Requirements

Requirements	Hours
Unrestricted electives	max of 75.0
Professional requirements*	min of 51.0
Concentration or minor**	min of 24.0

* All professional and visual studies courses required in prior major through winter term of junior year must be successfully completed.

** Up to 9 credits of general education and professional requirements may be included in this minimum.

Minor in Digital Media

The Digital Media Minor requires the completion of eight courses (minimum 24.0 credits). The minor provides basic foundations in digital media, including; 3D animation, game art, and interactivity with the opportunity for individualized tailoring according to the student's interests.

The Digital Media Minor is open to all University students.

Required Courses:

DIGM 100	Digital Design Tools	3.0
DIGM 105	Overview of Digital Media	3.0
ANIM 140	Computer Graphics Imagery I	3.0
GMAP 260	Overview of Computer Gaming	3.0
IDM 100	Introduction to Web Development	3.0
Select any three courses in ANIM, DIGM, GMAP or WBDV		9.0
Total Credits		24.0

Minor in Fine Art

To be eligible for the minor in fine art, a student must have completed 30.0 undergraduate credits, have a declared major, and have a minimum GPA of 2.7. The academic credit requirements for the minor must be completed at or before the time of graduation.

Basic design pre-requisite courses are required for most visual studies courses, and some of these may have already been taken for a student's major. However, only nine credits of major-related coursework can be applied to the credits required for the minor in fine arts. Students with design credits from other schools or departments may be allowed to apply

them to their pre-requisite requirements only upon review by the fine art minor faculty advisor.

Required Courses

VSST 101	Design I	4.0
or VSST 108	Design I for Media	
VSST 110	Introductory Drawing	3.0
Select a minimum of an additional 17.0 credits from the following:		17.0
VSST 102	Design II	
VSST 103	Design III	
VSST 111	Figure Drawing I	
VSST 109	Design II for Media	
VSST 112	Figure Drawing II	
VSST 201	Multimedia: Performance	
VSST 202	Multimedia: Space	
VSST 203	Multimedia: Materials	
VSST 204	Materials Exploration	
VSST 301	Painting I	
VSST 302	Painting II	
VSST 303	Painting III	
VSST 310	Sculpture: Metal Fabrication	
VSST 311	Sculpture I	
VSST 312	Sculpture II	
VSST 313	Sculpture III	
VSST 321	Screenprint I	
VSST 322	Printmaking I	
VSST 323	Printmaking II	
VSST 324	Advanced Printmaking	
VSST 325	Screenprint II	
VSST 399	Independent Study: Visual Studies	
VSST 465	Special Topics in Visual Studies	
PHTO 110	Photography	
PHTO 210	Intermediate Photography	
PHTO 233	Large Format Photography	
PHTO 253	Fine Black & White Printing	
Total Credits		24.0

Minor in Interdisciplinary Smart Initiatives

The Interdisciplinary Smart Initiatives Minor provides students across the University an experience of both breadth and depth through multi-disciplinary practices and learning. Students will develop skills and knowledge in the topics associated with problem solving, innovative technology, leadership and immersive participatory experiences. Skills and knowledge will be delivered through collaborative teaching and coursework, skill building, experimentation, experiential learning, and engaging research initiatives.

This minor provides the opportunities to engage in a variety of University venues and initiatives that places students on the leading edge of their chosen paths. The Interdisciplinary Smart Initiatives Minor is intended to build on experiential learning that is the foundation of a Drexel education.

Admission Requirements

The Interdisciplinary Smart Initiatives Minor is open to all University students that meet the criteria for acceptance. Because of the nature of the minor, success is dependent upon students showing self-discipline, being highly motivated and self-reliant. All applications for the minor will be submitted to the director of the minor.

Please contact Dr. Ulrike Altenmüller-Lewis at ua27@drexel.edu with questions concerning the INSI Minor.

The following are the requirements that students must meet to be considered:

- **Required Essay:** Student statement of interest and desired goals
- **Required Recommendation:** Two letters of recommendation from faculty that speaks to the student's ability to be collegial and collaborative, exhibit initiative and resourcefulness and ability to work independently.

Required Courses

WEST 210	Innovative Problem Solving	4.0
WEST 220	Multimodal Research	4.0
WEST 310	Active Learning and Exploration	4.0
WEST 320	Active Engagement Projects	4.0
Electives*		9.0

Choose 9 credits from the following subject areas:

Antoinette Westphal College of Media Arts & Design

INTR 310	Sustainability: History, Theory and Critic
PROD 215	Design Thinking in Product Design

College of Engineering

CAEE 202	Introduction to Civil, Architectural & Environmental Engineering
CIVE 240 [WI]	Engineering Economic Analysis

College of Computing & Informatics

INFO 101	Introduction to Information Technology
INFO 105	Introduction to Informatics

LeBow College of Business

BUSN 103	Advanced First Year Business Seminar
MGMT 260	Introduction to Entrepreneurship
MGMT 364	Technology Management
MIS 200	Management Information Systems

College of Arts and Sciences

BIO 264	Ethnobotany
COM 111	Principles of Communication
COM 220	Qualitative Research Methods
COM 317 [WI]	Environmental Communication
ENVS 260	Environmental Science and Society
PSY 352	Environmental Psychology
SOC 341	Environmental Movements in America

School of Biomedical Engineering, Science and Health Systems

BMES 130	Problem Solving in Biomedical Engineering
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Total Credits 25.0

* Other courses may be substituted with the approval of the minor director.

Minor in Jazz and African-American Music

The minor in jazz and African-American music takes advantage of Drexel faculty expertise in those areas. This minor can include course work in jazz history, African-American music, jazz theory, private study in jazz performance, and ensemble work in several ensembles devoted to jazz.

MUSC 121	Music Theory I	3.0
MUSC 125	Ear Training I	1.0
MUSC 126	Ear Training II	1.0
MUSC 196	Jazz Class Piano	2.0
MUSC 241	Private Lesson (3 terms)	6.0
MUSC 300	Improvisation	3.0

MUSC 331	World Musics	3.0
MUSC 333	Afro-American Music USA	3.0
MUSC 336	History of Jazz	3.0
Ensembles*		
Total Credits		25.0

* 6 terms of MUSC 107 and/or MUSC 108, MUSC 112, MUSC 115

Minor in Music

The minor in music requires 26.0 credits, including work in music theory, history, applied music (class or private lessons), and ensemble performance, and 9.0 credits of music electives.

MUSC 121	Music Theory I	3.0
MUSC 125	Ear Training I	1.0
MUSC 126	Ear Training II	1.0
MUSC 331	World Musics	3.0
MUSC 231	Music History I	3.0
MUSC 232	Music History II	3.0
MUSC 241	Private Lesson (Students take 3 terms)	6.0
Music electives		6.0
Ensembles (Six terms from MUSC 101 to MUSC 118)		0.0
Total Credits		26.0

Minor in Music Performance

The minor in music performance requires two years of private lessons study with our artist faculty, culminating in a recital. The Music Program will provide support for the recital venue and accompanist. Students must audition and be approved to pursue this minor.

Required Courses

MUSC 121	Music Theory I	3.0
MUSC 125	Ear Training I	1.0
MUSC 126	Ear Training II	1.0
MUSC 241	Private Lesson (5 terms)	10.0
MUSC 231	Music History I	3.0
MUSC 232	Music History II	3.0
MUSC 331	World Musics	3.0
MUSC 342	Applied Music-Recital	2.0
Ensembles (six terms from MUSC 101 to MUSC 118))		0.0
Total Credits		26.0

Music Theory and Composition

The minor in music theory and composition is aimed at people who are writing their own music or who would like to begin doing so. Students will take courses in music theory, arranging, composition, and digital composition, and end with a portfolio of several completed pieces.

Requirements

MUSC 121	Music Theory I	3.0
MUSC 122	Music Theory II	3.0
MUSC 229	Modern Arranging Techniques	3.0
MUSC 125	Ear Training I	1.0
MUSC 249	Digital Music Composition	3.0
MUSC 231	Music History I	3.0
MUSC 232	Music History II	3.0
MUSC 252	Music Composition	3.0
MUSC 331	World Musics	3.0
MUSC 241	Private Lesson (*)	2.0

Ensembles (**)	
Total Credits	27.0

* Students are strongly encouraged to register for the section designated for composition.

** Ensembles (6 terms from MUSC 101 to MUSC 118)

Minor in Performing Arts

Designed for the student who wishes to explore the fields of dance, music and theater rather than specialize in one area, the minor in performing arts provides motivated students the opportunity to learn about all three areas while performing for two years in one or more of the department's performing groups.

Required Courses

DANC 210	Introduction to Dance	3.0
MUSC 130	Introduction to Music	3.0
Applied music (two terms selected from MUSC 241/242)		4.0
THTR 115	Theatrical Experience	3.0
Theatre Elective		3.0
Dance Elective		3.0
Performing Arts Electives		7.0
Performing Arts Practicum *		0.0
Total Credits		26.0

* Performing arts practicum (6 terms from MUSC 101 - MUSC 115, THTR 130 , and/or DANC 131 - DANC 133).

Minor in Retail

The retail minor, administered by the Design & Merchandising Program, provides basic foundations in retail operations, buying and merchandise planning and e-commerce. The curriculum allows the opportunity for individualized tailoring according to a student's interests. The minor is open to all Drexel University students, and requires the completion of eight or nine courses for a minimum of 24.0 credits.

Required Courses:

DSMR 205	eFashion Promotion	3.0
DSMR 231	Retail Principles *	3.0
DSMR 232	Retail Merchandise Planning *	4.0
DSMR 233 [WI]	Retail Image Analysis	3.0
DSMR 324	Retail Intersections: Social & Cultural Issues	3.0
DSMR 325	Retail Buying and Assortment Strategies	4.0
Select 2-3 courses:		7.0-9.0
DSMR I299	Independent Study in Design & Merchandising	
DSMR 305	eTailing	
DSMR 313	International Fashion Merchandising	
DSMR 326	Fashion Product Promotion	
DSMR 397	Retail Practicum	
DSMR 434	Fashion Product Sourcing	
RETL 325	Applied In-Store Visual Strategies	
Total Credits		27.0-29.0

* All courses are currently open to all DSMR students. DSMR 231 and DSMR 232 are required for all students enrolled in DSMR and the retail minor. The three elective courses can be delivered during other quarters as required. All courses will be restricted to appropriately include the students enrolled in the retail minor. As the industry and curriculum change, courses will be added and adapted accordingly.

Screenwriting

Minor in Screenwriting

The minor in screenwriting is intended to guide the student from the acquisition of basic screenwriting skills through the completion of a full-length feature screenplay. Fifteen of the credits are directly craft-oriented, teaching the student what she needs to know to translate her ideas into a format suitable for production; the other nine credits are dedicated to background knowledge intended to inform her creative thinking.

Film & video majors should note that they will be taking half of the courses in the screenwriting minor as part of their degree requirements, making this minor a relatively simple addition to their education.

Required courses

FMST 150	American Classic Cinema	3.0
FMST 160	European Cinema	3.0
SCRP 270 [WI]	Screenwriting I	3.0
SCRP 275 [WI]	Screenwriting II	3.0
SCRP 310	Literature for Screenwriters	3.0
SCRP 370	Screenplay Story Development	3.0
SCRP 380	Screenwriting Workshop I	3.0
SCRP 381	Screenwriting Workshop II	3.0
Total Credits		24.0

Minor in Somatics

An understanding of movement and body language has become increasingly important across many fields; in communication, corporate training, movement therapy, education, performance, rehabilitation, sport and fitness. Physical health, clear communication and effective leadership all rely on an awareness of how we carry our bodies through our lives.

The Somatics Minor provides an in-depth study of the body, building from an understanding of its functional/structural basis, to its patterns and habits. We focus on how to interpret, analyze, and articulate somatic concepts and develop strategies for application.

Admission requirements

Admission on consultation with Somatics Coordinator:

Jennifer Morley
jsm76@drexel.edu
215.895.2018

Minor Requirements

DANC 120	Yoga	3.0
DANC 180	Dance Improvisation	2.0
DANC 261	Foundations of Somatic Theory and Practice	3.0
DANC 262	Dance and Fitness	3.0
DANC 263	Survey of Somatic Practices	3.0
DANC 330	Introduction to Laban Movement Analysis	3.0
DANC 360	Dance Kinesiology	3.0
Complete two of the following courses:		4.0-5.0
DANC 140	Ballet Technique I	
DANC 141	Ballet Technique II	
DANC 142	Ballet Dance Technique III	
DANC 150	Modern Dance Technique I	
DANC 151	Modern Dance Technique II	
DANC 152	Modern Dance Technique III	
DANC 160	Jazz Dance Technique I	
DANC 161	Jazz Dance Technique II	

DANC 162	Jazz Dance Technique III	
DANC 170	Hip-Hop Dance Technique I	
DANC 171	Hip-Hop Dance Technique II	
DANC 181	Dance Improvisation II	
DANC 190	African Dance Technique I	
DANC 191	African Dance Technique II	
DANC 260	Injury Prevention for Dance	

Total Credits

24.0-25.0

Minor in Sports Media Production

About the Program

The Sports Media Production Minor is a gateway for students committed to pursuing a career and a meaningful introduction for those who are intrigued but uncertain about sports media as a profession. Students are required to take the same foundational shooting & lighting, editing, sound, and studio operations courses as the TV Production and Media Management and Film and Video majors and minors. They are also required to take a TVIE sports media strategy course as well as SMT digital and sports media history courses that will provide a greater academic and contextual understanding of the profession. With additional courses in actual physical production, on-air performance, and technology courses.

FMVD 110	Basic Shooting and Lighting	3.0
FMVD 115	Basic Editing	3.0
FMVD 120	Basic Sound	3.0
SMT 110	The Business of Sport	3.0
SMT 290	Digital Media in Sport	3.0
TVIE 250	TV Sports Program Strategies	3.0
TVPR 100	TV Studio: Basic Operations	3.0
TVPR 356	DNews	3.0
	or TVPR 357 DNews II	
Choose one of the following		3.0
TVPR 200	TV Studio: Live Directing	
TVPR 242	TV On-Camera Performance	
TVPR T280	Special Topics in TV Production	
TVPR T380	Special Topics in TV Production	
TVPR T480	Special Topics in TV Production	
SMT T280	Special topics in SMT	
SMT T380	Special topics in SMT	
SMT T480	Special topics in SMT	

Total Credits

27.0

Minor in Sustainability in the Built Environment

The intent of this minor is to prepare students to engage and analyze future design challenges from a sustainability perspective. Students completing this program will be able to approach these challenges in a resourceful and insightful way, with a solid foundation of sustainability principles. The emphasis on collaboration and trans-disciplinary teamwork will allow students to serve as agile leaders in their future careers and be active participants in the critical discourse of their field.

In addition to the 15.0 credits of core courses, students select 9.0 credits of electives. The list below will be updated as new courses in sustainability become available. Students having a question about the inclusion of a course not currently listed as a possible elective should check with the coordinator for this minor.

Additional Information

For additional information about this program, visit the College's Sustainability in the Built Environment web page. Or contact the program's advisor:

Diana Nicholas
URBN Center, Suite 410
Phone: 215.571.4432
dsn35@drexel.edu

Required Courses

ARCH 315	Sustainable Built Environment I	3.0
ARCH 320	Sustainable Built Environment II	3.0
INTR 310	Sustainability: History, Theory and Critic	3.0
INTR 410	Collaborative Research in Sustainability	3.0

Arts and Sciences Course

Students must select one of the following courses from the Arts and Science College or an approved substitute with the permission of the advisor for this minor:

ANTH 360	Culture and the Environment	
ENVS 260	Environmental Science and Society	
PHIL 341	Philosophy of the Environment	
SOC/ENVP 345	Sociology of the Environment	

Additional Electives *

Students select three of the following (or alternative options with the permission of the advisor for this minor):

ANTH 360	Culture and the Environment	
ARCH 348 [W]	Studies in Vernacular Architecture	
ARCH 463	Emerging Architectural Technology	
ARCH 465	Energy and Architecture	
COM 317 [W]	Environmental Communication	
INTR 465/ENVP 360	Special Topics in Interior Design	
ENVS 260	Environmental Science and Society	
PHIL 341	Philosophy of the Environment	
SOC 341	Environmental Movements in America	
SOC/ENVP 345	Sociology of the Environment	

Total Credits 24.0

* The elective list will be updated as new courses in sustainability become available. If a student has questions regarding inclusion of a course not on this list, he or she should see the Advisor for the Sustainability in the Built Environment Minor Program.

Minor in Television Industry and Enterprise

Students with a 3.0 or higher G.P.A. may apply for the TV Industry & Enterprise minor program. Once accepted, they take 21.0 credits of required courses that provide a basic foundation in the historical, financial, and programming elements of the television industry. The remaining 6.0 credits of study provide students the opportunity to have more hands-on production experience and/or to delve more deeply into the academic study of a specific area of interest.

Required Courses

TVIE 180	TV Industry Overview	3.0
TVIE 280	Research, Sales and Programming	3.0
TVIE 285	Media Law and Ethics	3.0
TVIE 290	Introduction to Money and the Media	3.0

TVST 260	History of Television	3.0
One of the following courses:		3.0
TVST 261	History of TV Journalism	
TVST 361	Art of TV Comedy	
TVST 362	Art of TV Drama	
Three of the following courses:		9.0
EAM 211	Strategic Management for Entertainment and Arts Management	
EAM 365	Media and Entertainment Business	
EAM 391 [W]	Promotion, Press and Publicity	
FMVD 110	Basic Shooting and Lighting	
FMVD 115	Basic Editing	
FMVD 120	Basic Sound	
SCRIP 270 [W]	Screenwriting I	
TVIE 365	Special Topics: TVIE	
TVPR 100	TV Studio: Basic Operations	
TVPR 200	TV Studio: Live Directing	
TVPR 201	TV Studio: Comedy	
TVPR 202	TV Studio: Drama	
TVPR 205	TV Studio: Advanced Live Directing	
TVPR 240	Producing for Television	
Total Credits		27.0

Courses

TVIE 180 TV Industry Overview 3.0 Credits

The TV industry (broadcast, cable, satellite and internet) is explored. Topics examined include station and network relations, production, support systems, sales and promotion, revenue streams (advertiser, subscriber and hybrid), financial and legal systems that control TV, and program formats including TV content distributed by Internet, Wifi and mobile.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

TVIE 250 TV Sports Program Strategies 3.0 Credits

The course will analyze the "big 4" major sports franchises (NFL, MLB, NBA, NHL) by looking at the rights holders, the marketing, the ratings, and the coverage. We will also examine the creation and growth of Regional and National Sports Networks, and study the innovators and their contributions to the business of sports on television. We will examine how sports teams generate revenue with television, how advertising and sponsorships are bought and sold, and how television rights are negotiated and awarded.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

TVIE 280 Research, Sales and Programming 3.0 Credits

Research, sales and programming are the core of the TV industry. Students examine the selling environment; the research process; the meaning of "audience"; metrics; the sales process; market analysis; program promotion; and broadcast, cable, radio, and interactive media sales. Formats, day parts, scheduling, linkages and promotions are also explored.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

TVIE 285 Media Law and Ethics 3.0 Credits

This course studies the intersection of media law and ethics. Included are: current legal issues in old and new media industries, the First Amendment, Congress and the FCC, licensing and regulation of media businesses, intellectual property and rights acquisition, and the foundation for ethical actions that result from multiple cross-pressures.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVIE 180 [Min Grade: D] or EAM 130 [Min Grade: D]

TVIE 290 Introduction to Money and the Media 3.0 Credits

This course focuses on the economics of various segments of the media business, with an emphasis on television through its past, present and future incarnations. Instruction will focus on the business models for various media, and case studies of financial decisions faced by media companies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVIE 365 Special Topics: TVIE 1.0-3.0 Credit

This is a Special Topic course in the TV Industry & Enterprise Track that will have rotating topics that address current interests in the field.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 21 credits

TVIE 390 Practicum: Promotions 3.0 Credits

Students learn the art of promotions through industry placements, including DUTV. Students will produce promos for TV shows, create on-air branding elements for stations, design promotion materials, and complete other tasks related to promotions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D] and TVIE 180 [Min Grade: D] and TVIE 280 [Min Grade: D]

TVIE 391 Practicum: Programming 3.0 Credits

Students learn the art of programming a television station through industry placements, including DUTV. Students will aid in programming negotiation and acquisition, log and systems preparation, and other programming related duties.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D] and TVIE 180 [Min Grade: D] and TVIE 280 [Min Grade: D]

TVIE 392 Practicum: New Media Management 3.0 Credits

Students learn the operation of new media enterprises through industry placements, including DUTV. Students will develop ways to develop, promote, and disseminate new media content related to the television industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

Prerequisites: DIGM 100 [Min Grade: D] and DIGM 240 [Min Grade: D] and FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D] and TVIE 180 [Min Grade: D] and TVIE 280 [Min Grade: D]

TVIE 399 Independent Project in TV Industry and Enterprise 0.5-12.0 Credits

This course offers students the opportunity to do an Independent Project in TV Industry & Enterprise.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

TVIE 480 TV Professions and Business 3.0 Credits

An exploration of professions and opportunities for entrepreneurship in the TV industry through readings and guest lectures. After student assess their research, skills, and talents, they will research professional and business opportunities that match their future aspirations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVIE 495 Senior Project: TV Enterprise I 3.0 Credits

This is the first course in a 3 course sequence for senior project in the TV Industry & Enterprise Track. Students will survey market opportunities, look at the competition and design a plan for new product development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is TELE and classification is Senior.

TVIE 496 Senior Project: TV Enterprise II 3.0 Credits

This is the second course in a 3 course sequence for senior project in the TV Industry & Enterprise Track. Students will survey market opportunities, look at the competition and design a plan for new product development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is TELE and classification is Senior.

TVIE 497 Senior Project: TV Enterprise III 3.0 Credits

This is the third course in a 3 course sequence for senior project in the TV Industry & Enterprise Track. Students will survey market opportunities, look at the competition and design a plan for new product development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is TELE and classification is Senior.

TVIE I199 Independent Study in TV Industry & Enterprise 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIE I299 Independent Study in TV Industry & Enterprise 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIE I399 Independent Study in TV Industry & Enterprise 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

TVIE I499 Independent Study in TV Industry & Enterprise 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIE T180 Special Topics in TV Industry & Enterprise 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIE T280 Special Topics in TV Industry & Enterprise 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIE T380 Special Topics in TV Industry & Enterprise 1.0-3.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 21 credits

TVIE T480 Special Topics in TV Industry & Enterprise 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Minor in TV Production & Media Management

Students with a 3.0 or higher G.P.A. may apply for the TV Production & Media Management minor program. Once accepted, they take 21.0 credits of required courses that provide a basic foundation in the technical, historical, and creative elements of television production. The remaining 6.0 credits of study provide students the opportunity to have more hands-on production experience and/or to delve more deeply into the academic study of a specific area of interest.

Required Courses

FMVD 110	Basic Shooting and Lighting	3.0
FMVD 115	Basic Editing	3.0
FMVD 120	Basic Sound	3.0
SCRIP 270 [WI]	Screenwriting I	3.0
TVPR 100	TV Studio: Basic Operations	3.0
TVPR 212	TV Commercials and Promos	3.0
TVST 260	History of Television	3.0
Two of the following courses:		6.0
SCRIP 241	Writing TV Comedy	
SCRIP 242	Writing TV Drama	
TVPR 200	TV Studio: Live Directing	
TVPR 201	TV Studio: Comedy	
TVPR 202	TV Studio: Drama	
TVPR 205	TV Studio: Advanced Live Directing	
TVPR 220	TV News Writing	
TVPR 221	TV News Production	
TVPR 230	Scripted TV Production	
TVPR 232	TV Field: Industrials	
TVPR 236	Reality TV Production	
TVPR 240	Producing for Television	
TVPR 242	TV On-Camera Performance	
TVPR 365	Special Topics: TVPR	

TVST 361	Art of TV Comedy	
TVST 362	Art of TV Drama	
TVST 365	Special Topics: TVST	
Total Credits		27.0

Minor in Theatre

The minor in theatre consists of two distinct, yet closely integrated components: academics and performance. The intertwining of foundation studies and practical application empowers students to discover and develop their own voice and style in their art.

Required Course

THTR 121 [WI]	Dramatic Analysis	3.0
Theatre History Requirement		
Select 6.0 credits from any combination of approved 3.0 credit Theatre courses listed below with Historical Perspectives (these include 3.0 credit special topics courses with a historical theater perspective as well)		6.0
THTR 221 [WI]	Theatre History I	
THTR 222 [WI]	Theatre History II	
THTR 231	Introduction to Musical Theatre	
THTR 232	Contemporary Musical Theatre	
Select 3.0 credits total from any combination of the following 1.0 credit courses:		3.0
THTR 130	Introduction to Theater Production Practicum	
THTR 131	Theatre Performance Practicum	
THTR 132	Theatre Production Practicum	
THTR 133	Theatre Management Practicum	
THTR 134	Open Mic Management Practicum	
THTR 141	Theatre Performance Ensemble	
THTR 142	Director's Lab Practicum	
THTR 143	Musical Theatre Cabaret	
THTR 144	NewWorks Festival Performance Practicum	
Select 12.0 credits from the following:		12.0
THTR 110	Voice and Articulation	
THTR 115	Theatrical Experience	
THTR 116	Philadelphia Theatre Let's Go!	
THTR 131	Theatre Performance Practicum	
THTR 132	Theatre Production Practicum	
THTR 209	Improvisation for the Theatre	
THTR 210	Acting: Fundamentals	
THTR 211	Acting: Scene Study	
THTR 212	Sketch Comedy	
THTR 231	Introduction to Musical Theatre	
THTR 232	Contemporary Musical Theatre	
THTR 240	Theatre Production I	
THTR 241	Theatre Production II	
THTR 260	Production Design	
THTR 320	Play Direction	
THTR 360	Lighting Design	
THTR I199	Independent Study in THTR	
THTR I299	Independent Study in THTR	
THTR I399	Independent Study in THTR	
THTR I499	Independent Study in THTR	
THTR T180	Special Topics in Theatre	
THTR T280	Special Topics in Theatre	
THTR T380	Special Topics in Theatre	
THTR T480	Special Topics in Theatre	
Total Credits		24.0

Dance Studies

Professional Dance Certificate Program

Certificate Level: Undergraduate

Admission Requirements: High school diploma or GED equivalency

Certificate Type: Certificate

Number of Credits of Completion: 18.0

Instructional Delivery: Campus

Calendar Type: Quarter

Maximum Time Frame: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 50.0399

Standard Occupational Classification (SOC) Code: 27-2031

The certificate in dance studies is a 1-year option for any qualified professional dancer to assess whether they have the interest and aptitude for entering an undergraduate dance program. The certificate program has no entrance requirement beyond possession of a high school diploma or GED equivalency. All credits earned in the certificate of study in dance will be transferable into the part-time or full time BS degree in Dance (p. 480).

General Requirements

DANC 100	Survey of Dance Studies	3.0
DANC 260	Injury Prevention for Dance	3.0
DANC 201 [WI]	Dance Appreciation	3.0
DANC 210	Introduction to Dance	3.0
DANC 330	Introduction to Laban Movement Analysis	3.0
DANC 355	Rhythmic Study for Dance	3.0
Total Credits		18.0

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 - Graduate (<http://catalog.drexel.edu/coursedescriptions/quarter/grad>)
 - Undergraduate (p. 548)
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 - Graduate (<http://catalog.drexel.edu/coursedescriptions/semester/grad>)
 - Undergraduate (p. 965)

Quarter

- Graduate (<http://catalog.drexel.edu/coursedescriptions/quarter/grad>)
- Undergraduate (p. 548)

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Accounting

Courses

ACCT 110 Accounting for Professionals 4.0 Credits

The course is open only to non-business students. A nontechnical introduction to the principles of financial and managerial accounting with emphasis on the use and interpretation of financial reports, managerial planning and control. The course would also provide an overview of business entities and taxation for businesses and individuals. The course is for the individual who seeks a basic knowledge of accounting and its uses. It is designed for the user of accounting information rather than the preparer. This course cannot be substituted for ACCT 115 or 116. Students graduating with a major in the School of Business cannot receive credit for this course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BAE or major is BUSN or major is ECON

ACCT 115 Financial Accounting Foundations 4.0 Credits

Introduces preparation of the income statement and the balance sheet. Covers analysis and recording of business transactions and a detailed study of accounting for assets, liabilities, and equity.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 116 Managerial Accounting Foundations 4.0 Credits

Introduces the managerial accounting tools and models available for planning, controlling, and decision-making. Covers budgeting, product costing, and analysis of financial statements for internal purposes.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 115 [Min Grade: D] or ACCT 110 [Min Grade: D]

ACCT 120 Accounting Essentials for New Ventures 4.0 Credits

The course covers essential accounting topics specific to new entrepreneurial ventures. Topics include: Financial Statement, cash flow issues, cost accounting, tax calculations, and choice of business entity.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 320 Fundamentals of Accounting for New Ventures 4.0 Credits

This course helps students develop an understanding of the key elements of designing an accounting system and support policies and procedures for a new business venture.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

Prerequisites: ACCT 115 [Min Grade: C] and ACCT 116 [Min Grade: C]

ACCT 321 Financial Reporting I 4.0 Credits

Provides intensive review of current accounting practice in light of authoritative pronouncements and critical study of theory and practice relating to preparing financial statements.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ACCT 115 [Min Grade: C]

ACCT 322 Financial Reporting II 4.0 Credits

Continues critical study of accounting theory and practice relating to financial statement items and selected accounting topics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ACCT 321 [Min Grade: C]

ACCT 323 Financial Reporting III 4.0 Credits

Provides a detailed analysis of higher level financial accounting topics, connects topics learned in all financial reporting classes, and requires successful completion of a senior project on financial reporting.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ACCT 322 [Min Grade: C]

ACCT 329 Advanced Accounting 4.0 Credits

Study of theory and practice related to advanced accounting topics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 323 [Min Grade: C]

ACCT 331 Cost Accounting 4.0 Credits

Continues ACCT 116. Emphasizes the use of accounting information in business decisions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ACCT 116 [Min Grade: C]

ACCT 341 Principles of Auditing 4.0 Credits

Covers auditing standards and professional ethics, auditing theory and concepts, audit evidence and procedures, and auditors' reports.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ACCT 322 [Min Grade: C]

ACCT 344 Internal Auditing 4.0 Credits

Internal Auditing brings a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control and governance processes. It is designed to add value and improve an organization's operations. Topics covered include: The Institute of Internal Auditors' International Professional Practices Framework; risk assessment, including internal control system evaluation; and the relationship of management and employee fraud to the internal audit process. Outside speakers and case studies will be used to demonstrate the application of internal auditing practices in the real world.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT I199 Independent Study in ACCT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ACCT I299 Independent Study in ACCT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ACCT I399 Independent Study in ACCT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ACCT I499 Independent Study in ACCT 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ACCT T180 Special Topics in ACCT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ACCT T280 Special Topics in ACCT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ACCT T380 Special Topics in ACCT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ACCT T480 Special Topics in ACCT 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Advertising Design

Courses

ADGD 200 Introduction to Advertising 4.0 Credits

Examines effective targets advertising and the working relationships between art direction and copywriting. Art direction and graphic design techniques for creative strategies are explored.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: VSCM 230 [Min Grade: D] and VSCM 240 [Min Grade: D]

ADGD 210 Print Advertising I 4.0 Credits

This course examines the creative process and research for creating innovative advertising. Students design and create a series of ads in market segments that include retail, trade, corporate identity, non-profit, and public service.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: VSCM 240 [Min Grade: D] and VSCM 242 [Min Grade: D]

ADGD 310 Television and Web Advertising 4.0 Credits

A concept-focused exploration of the creative process essential to creating effective ads for TV and new media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: ADGD 210 [Min Grade: D] or WMGD 210 [Min Grade: D]

ADGD 320 Print Advertising II 4.0 Credits

Advanced advertising design class instruction that will result in a portfolio of design work that demonstrates innovative solutions and visual systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: ADGD 210 [Min Grade: D] and VSCM 230 [Min Grade: D] and VSCM 240 [Min Grade: D]

ADGD 496 Senior Thesis in Advertising Design 3.0 Credits

Students will meet with faculty advisors to create a comprehensive self-described project. Proposals must be approved by faculty.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: ADGD 310 [Min Grade: D]

ADGD I199 Independent Study in ADGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ADGD I299 Independent Study in ADGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ADGD I399 Independent Study in ADGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ADGD I499 Independent Study in ADGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ADGD T180 Special Topics in Advertising Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ADGD T280 Special Topics in Advertising Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ADGD T380 Special Topics in Advertising Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ADGD T480 Special Topics in Advertising Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Africana Studies

Courses

AFAS 101 Introduction to Africana Studies 3.0 Credits

Provides an overview of the experience, culture, and political practices of African descendants in the Americas and the Caribbean. The course uses a multidisciplinary approach to introduce students to the history, art, music, and literature of the African Diaspora.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

AFAS 201 Cross Currents in Africana Studies 3.0 Credits

With a temporal focus on the 20th century, this course critically explores and analyzes the cultural, political and intellectual practices of blacks in North, Central, and South America as well as in the Caribbean.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

AFAS 250 African American Herstories 3.0 Credits

Students gain insights into three distinct historical periods of African American (American) History and a cross section of African American life through the reading, analysis, and discussion of selected African American women's autobiographies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

AFAS 255 Gender & Black Popular Culture 3.0 Credits

This course critically examines the media's role in the social construction of "Blackness." Paying particular attention to images of race, culture and gender, this course examines representations of Black women and men in "popular culture" (film, television, music, advertising, etc.).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

AFAS 260 Race, Politics and Religion 3.0 Credits

An examination of race and religion as in liberal tradition. How has liberal theory purported the state will confront issues of race and religion? Have the political realities of race and religion in the modern state lived up to the promises laid out by liberalism?.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

AFAS 301 Politics of Hip Hop 3.0 Credits

This class is an interdisciplinary, socio-historical introduction to rap music and hip hop culture. Several themes will be explored including the origins of rap music as well as the role of urban youth and their notions of race and gender. Record industry practices will also be investigated together with the impact of commercialism on hip hop. We will also consider sexism, misogyny, and violence in both the music and culture.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

AFAS 310 Women, Crime, & History 3.0 Credits

This class will examine gender, race and crime in US history. Specifically, we will explore the experience of female criminals from the colonial period to the present. We will conduct primary research into this subject at the Philadelphia City Archive (PCA), located at 3101 Market Street. Students will be responsible for a final research paper based on their research findings.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

AFAS 385 Rum, Rice and Revolution: Caribbean History 3.0 Credits

Course provides a broad, interdisciplinary and socio-historical introduction to the Caribbean. Several themes are covered including empire and the making of the Caribbean; slavery and emancipation; labor formation and race; revolution and resistance; gender oppression and women's experiences; and cultural expressions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

AFAS 401 Urban Social Justice Practicum I 3.0 Credits

The Urban Social Justice Practicum offers Drexel students an exciting opportunity to work on-site at a variety of community based organizations that address issues relevant to the African Diaspora. Students can work as mentors, teaching assistants, and interns and inner-city schools, governmental agencies, judicial offices and health care facilities. Working 5 hours per week at a site of their choosing, students also participate in weekly seminars, maintain journals, and complete a final paper. Course runs over two quarters.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

AFAS 402 Urban Social Justice Practicum II 3.0 Credits

The Urban Social Justice Practicum offers Drexel students an exciting opportunity to work on-site at a variety of community based organizations that address issues relevant to the African Diaspora. Students can work as mentors, teaching assistants, and interns and inner-city schools, governmental agencies, judicial offices and health care facilities. Working 5 hours per week at a site of their choosing, students also participate in weekly seminars, maintain journals, and complete a final paper. Course runs over two quarters.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: AFAS 401 [Min Grade: CR]

AFAS I199 Independent Study in AFAS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AFAS I299 Independent Study in AFAS 0.5-3.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 6 credits

AFAS I399 Independent Study in AFAS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AFAS I499 Independent Study in AFAS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AFAS T180 Special Topics in Africana Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AFAS T280 Special Topics in Africana Studies 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AFAS T380 Special Topics in Africana Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AFAS T480 Special Topics in Africana Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Anatomy

Courses

ANAT 101 Anatomy & Physiology I 5.0 Credits

This course is a general study of the structures and physiology of the human body. Fundamental concepts of microscopic tissue structure, gross structures of organs and body system organization are taught. The course consists of both lecture and lab material. The lecture portion deals with the general principles. In the lab, the student participates with practical examination of microscopic sections, tissues and organs, and the anatomical layout of human cadavers. The cell, tissues and musculoskeletal system will be covered in this course, as well as muscle and nerve physiology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ANAT 102 Anatomy & Physiology II 5.0 Credits

This course is a continuation of ANAT 101. This course is a general study of the structures & physiology of the human body. Fundamental concepts of microscopic tissue structure, gross structures of organs and body system organization are taught. The course consists of both lab and lecture material. The lecture deals with the general principles. In the lab, the student participates with practical examination of microscopic sections, tissues and organs, and the anatomical layout of various animal cadavers. The nervous, endocrine and digestive system will be covered in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 101 [Min Grade: D]

ANAT 103 Anatomy & Physiology III 5.0 Credits

This course is a continuation of ANAT 101 & 102. This course is a general study of the structures and physiology of the human body. Fundamental concepts of microscopic tissue structure, gross structures of organs and body system organization are taught. The course consists of both lab and lecture material. The lecture deals with the general principles. While in the lab, the student participates with practical examination of microscopic sections, tissues, organs and the anatomical layout of various animal cadavers. The cardiovascular, lymphatic, respiratory, urinary and reproductive systems will be covered.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 102 [Min Grade: D]

ANAT 202 Sectional Anatomy 3.0 Credits

This course is designed to bridge the gap between Anatomy & Physiology and Advanced Anatomy. Anatomy of the head, neck, thorax, abdomen and pelvis is reviewed. Relationships of surface and internal structures from different bodily systems are emphasized. The analysis is supported by illustrations, CT scans, and MRI images.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 103 [Min Grade: D]

ANAT 420 Advanced Anatomy I 4.0 Credits

This course introduces the fundamentals of gross anatomy. Emphasis is placed on the regional study of the head, neck, back and upper extremity. Special attention is directed to study of the brain and spinal cord. Laboratory materials include human cadavers, models, radiographs, CT scans, MRI images and relevant web sites.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 103 [Min Grade: D]

ANAT 421 Advanced Anatomy II 4.0 Credits

This course is a continuation of ANAT 420. Emphasis is placed on the regional study of the thorax, abdomen, pelvis and lower extremity. Laboratory material include human cadavers, models, radiographs, CT scans, MRI images and relevant web sites.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 420 [Min Grade: D]

Animation

Courses

ANIM 140 Computer Graphics Imagery I 3.0 Credits

Students learn to represent 3D objects and spaces in 2D media using a variety of drawing and computer graphic techniques. This course lays important foundations for subsequent courses in 3D computer modeling and animation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 100 [Min Grade: D] or VSCM 200 [Min Grade: D]

ANIM 141 Computer Graphics Imagery II 3.0 Credits

This course will introduce students to the principles and techniques of 3D virtual scene building for animation, visualization and game development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 110 [Min Grade: D] or ANIM 140 [Min Grade: D]

ANIM 152 Multimedia Timeline Design 3.0 Credits

Introduces basic design concepts and tools to create time based 2D and 3D multimedia. Addresses issues from pre-production planning, through, post-production and delivery; emphasis on time-based multimedia.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 100 [Min Grade: D] and VSST 110 [Min Grade: D]

ANIM 211 Animation I 3.0 Credits

Explores computer animation with an introduction to concepts of 3D animation. Includes narrative structure, storyboarding, and development. Emphasizes aesthetic, technical and conceptual issues. Requires students to create shorty animations in timeline based software.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ANIM 140 [Min Grade: D] and ANIM 152 [Min Grade: D]

ANIM 212 Animation II 3.0 Credits

Builds on topics introduced in ANIM 211 Animation I, incorporating advanced animation techniques such as inverse kinematics and dynamics. Requires students to propose, design, and produce a short animation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ANIM 211 [Min Grade: D] or DIGM 211 [Min Grade: D]

ANIM 215 History of Animation 3.0 Credits

Students learn the pre-cursors to modern animation and the evolution of the art since the beginning of the 20th century. Concepts in both 2D and 3D animation will be covered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ANIM 220 Digital Compositing I 3.0 Credits

Examines digital compositing possibilities through the manipulation and recombination of acquired and produced digital imagery, including study of digital image and video formats, color space, live action digital matte painting, Greenscreen/Bluescreen compositing, rotoscope masking and 2D tracking.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (DIGM 100 [Min Grade: D] or VSST 108 [Min Grade: D]) and FMVD 110 [Min Grade: D]

ANIM 221 Digital Compositing II 3.0 Credits

Examines 2D and 3D digital compositing possibilities through the manipulation and recombination of acquired and produced digital imagery, including 2D/3D Integration, 3D Matchmoving, and High Dynamic Range Imagery.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ANIM 211 [Min Grade: D] and ANIM 220 [Min Grade: D]

ANIM 231 Scripting for Animation and Visual Effects 3.0 Credits

This course explores modern scripting languages utilized in Animation and Visual Effects operating systems and software tools that are integral to artist productivity and production pipeline scalability.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: CS 140 [Min Grade: D] or CS 171 [Min Grade: D]

ANIM 247 Organic Modeling 3.0 Credits

This course will be an intensive exploration of organic modeling. Students will learn the best approaches to modeling organic forms and why these approaches are relevant. There will be considerable emphasis on anatomical forms.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ANIM 141 [Min Grade: D] or DIGM 141 [Min Grade: D]

ANIM 248 Advanced Lighting 3.0 Credits

Students will learn to integrate production-oriented lighting techniques into animation. Techniques utilizing both point-based and raytraced global illumination will be covered, and how to optimize pipelines for animation. Basic shader development will also be covered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ANIM 141 [Min Grade: D] or DIGM 141 [Min Grade: D]

ANIM 314 Character Animation I 3.0 Credits

Examines issues and processes of 3D character development. Addresses various modes of 3D data wrangling for highly detailed, articulated character controls.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ANIM 212 [Min Grade: D] or DIGM 212 [Min Grade: D]

ANIM 315 Character Animation II 3.0 Credits

Covers advanced techniques of inverse and forward kinematics, full-character skeletal setup, development of animation, and puppeteer controls. Explores levels of reality, and world interaction within scope of character.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ANIM 314 [Min Grade: D] or DIGM 314 [Min Grade: D]

ANIM 321 Immersive Animation 3.0 Credits

Students will explore and experiment with non-planar multi-perspective projection to develop a unique and powerful immersive animation experience. Focus will be on the production of animations for both irregular architectural surfaces and conventional projection environments such as fulldome.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ANIM 212 [Min Grade: D] or DIGM 212 [Min Grade: D]

ANIM 388 Spatial Data Capture 3.0 Credits

Students learn about the tools available to integrate components from the physical environment into computer animations and games. Aspects covered will be 3D scanning, motion capture and imaging techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 212 [Min Grade: D] or ANIM 212 [Min Grade: D]

ANIM 399 Independent Project in Animation 0.5-12.0 Credits

Supervised planning and execution of a project in the area of Animation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ANIM 410 Advanced Compositing 3.0 Credits

Students learn to create detailed visual effects, and the best methods to integrate them into live-action plates. Drawing on existing compositing and animation knowledge, students will work in groups to produce short visual effects sequences.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: (ANIM 219 [Min Grade: D] or ANIM 221 [Min Grade: D]) and ANIM 212 [Min Grade: D]

ANIM 411 Advanced Animation 3.0 Credits

This course explores a wide range of visual effects assets, both practical and synthetic. Projects focus on the creation of a comprehensive short animation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: ANIM 410 [Min Grade: D] or DIGM 302 [Min Grade: D] or ANIM 219 [Min Grade: D]

ANIM 435 Technical Directing for Animation 3.0 Credits

Students learn the necessary toolsets for technical direction of animated films and visual effects. The topics covered include Pythos scripting, pipeline development and integration and creation of custom shaders to streamline production processes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ANIM 219 [Min Grade: D] or DIGM 302 [Min Grade: D]

ANIM 465 Special Topics in Animation 3.0 Credits

Addresses current topics in Animation. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ANIM I199 Independent Study in Animation 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ANIM I299 Independent Study in Animation 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ANIM I399 Independent Study in Animation 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ANIM I499 Independent Study in Animation 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ANIM T180 Special Topics in Animation 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ANIM T280 Special Topics in Animation 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ANIM T380 Special Topics in Animation 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ANIM T480 Special Topics in Animation 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Anthropology

Courses

ANTH 101 Introduction to Cultural Diversity 3.0 Credits

Examines the diversity that exists in human culture. Uses lectures, films, and discussions to examine and illustrate the relationship between humans and their social/cultural systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 110 Human Past: Anthropology and Prehistoric Archeology 3.0 Credits

Examines human origins from the australopithecines to the present, including both the physiological and archaeological records. Discusses new finds and new interpretations of evolution.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 111 Introduction to Biological Anthropology 3.0 Credits

Anthropology is the holistic study of the human condition. Biological anthropology is a subfield of the larger discipline that studies humankind as a zoological species. As biological anthropology is firmly rooted in evolutionary theory, the evolutionary biology of humans is the central focus of the course. Basic concepts of genetics, geology, paleontology, comparative anatomy, primate biology and material culture provide the foundation for understanding humanity's place in nature.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 112 Language, Culture & Cognition 3.0 Credits

This course is an introductory survey of three ways language is understood as a central element that glues together human culture; language around categories and taxonomies as shared perception; language origins and evolution; and language as socialization. An additional fourth unit on fieldwork methods in cross-cultural understanding and language starts to prepare you for future qualitative research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 120 Biblical Archaeology: The Archaeology of Israel and Jordan 3.0 Credits

Examines the archaeology of Israel and Jordan from the earliest human occupation until the Persian Conquest in 535 B.C. Discusses many places described in the Old Testament in an archaeological context.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 210 [WI] Worldview: Science, Religion and Magic 3.0 Credits

Examines anthropological and archaeological evidence of the worldviews of non-literate people, as shown in the practice of ceremony, magic, sorcery, and witchcraft, and the role of shamans and priests. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ANTH 212 [WI] Topics in World Ethnography 3.0 Credits

Examines the peoples and cultures of the selected cultural areas. Emphasizes indigenous cultures and the effects of modernization on these cultures.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ANTH 215 Anthropology of Gender 3.0 Credits

This course takes an ethnographic approach to the study of gender socializations and gender roles. We will address issues of sex roles, the cultural construction of gender categories, the forms of gender inequality, and the ways cultures engage in gender based power relationships. While these issues will be dealt with in specific and local ethnographic contexts, students will be encouraged to make comparisons across the contexts and to compare these works with their own experience.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 220 Aging In Cross-Cultural Perspective 3.0 Credits

Examines the status, roles, and treatments of elderly people in various societies throughout the world and among minority groups in the United States.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 225 Anthropology of Youth 3.0 Credits

What is youth? Is it a universal, biological phase of human life somewhere between childhood and adulthood, or a cultural category, socially constructed and historically contingent? Does it mean the same thing to be young today in the US, Samoa, Indonesia, Nepal, or Japan, or do place, culture, history, media, and politics dramatically influence the feeling and experience of being young? This course addresses these and other questions raised by anthropologists about the culture and nature of "youth." We will be analyzing youth as an idea, an identity, a moral panic, a branding distinction, and an obsession.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 240 Urban Anthropology 3.0 Credits

This course will give students the opportunity to familiarize themselves with the major themes in urban anthropology and how they relate to other areas of research in anthropology and the social sciences in general. Students will focus on the research methods used by urban anthropologists as well as read different ethnographic cases of urban life.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 245 Reflecting on Work Identity 3.0 Credits

Reflecting on Work Identity is an online course developed for students to take during their first co-op cycle. The first phase of the course will focus on the "self"; the student will participate in self-categorization and evaluation of personal expectations in regard to their co-op and future professional life. The second phase will consist of an analysis of power dynamics at the workplace, focusing on the "other" rather than the "self." The final phase is a synthesis of the "self" and the "other," in which the student will combine knowledge acquired from the readings and personal experiences in order to address issues facing the modern workplace, as well as reflect on their individual work identity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ANTH 250 Anthropology of Immigration 3.0 Credits

By examination of key ethnographical texts, the course covers basic theoretical and topical approaches to the anthropology of immigration, including: immigration and emigration; transnationalism and globalization; reception contexts; ethnic economies, enclaves and ethnic businesses; global economic strategies for migrant households; refugees, the state and immigration; culture, identity, and adaptation and assimilation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 255 Psychological Anthropology 3.0 Credits

The course is an overview of the field of Psychological Anthropology. It examines issues live nature vs. nurture; personality and "madness"; ethnopsychologies; and cognition. The attempt is to always recognize the salience and significance of culture when considering these issues.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ANTH 265 Health & Healing Practices in Cross-Cultural Perspective 3.0 Credits

This course examines the key concepts and research methodologies of medical anthropology. It will explore the various metaphors about health, and their meanings, that can be found across a range of cultural contexts. Students will learn that the distinctive feature of the anthropological approach to the study of health, disease and healthcare is the use of ethnography.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 310 Societies In Transition: The Impact of Modernization and the Third World 3.0 Credits

Looks at the impact of 20th-century technology on traditional societies. Uses area studies from Africa, Asia, and elsewhere to explore institutions such as the family, the polity, the economy, and religion.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ANTH 312 Approaches to Intercultural Behavior 3.0 Credits

Examines theory and case studies related to working and living outside the United States. Includes topics such as culture shock, cultural relativity, and ethnocentrism. Selects specific geographic culture areas for case studies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 325 DIY Culture 3.0 Credits

Home-recorded albums, self-published books, personal style blogs, and YouTube cat videos. These are just a small portion of the do-it-yourself cultural products we encounter — and perhaps even make ourselves — everyday. This course is a survey of DIY culture in the digital age, from cutting and pasting, to photoshopping, digital video posting, and blogging. Using critical theory, poststructuralist critique, and recent anthropological work in the studies of media production, we will be analyzing the cultural, historical, and political significance of DIY movements and cultures, as well as assessing the theoretical frameworks put forward by social theorists to make sense of them.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 330 Media Anthropology 3.0 Credits

This course will introduce students to the anthropological study of media including traditional forms of mass media as well as new media such as the Internet. Students will be exposed to the theories and methodologies of media study from an anthropological perspective. Students will also engage in their own ethnographic studies of media to gain first hand experience with the methods of anthropology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 335 Anthropology of Education 3.0 Credits

This course will look at key works of anthropologists as they look at educational institutions from a cultural perspective. The course will consider some of the more critical issues of the field, such as issues of class, race and gender relations in schooling by focusing on some more contemporary ethnographies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 340 Crete Through The Looking Glass 3.0 Credits

Students are guided through the techniques of fieldwork and participant observation to attend several customs and practices through various fieldtrips. Traveling is a course requirement used toward the completion of a research project. While "at home", students reflect on their experiences through a looking-glass process.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ANTH 345 Visual Anthropology 3.0 Credits

Introduces students to the subdiscipline of visual anthropology through an overview of visual theory and a survey of ethnographic photography and film. Students will learn to evaluate ethnographic visual representation as well as develop their own skills as visual anthropologists through documenting and representing cultural phenomena.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ANTH 101 [Min Grade: D]

ANTH 350 Anthropology of Language 3.0 Credits

Explores how humans organize cultural activities through language and vice versa. After covering a short history of linguistic anthropological study and method, materials include ethnographic study of language and socialization, verbal art and linguistic performance, language and cultural categories, writing and literacy, and language ideologies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 355 Anthropology of Cyberspace 3.0 Credits

This course will focus on how the internet and new media have changed the way we think about space and time, the ways we work and engage in leisure activities. We will bring the approach of anthropology to the study of these new media in order to ask key questions about social life.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 360 Culture and the Environment 3.0 Credits

This course explores the interplay between culture and the environment by examining both ethnographic accounts from around the world and archaeological materials from the last 14,000 years. Special attention is paid to the changing cultural view of the environment over the last two centuries.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 363 Sacred Traditions of the East 3.0 Credits

This course introduces the student to sacred traditions of Asia: Hinduism, Buddhism and Confucianism. It will attempt a historical-comparative investigation of these traditions. It will emphasize the practice and philosophical underpinnings of these traditions, as well as the interplay between integration of the folk or popular aspects and the abstracts or esoteric.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 365 Family and Kinship 3.0 Credits

The course investigates the concepts of family and kinship from an anthropological perspective. It looks at the family as a critical and contradictory location at the intersection of global and transnational forces. Using anthropological concepts such as status and role, it will explore changing gender relationships, sexual expression, parenting and aging.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ANTH 370 Ethnographic Methods 3.0 Credits

The course introduces students to ethnographic research methods through eight hands-on assignments: 1) selecting a site; 2) establishing rapport; 3) operationalizing hypotheses; 4) using qualitative and quantitative data gathering techniques; 5) taking field notes; 6) analyzing data collected; 7) synthesizing these data; and 8) writing an ethnographic report.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ANTH 375 Digital Ethnography 3.0 Credits

This course is the second part in the ethnographic methods series. It introduces students to the research methodologies employed by anthropologists to study online environments, digital communities, and virtual worlds. Students will gain practical, firsthand experience carrying out digital ethnographies and learn to evaluate the quality of digital ethnographic research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 380 Special Topics in Anthropology 3.0 Credits

This course will explore current issues and debates in Anthropology. It will be conducted as a seminar. The topic will vary each term.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ANTH 385 Community Engaged Anthropology 3.0 Credits

Community engaged anthropology is a form of anthropology that employs participatory action research. As such, it is less research done on a community, as research done with the community as an equal partner. This course introduces students to that technique and approach, its philosophical underpinnings and principles. It is a writing intensive course involving the development and assessment of anthropological fieldnotes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH 390 Seminar in Ethnography 2.0 Credits

The Seminar in Ethnography is a course for anthropology majors. This is a peer-mentoring practicum where students are given the opportunity to present their own ethnographic fieldwork and get feedback from other students in the seminar. All anthropology majors will be in the seminar together. Juniors and seniors will be presenting mature research as well as mentoring the freshmen and sophomores.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 8 credits

Restrictions: Can enroll if major is ANTH.

ANTH 410 Cultural Theory I 3.0 Credits

The course is the first of a two part core cultural theory sequence. It tracks the development of anthropological theory beginning in the mid-19th century until the 1980s. Students are expected to understand the foundational role played by cultural evolution, historical particularism, structural functionalism, structuralism and cultural ecology within the discipline.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ANTH 411 Cultural Theory II 3.0 Credits

This course is the second part of a two-part core in cultural theory that begins with Anthropology 410. It tracks the major theoretical streams of anthropological thought from the early 1980s to the present and challenges students to begin to place their own thinking within, and in opposition, to these streams of thought. Theoretical frameworks covered in this course include practice theory, post-structural theory, feminist theory, neo-Marxism, affect theory, and critiques of globalization and neoliberalism.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ANTH I199 Independent Study in ANTH 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ANTH I299 Independent Study in ANTH 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ANTH I399 Independent Study in ANTH 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ANTH I499 Independent Study in ANTH 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ANTH T180 Special Topics in Anthropology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ANTH T280 Special Topics in Anthropology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ANTH T380 Special Topics in Anthropology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ANTH T480 Special Topics in Anthropology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Arabic

Courses

ARBC 101 Arabic I 4.0 Credits

Introductory Arabic includes listening, speaking, reading and writing. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ARBC 102 Arabic II 4.0 Credits

Continues ARBC 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ARBC 101 [Min Grade: C]

ARBC 103 Arabic III 4.0 Credits

Continues ARBC 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ARBC 102 [Min Grade: C]

ARBC 201 Arabic IV 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on Arabic 103.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ARBC 103 [Min Grade: C]

ARBC 202 Arabic V 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on Arabic 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ARBC 201 [Min Grade: C]

ARBC 203 Arabic VI 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on Arabic 202.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ARBC 202 [Min Grade: C]

ARBC 301 Arabic VII 3.0 Credits

Advanced Arabic. Includes reading, writing, and extensive conversational practice.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ARBC 203 [Min Grade: C]

ARBC 302 Arabic VIII 3.0 Credits

Continues ARBC 301. Provides advanced practice in translation, comprehension, and written and oral conversation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ARBC 301 [Min Grade: C]

ARBC 303 Arabic IX 3.0 Credits

Continues ARBC 302. Provides advanced practice in translation, comprehension, and written and oral conversation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ARBC 302 [Min Grade: C]

ARBC 411 Arabic - Introduction to Arabic Stylistics 3.0 Credits

Fourth year of Arabic -- provides advanced practice in translation, comprehension, and written and oral communication.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ARBC 303 [Min Grade: C]

ARBC 471 Arabic Civilization 3.0 Credits

ARBC 471 presents an integrated approach in Arabic to the civilization, culture, history, and literature specific to the areas in which the language is spoken, with emphasis on the development and evaluation of cultural values.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ARBC 303 [Min Grade: C]

ARBC 480 Arabic Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ARBC I199 Independent Study in ARBC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ARBC I299 Independent Study in ARBC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ARBC I399 Independent Study in ARBC 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ARBC I499 Independent Study in ARBC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ARBC T180 Special Topics in Arabic 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ARBC T280 Special Topics in Arabic 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ARBC T380 Special Topics in Arabic 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ARBC T480 Special Topics in Arabic 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Architectural Engineering

Courses

AE 220 Introduction to HVAC 3.5 Credits

This course includes a review of thermodynamics, moist air properties and processes, basic heat transfer, solar radiation, heating and cooling losses and load calculation, types of air conditioning systems, infiltration and ventilation, air motion and distribution.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CAEE 201 [Min Grade: D] and (ENGR 210 [Min Grade: D] or TDEC 202 [Min Grade: D])

AE 340 Architectural Illumination and Electrical Systems 3.0 Credits

This course covers building electrical systems, including power demand, distribution and control; building illumination techniques, including lighting demand, layout and energy analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CAEE 201 [Min Grade: D] and (PHYS 102 [Min Grade: D] or TDEC 115 [Min Grade: D])

AE 390 Architectural Engineering Design I 4.0 Credits

Establishes a base of building systems design concepts, knowledge and performance criteria, with emphasis on the thermal, electrical, illumination and structural aspects of buildings.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: AE 220 [Min Grade: D] and AE 340 [Min Grade: D] and ARCH 192 [Min Grade: D] and MEM 202 [Min Grade: D]

AE 391 Architectural Engineering Design II 4.0 Credits

Emphasizes the development of insight into the solution of building system design problems, development of in-depth understanding of building systems design synthesis, and integration in a single building of modest scale and complexity.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: AE 390 [Min Grade: D]

AE 410 Intelligent Buildings 3.0 Credits

An overview of the present and future role of Information Technology in the construction industry with emphasis on the computer tools used throughout the building life cycle by all stakeholders, primarily Building Information Modeling (BIM) and the role of networked-linked sensors and actuators.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

AE 430 Control Systems for HVAC 3.0 Credits

This course introduces basic control concepts with applications to HVAC systems; direct digital control, control loops; system modeling; transfer functions; selecting and locating sensors and actuators; design and tuning control algorithms; design and programming of HVAC control systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: AE 220 [Min Grade: D] or MEM 413 [Min Grade: D]

AE I199 Independent Study in AE 12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

AE I299 Independent Study in AE 12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

AE I399 Independent Study in AE 12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

AE I499 Independent Study in AE 12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

AE T180 Special Topics in AE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

AE T280 Special Topics in AE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

AE T380 Special Topics in AE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

AE T480 Special Topics in AE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Architecture

Courses

ARCH 101 Studio 1-A 4.0 Credits

2+4 Option Architecture Majors only. Introduces basic architectural design principles. Elementary concepts of space, surface, and form will be explored in two- and three-dimensional abstract exercises. Incorporates observational analysis and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 102 Studio 1-B 4.0 Credits

2+4 Option Architecture Majors only. Transitions from abstract principles to simple architectural exercises, considering function, scale, user and ordering strategies in relationship to form-making in three-dimensional space. Exercises heighten observation and graphic skills while developing an architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 101 [Min Grade: C] and ARCH 131 [Min Grade: C]

ARCH 103 Studio 2-A 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 102. Introductory architectural design studio in which simple architectural problems develop issues of context and the use of materials with issues of space and human activity.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 102 [Min Grade: C-] and (ARCH 132 [Min Grade: C-] or ARCH 152 [Min Grade: C-])

ARCH 104 Studio 2-B 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 103. Introductory architectural design studio in which issues of architectural form are balanced with site and programmatic concerns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 103 [Min Grade: C-] and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-])

Corequisite: ARCH 161

ARCH 105 Studio 3-A 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 104. Covers intermediate architectural design problems of increasing complexity that emphasize the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 104 [Min Grade: C-] and ARCH 161 [Min Grade: C-]

Corequisite: ARCH 134

ARCH 106 Studio 3-B 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 105. Continues exploration of intermediate architectural design problems that present a full range of challenges in the areas of organization, context, and expression.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 105 [Min Grade: C-] and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-])

ARCH 107 Foundation Design I 2.0 Credits

Introduces basic design principles through investigation of abstract and applied design projects using two-dimensional media. Exercises heighten observation and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 108 Foundation Design II 2.0 Credits

Investigates basic design principles through abstract and applied design projects in two-dimensional and three-dimensional media. Design exercises will advance understanding of the design process by exploring conceptual ideas through graphic and oral communication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 107 [Min Grade: C]

ARCH 109 Foundation Design III 2.0 Credits

Investigates basic design principles that emphasize the inter-relationship between the scale of the human body and its movement within three-dimensional space. More in-depth design exercises will address the design process, development of a conceptual idea and a higher-level graphic and oral presentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 108 [Min Grade: C]

ARCH 111 Studio 1-1 4.0 Credits

Introduces basic architectural design principles and concepts of space, surface and form explored in two and three-dimensional abstract exercises. Exercises incorporate observational analysis and graphic skills while developing architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 109 [Min Grade: C] or ARCH 192 [Min Grade: C]

ARCH 112 Studio 1-2 4.0 Credits

Emphasizes the nature of function, structure, and material and their impact on the design process, and therefore their solutions to architectural problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ARCH 111 [Min Grade: C] or INTR 233 [Min Grade: C]) and ARCH 131 [Min Grade: C]

ARCH 113 Studio 1-3 4.0 Credits

Investigates the interrelationships of scale, context, and building elements and the nature of materials and structure and their impact on the process of creating spaces for human activity through simple architectural problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ARCH 112 [Min Grade: C] and ARCH 132 [Min Grade: C]) or (INTR 233 [Min Grade: C] and INTR 220 [Min Grade: C])

ARCH 121 Studio 2-1 3.0 Credits

Stresses the impact of function, materials, and the issue of building image on the design process. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 113 [Min Grade: C-] and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-]) and ARCH 161 [Min Grade: C-]

Corequisite: ARCH 141

ARCH 122 Studio 2-2 3.0 Credits

Continues ARCH 121. Investigates projects of greater programmatic complexity and more stringent site constraints. Projects begin to deal with buildings in an urban context. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 121 [Min Grade: C-]

Corequisite: ARCH 142

ARCH 123 Studio 2-3 3.0 Credits

Continues ARCH 122. Poses design problems of increased complexity to enable students to explore in greater detail the issues presented in the previous term. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 122 [Min Grade: C-]

Corequisite: ARCH 143

ARCH 131 Architectural Representation I-Drawing Basics 3.0 Credits

Introduces the basic skills of architectural representation through drawing, including drafted and freehand techniques in a variety of media. Also introduces techniques of digital documentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 132 Architectural Representation II-Drawing 3.0 Credits

Continues ARCH 131 Architectural Representation I. Introduces advanced skills of architectural representation through drawing, including drafted and freehand techniques in a variety of media. Also introduces advanced techniques of digital documentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 101 [Min Grade: C-] or ARCH 111 [Min Grade: C-]) and ARCH 131 [Min Grade: C-]

ARCH 133 Architectural Representation III-Digital 4.0 Credits

Continues ARCH 132 Architectural Representation II. Introduces basic digital representation skills in 2D and 3D, the creation and manipulation of three-dimensional architectural models and the resultant two-dimensional drawings as well as renderings using various computer techniques and software programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 102 [Min Grade: C-] or ARCH 113 [Min Grade: C-]) and ARCH 132 [Min Grade: C-]

ARCH 134 Architectural Representation IV-3D Modeling 4.0 Credits

Continues ARCH 133. Further investigates and demonstrates the computer's capabilities in architectural design, 3D modeling and representation using various computer techniques and software programs. May also introduce digital fabrication techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 104 [Min Grade: C-] or ARCH 113 [Min Grade: C-]) and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-])

ARCH 135 Architectural Representation V-Advanced Methods 3.0 Credits

Continues ARCH 134. Examines advanced techniques of architectural representation and visual communications for use in the architectural design process. Emphasizes presentation methods to describe design concepts. Content may vary. Contact Architecture program for details. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 106 [Min Grade: C-] or ARCH 233 [Min Grade: C-]) and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-])

ARCH 141 Architecture and Society I 3.0 Credits

Examines the evolution of Western architectural thought, form, space, and structures in light of changing human values and institutions. Covers Western architecture from the prehistoric era through the Romanesque, and contemporary architecture in Asia and Central America as well as Islamic architecture in the Middle East and Spain.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 142 Architecture and Society II 3.0 Credits

Examines the evolution of Western architectural thought, form, space and structures in light of changing human values and institutions. Course covers early monumental architecture of the Western Hemisphere and then considers the evolution of Western architecture from the "Dark Ages" through the development and spread of Renaissance architecture across Europe and Latin America.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 141 [Min Grade: D]

ARCH 143 Architecture and Society III 3.0 Credits

Examines the evolution of Western architectural thought, form, space and structures in light of changing human values and institutions. Covers Western architecture and urbanism from the 16th C through the early 20th C. Also considered is the architecture of the Aztec and Inca empires, Islamic architecture and architecture and landscape designs of 16th C and 17th C Japan.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 142 [Min Grade: D]

ARCH 144 Architecture and Society IV 3.0 Credits

Examines the evolution of architectural thought, form, space and structures in light of changing human values and institutions. Surveys the crucial buildings and thematic development of modern architecture and urbanism beginning in the late 19th C. through the mid-20th C.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: D]

ARCH 161 Architectural Construction 3.0 Credits

Architecture majors only. Covers basic construction principles and the use of materials in developing architectural assemblies, providing a conceptual framework to integrate construction and design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 103 [Min Grade: C-] or ARCH 112 [Min Grade: C-]) and (ARCH 132 [Min Grade: C-] or ARCH 152 [Min Grade: C-] or ARCH 156 [Min Grade: C-])

ARCH 170 Architectural Technology I 3.0 Credits

Introduction to the fundamental aspects of building technology with exposure to materials, structure and building systems that are frequently used in building construction. Provides a framework for the exploration of construction in the context of design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 213 [Min Grade: C]

ARCH 172 Architectural Technology II 3.0 Credits

Further exploration of materials, structure and building systems and their influence on passive systems and sustainable design principles. Begins the development of systematic thinking regarding architectural technology.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 170 [Min Grade: C]

ARCH 173 Architectural Technology III 3.0 Credits

Introduction to the technical building analysis including the organizing principles for materials, structure and systems. Includes envelope assembly, thermal comfort, structural and passive building systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 172 [Min Grade: C]

ARCH 181 Architecture Studio 1A 4.0 Credits

Introduces basic architectural design principles. Elementary concepts of space, surface and form will be explored in two and three dimensional abstract exercises. Exercises incorporate observational analysis and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 182 Architecture Studio 1B 4.0 Credits

Transitions from abstract design principles to simple architectural exercises, considering function, scale, user and ordering strategies in relation to form-making in three-dimensional space. Exercises heighten observation and graphic skills while developing an architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 181 [Min Grade: C] and ARCH 211 [Min Grade: C])

ARCH 183 Architecture Studio 1C 4.0 Credits

Focuses on a series of basic architectural problems developed around issues of context and material use in relationship to the organization of space and human activity. Design exercises will cultivate the design process through developing a conceptual idea through graphic and oral communication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 182 [Min Grade: C] and ARCH 212 [Min Grade: C])

ARCH 191 Studio 1-AE 3.0 Credits

Architectural engineering majors only. Covers basic design principles using three-dimensional abstract and applied projects. Exercises heighten observation skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE.

ARCH 192 Studio 2-AE 3.0 Credits

Architectural engineering majors only. Continues ARCH 191. Uses design exercises to emphasize the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE.

Prerequisites: ARCH 191 [Min Grade: D]

ARCH 211 Architectural Representation I 2.0 Credits

Introductory course that will provide a survey of drawing types with an emphasis on process and visual literacy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 212 Architectural Representation II 2.0 Credits

Emphasis on craft and composition in the architectural representation of the built environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 211 [Min Grade: C]

ARCH 213 Architectural Representation III 2.0 Credits

Exploration of digital representation with an emphasis on making combining process drawing, digital fabrication and analog craft to develop three-dimensional representation skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 212 [Min Grade: C]

ARCH 224 Architectural Representation IV 2.0 Credits

Emphasizes the communication of design through perspective, view-making and rendering. Through the use of digital and analog techniques, the ability to select the proper media to visually convey a design concept will be developed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 213 [Min Grade: C]

ARCH 225 Architectural Representation V 2.0 Credits

Emphasizes the tools to complete a final quality architectural presentation in a variety of venues including portfolios, digital presentations and online media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 224 [Min Grade: C]

ARCH 226 Architectural Representation VI 2.0 Credits

Explores parametric thinking and the iterative design process while reinforcing critical skills in detailing and design development through various software programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 225 [Min Grade: C]

ARCH 231 Studio 3-1 3.0 Credits

Investigates specific building types to help students reach a basic level of competence in the language of architecture, problem-solving, and the means of communicating design solutions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 123 [Min Grade: C-] and ARCH 143 [Min Grade: C-] and ARCH 161 [Min Grade: C-] and ARCH 134 [Min Grade: C-]

ARCH 232 Studio 3-2 3.0 Credits

Continues ARCH 231. Design projects expand students' vocabulary and understanding of the process of creating solutions to the problems of architecture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 231 [Min Grade: C-]

ARCH 233 Studio 3-3 3.0 Credits

Continues ARCH 232. Addresses the interaction and coordination between the language of architecture and the languages of the other disciplines that influence the process of design. More complex programs are assigned.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 232 [Min Grade: C-]

ARCH 241 Studio 4-1 4.0 Credits

Investigates the design relationship between the man-made and the natural environment in a study of large-scale site design and building development in relation to natural forces. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 106 [Min Grade: C-] or ARCH 233 [Min Grade: C-]) and (PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-])

ARCH 242 Studio 4-2 4.0 Credits

Continues ARCH 241. Studies the relationship between building and site. A series of smaller-scale problems in site design investigates the architecture of the exterior. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 241 [Min Grade: D] and CIVE 261 [Min Grade: C-]

ARCH 243 Studio 4-3 4.0 Credits

Addresses architectural problems with specific environmental and site restraints and criteria. Issues of sustainable design will also be explored. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 242 [Min Grade: D] and CIVE 262 [Min Grade: C-]

Corequisite: CIVE 263

ARCH 261 Environmental Systems I 3.0 Credits

Introduces heating, ventilation, and air conditioning systems and site utility planning. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 262 Environmental Systems II 3.0 Credits

Introduces plumbing systems, including site distribution, water distribution, and waste systems. Fire protection is also covered. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 263 Environmental Systems III 3.0 Credits

Covers application of electrical systems and lighting to architectural design and construction. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 271 Materials & Structural Behavior I 3.0 Credits

Introduces the basics of construction (timber, masonry, steel, and concrete). Covers their behavior as ingredients of the structural system.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 184 [Min Grade: D] or PHYS 104 [Min Grade: D]

ARCH 272 Materials & Structural Behavior II 3.0 Credits

Second part of a three course sequence that introduces students to building structures and materials. The course will introduce structural design methodologies and students will learn how to design wood floor systems, beams, columns, steel beams and tension elements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 271 [Min Grade: C] or CIVE 261 [Min Grade: D]

ARCH 273 Materials & Structural Behavior III 3.0 Credits

Third part of a three course sequence that introduces students to building structures and materials. The course will introduce masonry and foundation design. Students will learn how to design concrete beams and columns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 272 [Min Grade: C] or CIVE 262 [Min Grade: D]

ARCH 274 Architectural Technology IV 3.0 Credits

Intermediate development of architectural technology with a focus on application of analysis of primary materials, structure and systems. Depth and range of analytical tools are addressed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 173 [Min Grade: C]

ARCH 275 Architectural Technology V 3.0 Credits

Further development of analytical skills for building technology. Case studies and real world precedents examine materials, structure and systems in the support of larger architectural objectives.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 274 [Min Grade: C]

ARCH 276 Architectural Technology VI 3.0 Credits

Examination of technical analysis and design in support of iterative architectural concepts. Materials, structure and systems are utilized to develop strong design synergies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 275 [Min Grade: C]

ARCH 281 Architecture Studio 2A 4.0 Credits

Introduces issues of architectural form, site and programmatic concerns. Design exercises will explore simple issues of structure, building and material systems and sustainability.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 183 [Min Grade: C] and ARCH 213 [Min Grade: C])

ARCH 282 Architecture Studio 2B 4.0 Credits

Covers architectural design problems of incremental complexity that emphasizes the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 281 [Min Grade: C] and ARCH 224 [Min Grade: C] and ARCH 170 [Min Grade: C]

ARCH 283 Architecture Studio 2C 4.0 Credits

Explores architectural design problems that introduce the full range of challenges in the areas of organization, program, context, systems and formal expression.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 282 [Min Grade: C] and ARCH 225 [Min Grade: C] and ARCH 272 [Min Grade: C]

ARCH 315 Sustainable Built Environment I 3.0 Credits

Provides an overview of contemporary sustainable design principles and systems involved to posit novel solutions to various design challenges. Combining theoretical knowledge, field trips and case studies enabling students to critically assess sustainability as it relates to the built environment through five key subsystems: materials, air, water, energy and life.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ARCH 320 Sustainable Built Environment II 3.0 Credits

Students will examine the work of scientists, designers, authors, artists, architects, engineers, planners, etc to gain a deeper conceptual understanding of current and emerging strategies in sustainability and the complex and integrated systems approach to the built environment in the present and near future.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ARCH 315 [Min Grade: C-]

ARCH 335 Professional Practice I 3.0 Credits

This seminar is the first of a two-course sequence that introduces students to varying topics related to architectural practice in today's society. It addresses the following issues: Community and Social Responsibility, Leadership, Ethics & Professional Judgment, Client Role in Architecture, Basic Principles of Architectural Practice.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

Prerequisites: ARCH 243 [Min Grade: C-] or ARCH 333 [Min Grade: C]

ARCH 336 Professional Practice II 3.0 Credits

This seminar is the second of a two-course sequence that introduces students to varying topics related to architectural practice in today's society. It addresses the following issues: Practice Management, Project Management, Financial Considerations, Legal Responsibilities, Ethics & Professional Judgment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

Prerequisites: ARCH 335 [Min Grade: C]

ARCH 340 American Architecture & Urbanism 3.0 Credits

Surveys the development of American architecture and urbanism from its Native American origins through the arrival of early Modernism in the 1930s and 1940s. Writing Intensive.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 143 [Min Grade: C-])

ARCH 341 [WI] Theories of Architecture I 3.0 Credits

Seminar that examines theories and principles of Western architecture before 1700. History/theory elective. Fall. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 342 [WI] Theories of Architecture II 3.0 Credits

Continues ARCH 341. Seminar that examines theories and principles of Western architecture from the Baroque era of the 17th century to the beginning of Modernism in the 20th century. History/theory elective. Winter. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 343 Theories of Architecture III 3.0 Credits

Seminar that examines 20th-century theories of architecture, including analysis and discussion of current theoretical positions. History/theory elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 344 [WI] History of Modern Architecture I 3.0 Credits

Surveys the crucial buildings and thematic development of modern architecture and urbanism beginning in the late nineteenth Century continuing through the mid-20th Century. History/theory elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 345 [WI] History of Modern Architecture II 3.0 Credits

Continuation of ARCH 344. Surveys the crucial buildings and thematic development of modern architecture and urbanism from the mid-20th Century to the present. History/theory elective. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 346 [WI] History of Philadelphia Architecture 3.0 Credits

Covers the architecture of the city of Philadelphia from 1682, examining its architects, styles, and sources through lectures, walking tours, and student reports. History/theory elective. Fall. Alternate years. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 347 [WI] Architectural Study Tour 1.0-6.0 Credit

An intensive study tour of selected domestic and foreign destinations focusing on architecture and related design disciplines. Combines lecture, site visits, sketching and individual research. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C-] or INTR 200 [Min Grade: C-] or ARTH 103 [Min Grade: C-]

ARCH 348 [WI] Studies in Vernacular Architecture 3.0 Credits

A topical survey of world traditions of vernacular architecture, with emphasis on houses and dwelling environments. The survey topics include basics of shelter, construction methods, response to climate, patterns of settlement, social and economic organization, cultural expression, and methods of research and analysis.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 350 Contemporary Architecture 3.0 Credits

Survey and analysis of significant developments in architecture and urbanism over the past 50+ years. Writing Intensive.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 351 Studio 5-1 4.0 Credits

Poses problems that address the relationship of form, site, program, and theory within the constraints of the basic systems (structural, mechanical, etc.).

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (CIVE 263 [Min Grade: D] or ARCH 273 [Min Grade: C]) and ARCH 243 [Min Grade: C]

ARCH 352 Studio 5-2 4.0 Credits

Continues ARCH 351. Emphasizes the strengthening of students' ability to solve complex problems in architecture. Expects students to demonstrate understanding and control of basic architectural systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 351 [Min Grade: C] and ARCH 261 [Min Grade: C-]

ARCH 353 Studio 5-3 4.0 Credits

Continues ARCH 352. Stresses the coordination of all architectural criteria in a large scale and complex architectural problem.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 352 [Min Grade: C] and ARCH 262 [Min Grade: C-]

ARCH 361 Studio 6-1 4.0 Credits

Introduces problems of urban design. Case studies demonstrate the relationship between the manmade environment and the natural environment as well as the relationship between many buildings and other manmade environments and the natural environment. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 353 [Min Grade: D] and ARCH 263 [Min Grade: C-]

Corequisite: ARCH 335

ARCH 362 Studio 6-2 4.0 Credits

Continues ARCH 361. A large urban-design project is undertaken to learn the design process required to solve problems of such magnitude. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 361 [Min Grade: D]

Corequisite: ARCH 336

ARCH 363 Studio 6-3 4.0 Credits

Continues ARCH 362. Requires students to develop architectural solutions for a portion of the problem addressed in Studio 6-2, demonstrating an understanding of the relationship between buildings and the exterior environment established in the previous course. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 362 [Min Grade: D]

Corequisite: PHIL 317

ARCH 377 Architectural Technology VII 3.0 Credits

Advanced building technology concepts are explored through case studies and focused design examples. Materials, construction, methods, structure, systems and envelope are studied as integrated aspect of larger iterative design processes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 276 [Min Grade: C]

ARCH 378 Architectural Technology VIII 3.0 Credits

Building technology and analysis are explored through design precedents and sketch problems to develop integrated design and analytical skills.

Focuses on large and small scale elements that can become generative and performative aspects of major design decisions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 377 [Min Grade: C]

ARCH 379 Architectural Technology IX 3.0 Credits

Advanced building technology design and analysis is utilized in iterative and integrated design methods to support comprehensive design processes. Materials, structure and systems are developed qualitatively and quantitatively through design and analysis exercises.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 378 [Min Grade: C]

ARCH 381 Architecture Studio 3A 4.0 Credits

Investigates the design relationship between man-made and the natural environment. Cultivates advanced analysis methods and the development of informed and resolved design solutions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 283 [Min Grade: C] and ARCH 226 [Min Grade: C] and ARCH 173 [Min Grade: C]

ARCH 382 Architecture Studio 3B 4.0 Credits

Studies the relationship between building, site and context. Architectural design problems emphasize concept development that translates careful analysis into the building ideas with a progressing understanding of architectural concerns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 381 [Min Grade: C] and ARCH 274 [Min Grade: C]

ARCH 383 Architecture Studio 3C 4.0 Credits

Focuses on architectural problems with intermediate complexity. Integrates issues of context, site, program, function, and architectural systems into advanced design proposals.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 382 [Min Grade: C] and ARCH 275 [Min Grade: C]

ARCH 399 Independent Study in Architecture 0.5-12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ARCH 421 [WI] Environmental Psychology and Design Theory 3.0 Credits

Examines the relationship between human behavior and architecture from the perspective of environmental psychology. Topics include aesthetics, environmental experience, social interaction, social organization, and culture. This is a writing intensive course. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C]

ARCH 431 [WI] Architectural Programming 3.0 Credits

Introduces current techniques of building programming and their relationship to building design. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 363 [Min Grade: C] or ARCH 473 [Min Grade: C]

ARCH 432 The Development Process 3.0 Credits

Introduces the process of land development. Explores traditional and emerging development models (the architect as the equity participant and developer) in relation to new construction and rehabilitation. Covers various methods of initiating building projects and financing and tax issues. Professional elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 441 Urban Design Seminar 3.0 Credits

Expands the concept of architecture to urban design scale and presents the principles of city planning through a series of case studies. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 451 Advanced Drawing 3.0 Credits

Covers advanced architectural rendering, concentrating on the effects of light, shade, and color using the techniques of water-color rendering. Professional elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C] or INTR 341 [Min Grade: C]

ARCH 455 Computer Applications in Architecture I 3.0 Credits

Covers two-dimensional and three-dimensional computer representations and applications. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C]

ARCH 456 Computer Applications in Architecture II 3.0 Credits

Further investigates and demonstrates the computer's capabilities in architectural design and representation. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C]

ARCH 463 Emerging Architectural Technology 3.0 Credits

A holistic study of design and construction technology of significant buildings by leading architects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 464 Building Enclosure Design 3.0 Credits

Examines the integrations of aesthetics, building science, and technology in the design of building enclosures. Professional Elective. Summer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 465 Energy and Architecture 3.0 Credits

Creates an awareness of the availability of energy resources and their effect on the built environment. Discusses alternative sources of energy. Professional elective. Summer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 481 Architecture Studio 4A 4.0 Credits

Focuses on more complex architectural challenges through analysis of case studies that address the relationship between the man-made built environment and the natural environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 383 [Min Grade: C] and ARCH 276 [Min Grade: C]

ARCH 482 Architecture Studio 4B 4.0 Credits

Further the understanding of context and design and the application of solutions and strategies surrounding more complex architectural and environmental problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 481 [Min Grade: C] and ARCH 377 [Min Grade: C]

ARCH 483 Architecture Studio 4C 4.0 Credits

Challenges to develop and refine architectural solutions through an advanced understanding of the relationship between buildings and environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 482 [Min Grade: C] and ARCH 378 [Min Grade: C]

ARCH 487 Architecture Studio 5A 4.0 Credits

Addresses the complex relationship through analysis and synthesis of form, site, program, building technology and theory within specific building context.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 483 [Min Grade: C] and ARCH 379 [Min Grade: C]

ARCH 488 Architecture Studio 5B 4.0 Credits

Emphasizes complex architectural problems while demonstrating understanding and appropriate application.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 487 [Min Grade: C]

ARCH 489 Architecture Studio 5C 4.0 Credits

Integrates in-depth application and coordination of all architectural building criteria in a large scale and complex architectural problem.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 488 [Min Grade: C]

ARCH 491 Advanced Topics in Architecture 1.0-6.0 Credit

Covers advanced topics in architectural design, practice, technology or history and theory that satisfy professional or historical/theory elective requirements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 493 Senior Project I 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part one of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 363 [Min Grade: C] or ARCH 473 [Min Grade: C]

Corequisite: ARCH 431

ARCH 494 Senior Project II 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part two of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 493 [Min Grade: C]

ARCH 495 Senior Project III 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part three of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 494 [Min Grade: C]

ARCH 496 Thesis I 8.0 Credits

An individually structured year-long design problem that enables students to work independently and explore complex issues in depth. Periodic individual review sessions are scheduled with faculty adviser. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 363 [Min Grade: D] and ARCH 143 [Min Grade: C-] and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-]) and ARCH 263 [Min Grade: C-] and CIVE 263 [Min Grade: C-]

ARCH 497 Thesis II 8.0 Credits

Continues ARCH 496. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 496 [Min Grade: C-]

ARCH 498 Thesis III 8.0 Credits

Continues ARCH 497. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 497 [Min Grade: C-]

ARCH 499 [WI] Special Topics in Architecture 3.0 Credits

Covers special topics in architectural history, theory, or technology that satisfy history/theory or professional elective requirements and university writing intensive requirements. Course may be repeated for credit when different topics are offered. Fall, Winter, Spring, Summer. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH I199 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I299 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I399 Independent Study in Architecture 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I499 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C]

ARCH T180 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T280 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T380 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T480 Special Topics in Architecture 1.0-6.0 Credit

Covers special topics in architectural history, theory, or technology that satisfy history/theory or professional elective requirements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C]

Courses

ARCH 101 Studio 1-A 4.0 Credits

2+4 Option Architecture Majors only. Introduces basic architectural design principles. Elementary concepts of space, surface, and form will be explored in two- and three-dimensional abstract exercises. Incorporates observational analysis and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 102 Studio 1-B 4.0 Credits

2+4 Option Architecture Majors only. Transitions from abstract principles to simple architectural exercises, considering function, scale, user and ordering strategies in relationship to form-making in three-dimensional space. Exercises heighten observation and graphic skills while developing an architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 101 [Min Grade: C] and ARCH 131 [Min Grade: C]

ARCH 103 Studio 2-A 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 102. Introductory architectural design studio in which simple architectural problems develop issues of context and the use of materials with issues of space and human activity.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 102 [Min Grade: C-] and (ARCH 132 [Min Grade: C-] or ARCH 152 [Min Grade: C-])

ARCH 104 Studio 2-B 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 103. Introductory architectural design studio in which issues of architectural form are balanced with site and programmatic concerns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 103 [Min Grade: C-] and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-])

Corequisite: ARCH 161

ARCH 105 Studio 3-A 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 104. Covers intermediate architectural design problems of increasing complexity that emphasize the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 104 [Min Grade: C-] and ARCH 161 [Min Grade: C-]

Corequisite: ARCH 134

ARCH 106 Studio 3-B 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 105. Continues exploration of intermediate architectural design problems that present a full range of challenges in the areas of organization, context, and expression.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 105 [Min Grade: C-] and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-])

ARCH 107 Foundation Design I 2.0 Credits

Introduces basic design principles through investigation of abstract and applied design projects using two-dimensional media. Exercises heighten observation and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 108 Foundation Design II 2.0 Credits

Investigates basic design principles through abstract and applied design projects in two-dimensional and three-dimensional media. Design exercises will advance understanding of the design process by exploring conceptual ideas through graphic and oral communication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 107 [Min Grade: C]

ARCH 109 Foundation Design III 2.0 Credits

Investigates basic design principles that emphasize the inter-relationship between the scale of the human body and its movement within three-dimensional space. More in-depth design exercises will address the design process, development of a conceptual idea and a higher-level graphic and oral presentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 108 [Min Grade: C]

ARCH 111 Studio 1-1 4.0 Credits

Introduces basic architectural design principles and concepts of space, surface and form explored in two and three-dimensional abstract exercises. Exercises incorporate observational analysis and graphic skills while developing architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 109 [Min Grade: C] or ARCH 192 [Min Grade: C]

ARCH 112 Studio 1-2 4.0 Credits

Emphasizes the nature of function, structure, and material and their impact on the design process, and therefore their solutions to architectural problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ARCH 111 [Min Grade: C] or INTR 233 [Min Grade: C]) and ARCH 131 [Min Grade: C]

ARCH 113 Studio 1-3 4.0 Credits

Investigates the interrelationships of scale, context, and building elements and the nature of materials and structure and their impact on the process of creating spaces for human activity through simple architectural problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ARCH 112 [Min Grade: C] and ARCH 132 [Min Grade: C]) or (INTR 233 [Min Grade: C] and INTR 220 [Min Grade: C])

ARCH 121 Studio 2-1 3.0 Credits

Stresses the impact of function, materials, and the issue of building image on the design process. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 113 [Min Grade: C-] and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-]) and ARCH 161 [Min Grade: C-]

Corequisite: ARCH 141

ARCH 122 Studio 2-2 3.0 Credits

Continues ARCH 121. Investigates projects of greater programmatic complexity and more stringent site constraints. Projects begin to deal with buildings in an urban context. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 121 [Min Grade: C-]

Corequisite: ARCH 142

ARCH 123 Studio 2-3 3.0 Credits

Continues ARCH 122. Poses design problems of increased complexity to enable students to explore in greater detail the issues presented in the previous term. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 122 [Min Grade: C-]

Corequisite: ARCH 143

ARCH 131 Architectural Representation I-Drawing Basics 3.0 Credits

Introduces the basic skills of architectural representation through drawing, including drafted and freehand techniques in a variety of media. Also introduces techniques of digital documentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 132 Architectural Representation II-Drawing 3.0 Credits

Continues ARCH 131 Architectural Representation I. Introduces advanced skills of architectural representation through drawing, including drafted and freehand techniques in a variety of media. Also introduces advanced techniques of digital documentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 101 [Min Grade: C-] or ARCH 111 [Min Grade: C-]) and ARCH 131 [Min Grade: C-]

ARCH 133 Architectural Representation III-Digital 4.0 Credits

Continues ARCH 132 Architectural Representation II. Introduces basic digital representation skills in 2D and 3D, the creation and manipulation of three-dimensional architectural models and the resultant two-dimensional drawings as well as renderings using various computer techniques and software programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 102 [Min Grade: C-] or ARCH 113 [Min Grade: C-]) and ARCH 132 [Min Grade: C-]

ARCH 134 Architectural Representation IV-3D Modeling 4.0 Credits

Continues ARCH 133. Further investigates and demonstrates the computer's capabilities in architectural design, 3D modeling and representation using various computer techniques and software programs. May also introduce digital fabrication techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 104 [Min Grade: C-] or ARCH 113 [Min Grade: C-]) and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-])

ARCH 135 Architectural Representation V-Advanced Methods 3.0 Credits

Continues ARCH 134. Examines advanced techniques of architectural representation and visual communications for use in the architectural design process. Emphasizes presentation methods to describe design concepts. Content may vary. Contact Architecture program for details. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 106 [Min Grade: C-] or ARCH 233 [Min Grade: C-]) and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-])

ARCH 141 Architecture and Society I 3.0 Credits

Examines the evolution of Western architectural thought, form, space, and structures in light of changing human values and institutions. Covers Western architecture from the prehistoric era through the Romanesque, and contemporary architecture in Asia and Central America as well as Islamic architecture in the Middle East and Spain.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 142 Architecture and Society II 3.0 Credits

Examines the evolution of Western architectural thought, form, space and structures in light of changing human values and institutions. Course covers early monumental architecture of the Western Hemisphere and then considers the evolution of Western architecture from the "Dark Ages" through the development and spread of Renaissance architecture across Europe and Latin America.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 141 [Min Grade: D]

ARCH 143 Architecture and Society III 3.0 Credits

Examines the evolution of Western architectural thought, form, space and structures in light of changing human values and institutions. Covers Western architecture and urbanism from the 16th C through the early 20th C. Also considered is the architecture of the Aztec and Inca empires, Islamic architecture and architecture and landscape designs of 16th C and 17th C Japan.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 142 [Min Grade: D]

ARCH 144 Architecture and Society IV 3.0 Credits

Examines the evolution of architectural thought, form, space and structures in light of changing human values and institutions. Surveys the crucial buildings and thematic development of modern architecture and urbanism beginning in the late 19th C. through the mid-20th C.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: D]

ARCH 161 Architectural Construction 3.0 Credits

Architecture majors only. Covers basic construction principles and the use of materials in developing architectural assemblies, providing a conceptual framework to integrate construction and design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 103 [Min Grade: C-] or ARCH 112 [Min Grade: C-]) and (ARCH 132 [Min Grade: C-] or ARCH 152 [Min Grade: C-] or ARCH 156 [Min Grade: C-])

ARCH 170 Architectural Technology I 3.0 Credits

Introduction to the fundamental aspects of building technology with exposure to materials, structure and building systems that are frequently used in building construction. Provides a framework for the exploration of construction in the context of design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 213 [Min Grade: C]

ARCH 172 Architectural Technology II 3.0 Credits

Further exploration of materials, structure and building systems and their influence on passive systems and sustainable design principles. Begins the development of systematic thinking regarding architectural technology.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 170 [Min Grade: C]

ARCH 173 Architectural Technology III 3.0 Credits

Introduction to the technical building analysis including the organizing principles for materials, structure and systems. Includes envelope assembly, thermal comfort, structural and passive building systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 172 [Min Grade: C]

ARCH 181 Architecture Studio 1A 4.0 Credits

Introduces basic architectural design principles. Elementary concepts of space, surface and form will be explored in two and three dimensional abstract exercises. Exercises incorporate observational analysis and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 182 Architecture Studio 1B 4.0 Credits

Transitions from abstract design principles to simple architectural exercises, considering function, scale, user and ordering strategies in relation to form-making in three-dimensional space. Exercises heighten observation and graphic skills while developing an architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 181 [Min Grade: C] and ARCH 211 [Min Grade: C])

ARCH 183 Architecture Studio 1C 4.0 Credits

Focuses on a series of basic architectural problems developed around issues of context and material use in relationship to the organization of space and human activity. Design exercises will cultivate the design process through developing a conceptual idea through graphic and oral communication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 182 [Min Grade: C] and ARCH 212 [Min Grade: C])

ARCH 191 Studio 1-AE 3.0 Credits

Architectural engineering majors only. Covers basic design principles using three-dimensional abstract and applied projects. Exercises heighten observation skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE.

ARCH 192 Studio 2-AE 3.0 Credits

Architectural engineering majors only. Continues ARCH 191. Uses design exercises to emphasize the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE.

Prerequisites: ARCH 191 [Min Grade: D]

ARCH 211 Architectural Representation I 2.0 Credits

Introductory course that will provide a survey of drawing types with an emphasis on process and visual literacy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 212 Architectural Representation II 2.0 Credits

Emphasis on craft and composition in the architectural representation of the built environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 211 [Min Grade: C]

ARCH 213 Architectural Representation III 2.0 Credits

Exploration of digital representation with an emphasis on making combining process drawing, digital fabrication and analog craft to develop three-dimensional representation skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 212 [Min Grade: C]

ARCH 224 Architectural Representation IV 2.0 Credits

Emphasizes the communication of design through perspective, view-making and rendering. Through the use of digital and analog techniques, the ability to select the proper media to visually convey a design concept will be developed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 213 [Min Grade: C]

ARCH 225 Architectural Representation V 2.0 Credits

Emphasizes the tools to complete a final quality architectural presentation in a variety of venues including portfolios, digital presentations and online media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 224 [Min Grade: C]

ARCH 226 Architectural Representation VI 2.0 Credits

Explores parametric thinking and the iterative design process while reinforcing critical skills in detailing and design development through various software programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 225 [Min Grade: C]

ARCH 231 Studio 3-1 3.0 Credits

Investigates specific building types to help students reach a basic level of competence in the language of architecture, problem-solving, and the means of communicating design solutions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 123 [Min Grade: C-] and ARCH 143 [Min Grade: C-] and ARCH 161 [Min Grade: C-] and ARCH 134 [Min Grade: C-]

ARCH 232 Studio 3-2 3.0 Credits

Continues ARCH 231. Design projects expand students' vocabulary and understanding of the process of creating solutions to the problems of architecture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 231 [Min Grade: C-]

ARCH 233 Studio 3-3 3.0 Credits

Continues ARCH 232. Addresses the interaction and coordination between the language of architecture and the languages of the other disciplines that influence the process of design. More complex programs are assigned.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 232 [Min Grade: C-]

ARCH 241 Studio 4-1 4.0 Credits

Investigates the design relationship between the man-made and the natural environment in a study of large-scale site design and building development in relation to natural forces. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 106 [Min Grade: C-] or ARCH 233 [Min Grade: C-]) and (PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-])

ARCH 242 Studio 4-2 4.0 Credits

Continues ARCH 241. Studies the relationship between building and site. A series of smaller-scale problems in site design investigates the architecture of the exterior. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 241 [Min Grade: D] and CIVE 261 [Min Grade: C-]

ARCH 243 Studio 4-3 4.0 Credits

Addresses architectural problems with specific environmental and site restraints and criteria. Issues of sustainable design will also be explored. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 242 [Min Grade: D] and CIVE 262 [Min Grade: C-]

Corequisite: CIVE 263

ARCH 261 Environmental Systems I 3.0 Credits

Introduces heating, ventilation, and air conditioning systems and site utility planning. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 262 Environmental Systems II 3.0 Credits

Introduces plumbing systems, including site distribution, water distribution, and waste systems. Fire protection is also covered. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 263 Environmental Systems III 3.0 Credits

Covers application of electrical systems and lighting to architectural design and construction. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 271 Materials & Structural Behavior I 3.0 Credits

Introduces the basics of construction (timber, masonry, steel, and concrete). Covers their behavior as ingredients of the structural system.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 184 [Min Grade: D] or PHYS 104 [Min Grade: D]

ARCH 272 Materials & Structural Behavior II 3.0 Credits

Second part of a three course sequence that introduces students to building structures and materials. The course will introduce structural design methodologies and students will learn how to design wood floor systems, beams, columns, steel beams and tension elements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 271 [Min Grade: C] or CIVE 261 [Min Grade: D]

ARCH 273 Materials & Structural Behavior III 3.0 Credits

Third part of a three course sequence that introduces students to building structures and materials. The course will introduce masonry and foundation design. Students will learn how to design concrete beams and columns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 272 [Min Grade: C] or CIVE 262 [Min Grade: D]

ARCH 274 Architectural Technology IV 3.0 Credits

Intermediate development of architectural technology with a focus on application of analysis of primary materials, structure and systems. Depth and range of analytical tools are addressed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 173 [Min Grade: C]

ARCH 275 Architectural Technology V 3.0 Credits

Further development of analytical skills for building technology. Case studies and real world precedents examine materials, structure and systems in the support of larger architectural objectives.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 274 [Min Grade: C]

ARCH 276 Architectural Technology VI 3.0 Credits

Examination of technical analysis and design in support of iterative architectural concepts. Materials, structure and systems are utilized to develop strong design synergies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 275 [Min Grade: C]

ARCH 281 Architecture Studio 2A 4.0 Credits

Introduces issues of architectural form, site and programmatic concerns. Design exercises will explore simple issues of structure, building and material systems and sustainability.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 183 [Min Grade: C] and ARCH 213 [Min Grade: C])

ARCH 282 Architecture Studio 2B 4.0 Credits

Covers architectural design problems of incremental complexity that emphasizes the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 281 [Min Grade: C] and ARCH 224 [Min Grade: C] and ARCH 170 [Min Grade: C]

ARCH 283 Architecture Studio 2C 4.0 Credits

Explores architectural design problems that introduce the full range of challenges in the areas of organization, program, context, systems and formal expression.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 282 [Min Grade: C] and ARCH 225 [Min Grade: C] and ARCH 272 [Min Grade: C]

ARCH 315 Sustainable Built Environment I 3.0 Credits

Provides an overview of contemporary sustainable design principles and systems involved to posit novel solutions to various design challenges. Combining theoretical knowledge, field trips and case studies enabling students to critically assess sustainability as it relates to the built environment through five key subsystems: materials, air, water, energy and life.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ARCH 320 Sustainable Built Environment II 3.0 Credits

Students will examine the work of scientists, designers, authors, artists, architects, engineers, planners, etc to gain a deeper conceptual understanding of current and emerging strategies in sustainability and the complex and integrated systems approach to the built environment in the present and near future.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ARCH 315 [Min Grade: C-]

ARCH 335 Professional Practice I 3.0 Credits

This seminar is the first of a two-course sequence that introduces students to varying topics related to architectural practice in today's society. It addresses the following issues: Community and Social Responsibility, Leadership, Ethics & Professional Judgment, Client Role in Architecture, Basic Principles of Architectural Practice.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

Prerequisites: ARCH 243 [Min Grade: C-] or ARCH 333 [Min Grade: C]

ARCH 336 Professional Practice II 3.0 Credits

This seminar is the second of a two-course sequence that introduces students to varying topics related to architectural practice in today's society. It addresses the following issues: Practice Management, Project Management, Financial Considerations, Legal Responsibilities, Ethics & Professional Judgment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

Prerequisites: ARCH 335 [Min Grade: C]

ARCH 340 American Architecture & Urbanism 3.0 Credits

Surveys the development of American architecture and urbanism from its Native American origins through the arrival of early Modernism in the 1930s and 1940s. Writing Intensive.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 143 [Min Grade: C-])

ARCH 341 [WI] Theories of Architecture I 3.0 Credits

Seminar that examines theories and principles of Western architecture before 1700. History/theory elective. Fall. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 342 [WI] Theories of Architecture II 3.0 Credits

Continues ARCH 341. Seminar that examines theories and principles of Western architecture from the Baroque era of the 17th century to the beginning of Modernism in the 20th century. History/theory elective. Winter. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 343 Theories of Architecture III 3.0 Credits

Seminar that examines 20th-century theories of architecture, including analysis and discussion of current theoretical positions. History/theory elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 344 [WI] History of Modern Architecture I 3.0 Credits

Surveys the crucial buildings and thematic development of modern architecture and urbanism beginning in the late nineteenth Century continuing through the mid-20th Century. History/theory elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 345 [WI] History of Modern Architecture II 3.0 Credits

Continuation of ARCH 344. Surveys the crucial buildings and thematic development of modern architecture and urbanism from the mid-20th Century to the present. History/theory elective. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 346 [WI] History of Philadelphia Architecture 3.0 Credits

Covers the architecture of the city of Philadelphia from 1682, examining its architects, styles, and sources through lectures, walking tours, and student reports. History/theory elective. Fall. Alternate years. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 347 [WI] Architectural Study Tour 1.0-6.0 Credit

An intensive study tour of selected domestic and foreign destinations focusing on architecture and related design disciplines. Combines lecture, site visits, sketching and individual research. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C-] or INTR 200 [Min Grade: C-] or ARTH 103 [Min Grade: C-]

ARCH 348 [WI] Studies in Vernacular Architecture 3.0 Credits

A topical survey of world traditions of vernacular architecture, with emphasis on houses and dwelling environments. The survey topics include basics of shelter, construction methods, response to climate, patterns of settlement, social and economic organization, cultural expression, and methods of research and analysis.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 350 Contemporary Architecture 3.0 Credits

Survey and analysis of significant developments in architecture and urbanism over the past 50+ years. Writing Intensive.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 351 Studio 5-1 4.0 Credits

Poses problems that address the relationship of form, site, program, and theory within the constraints of the basic systems (structural, mechanical, etc.).

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (CIVE 263 [Min Grade: D] or ARCH 273 [Min Grade: C]) and ARCH 243 [Min Grade: C]

ARCH 352 Studio 5-2 4.0 Credits

Continues ARCH 351. Emphasizes the strengthening of students' ability to solve complex problems in architecture. Expects students to demonstrate understanding and control of basic architectural systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 351 [Min Grade: C] and ARCH 261 [Min Grade: C-]

ARCH 353 Studio 5-3 4.0 Credits

Continues ARCH 352. Stresses the coordination of all architectural criteria in a large scale and complex architectural problem.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 352 [Min Grade: C] and ARCH 262 [Min Grade: C-]

ARCH 361 Studio 6-1 4.0 Credits

Introduces problems of urban design. Case studies demonstrate the relationship between the manmade environment and the natural environment as well as the relationship between many buildings and other manmade environments and the natural environment. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 353 [Min Grade: D] and ARCH 263 [Min Grade: C-]

Corequisite: ARCH 335

ARCH 362 Studio 6-2 4.0 Credits

Continues ARCH 361. A large urban-design project is undertaken to learn the design process required to solve problems of such magnitude. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 361 [Min Grade: D]

Corequisite: ARCH 336

ARCH 363 Studio 6-3 4.0 Credits

Continues ARCH 362. Requires students to develop architectural solutions for a portion of the problem addressed in Studio 6-2, demonstrating an understanding of the relationship between buildings and the exterior environment established in the previous course. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 362 [Min Grade: D]

Corequisite: PHIL 317

ARCH 377 Architectural Technology VII 3.0 Credits

Advanced building technology concepts are explored through case studies and focused design examples. Materials, construction, methods, structure, systems and envelope are studied as integrated aspect of larger iterative design processes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 276 [Min Grade: C]

ARCH 378 Architectural Technology VIII 3.0 Credits

Building technology and analysis are explored through design precedents and sketch problems to develop integrated design and analytical skills.

Focuses on large and small scale elements that can become generative and performative aspects of major design decisions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 377 [Min Grade: C]

ARCH 379 Architectural Technology IX 3.0 Credits

Advanced building technology design and analysis is utilized in iterative and integrated design methods to support comprehensive design processes. Materials, structure and systems are developed qualitatively and quantitatively through design and analysis exercises.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 378 [Min Grade: C]

ARCH 381 Architecture Studio 3A 4.0 Credits

Investigates the design relationship between man-made and the natural environment. Cultivates advanced analysis methods and the development of informed and resolved design solutions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 283 [Min Grade: C] and ARCH 226 [Min Grade: C]

and ARCH 173 [Min Grade: C]

ARCH 382 Architecture Studio 3B 4.0 Credits

Studies the relationship between building, site and context. Architectural design problems emphasize concept development that translates careful analysis into the building ideas with a progressing understanding of architectural concerns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 381 [Min Grade: C] and ARCH 274 [Min Grade: C]

ARCH 383 Architecture Studio 3C 4.0 Credits

Focuses on architectural problems with intermediate complexity.

Integrates issues of context, site, program, function, and architectural systems into advanced design proposals.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 382 [Min Grade: C] and ARCH 275 [Min Grade: C]

ARCH 399 Independent Study in Architecture 0.5-12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ARCH 421 [WI] Environmental Psychology and Design Theory 3.0 Credits

Examines the relationship between human behavior and architecture from the perspective of environmental psychology. Topics include aesthetics, environmental experience, social interaction, social organization, and culture. This is a writing intensive course. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C]

ARCH 431 [WI] Architectural Programming 3.0 Credits

Introduces current techniques of building programming and their relationship to building design. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 363 [Min Grade: C] or ARCH 473 [Min Grade: C]

ARCH 432 The Development Process 3.0 Credits

Introduces the process of land development. Explores traditional and emerging development models (the architect as the equity participant and developer) in relation to new construction and rehabilitation. Covers various methods of initiating building projects and financing and tax issues. Professional elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 441 Urban Design Seminar 3.0 Credits

Expands the concept of architecture to urban design scale and presents the principles of city planning through a series of case studies. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 451 Advanced Drawing 3.0 Credits

Covers advanced architectural rendering, concentrating on the effects of light, shade, and color using the techniques of water-color rendering. Professional elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C] or INTR 341 [Min Grade: C]

ARCH 455 Computer Applications in Architecture I 3.0 Credits

Covers two-dimensional and three-dimensional computer representations and applications. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C]

ARCH 456 Computer Applications in Architecture II 3.0 Credits

Further investigates and demonstrates the computer's capabilities in architectural design and representation. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C]

ARCH 463 Emerging Architectural Technology 3.0 Credits

A holistic study of design and construction technology of significant buildings by leading architects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 464 Building Enclosure Design 3.0 Credits

Examines the integrations of aesthetics, building science, and technology in the design of building enclosures. Professional Elective. Summer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 465 Energy and Architecture 3.0 Credits

Creates an awareness of the availability of energy resources and their effect on the built environment. Discusses alternative sources of energy. Professional elective. Summer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 481 Architecture Studio 4A 4.0 Credits

Focuses on more complex architectural challenges through analysis of case studies that address the relationship between the man-made built environment and the natural environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 383 [Min Grade: C] and ARCH 276 [Min Grade: C]

ARCH 482 Architecture Studio 4B 4.0 Credits

Furthers the understanding of context and design and the application of solutions and strategies surrounding more complex architectural and environmental problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 481 [Min Grade: C] and ARCH 377 [Min Grade: C]

ARCH 483 Architecture Studio 4C 4.0 Credits

Challenges to develop and refine architectural solutions through an advanced understanding of the relationship between buildings and environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 482 [Min Grade: C] and ARCH 378 [Min Grade: C]

ARCH 487 Architecture Studio 5A 4.0 Credits

Addresses the complex relationship through analysis and synthesis of form, site, program, building technology and theory within specific building context.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 483 [Min Grade: C] and ARCH 379 [Min Grade: C]

ARCH 488 Architecture Studio 5B 4.0 Credits

Emphasizes complex architectural problems while demonstrating understanding and appropriate application.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 487 [Min Grade: C]

ARCH 489 Architecture Studio 5C 4.0 Credits

Integrates in-depth application and coordination of all architectural building criteria in a large scale and complex architectural problem.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 488 [Min Grade: C]

ARCH 491 Advanced Topics in Architecture 1.0-6.0 Credit

Covers advanced topics in architectural design, practice, technology or history and theory that satisfy professional or historical/theory elective requirements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 493 Senior Project I 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part one of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 363 [Min Grade: C] or ARCH 473 [Min Grade: C]

Corequisite: ARCH 431

ARCH 494 Senior Project II 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part two of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 493 [Min Grade: C]

ARCH 495 Senior Project III 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part three of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 494 [Min Grade: C]

ARCH 496 Thesis I 8.0 Credits

An individually structured year-long design problem that enables students to work independently and explore complex issues in depth. Periodic individual review sessions are scheduled with faculty adviser. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 363 [Min Grade: D] and ARCH 143 [Min Grade: C-] and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-]) and ARCH 263 [Min Grade: C-] and CIVE 263 [Min Grade: C-]

ARCH 497 Thesis II 8.0 Credits

Continues ARCH 496. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 496 [Min Grade: C-]

ARCH 498 Thesis III 8.0 Credits

Continues ARCH 497. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 497 [Min Grade: C-]

ARCH 499 [WI] Special Topics in Architecture 3.0 Credits

Covers special topics in architectural history, theory, or technology that satisfy history/theory or professional elective requirements and university writing intensive requirements. Course may be repeated for credit when different topics are offered. Fall, Winter, Spring, Summer. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH I199 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I299 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I399 Independent Study in Architecture 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I499 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C]

ARCH T180 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T280 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T380 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T480 Special Topics in Architecture 1.0-6.0 Credit

Covers special topics in architectural history, theory, or technology that satisfy history/theory or professional elective requirements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C]

Courses

ARCH 101 Studio 1-A 4.0 Credits

2+4 Option Architecture Majors only. Introduces basic architectural design principles. Elementary concepts of space, surface, and form will be explored in two- and three-dimensional abstract exercises. Incorporates observational analysis and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 102 Studio 1-B 4.0 Credits

2+4 Option Architecture Majors only. Transitions from abstract principles to simple architectural exercises, considering function, scale, user and ordering strategies in relationship to form-making in three-dimensional space. Exercises heighten observation and graphic skills while developing an architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 101 [Min Grade: C] and ARCH 131 [Min Grade: C]

ARCH 103 Studio 2-A 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 102. Introductory architectural design studio in which simple architectural problems develop issues of context and the use of materials with issues of space and human activity.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 102 [Min Grade: C-] and (ARCH 132 [Min Grade: C-] or ARCH 152 [Min Grade: C-])

ARCH 104 Studio 2-B 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 103. Introductory architectural design studio in which issues of architectural form are balanced with site and programmatic concerns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 103 [Min Grade: C-] and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-])

Corequisite: ARCH 161

ARCH 105 Studio 3-A 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 104. Covers intermediate architectural design problems of increasing complexity that emphasize the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 104 [Min Grade: C-] and ARCH 161 [Min Grade: C-]

Corequisite: ARCH 134

ARCH 106 Studio 3-B 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 105. Continues exploration of intermediate architectural design problems that present a full range of challenges in the areas of organization, context, and expression.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 105 [Min Grade: C-] and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-])

ARCH 107 Foundation Design I 2.0 Credits

Introduces basic design principles through investigation of abstract and applied design projects using two-dimensional media. Exercises heighten observation and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 108 Foundation Design II 2.0 Credits

Investigates basic design principles through abstract and applied design projects in two-dimensional and three-dimensional media. Design exercises will advance understanding of the design process by exploring conceptual ideas through graphic and oral communication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 107 [Min Grade: C]

ARCH 109 Foundation Design III 2.0 Credits

Investigates basic design principles that emphasize the inter-relationship between the scale of the human body and its movement within three-dimensional space. More in-depth design exercises will address the design process, development of a conceptual idea and a higher-level graphic and oral presentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 108 [Min Grade: C]

ARCH 111 Studio 1-1 4.0 Credits

Introduces basic architectural design principles and concepts of space, surface and form explored in two and three-dimensional abstract exercises. Exercises incorporate observational analysis and graphic skills while developing architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 109 [Min Grade: C] or ARCH 192 [Min Grade: C]

ARCH 112 Studio 1-2 4.0 Credits

Emphasizes the nature of function, structure, and material and their impact on the design process, and therefore their solutions to architectural problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ARCH 111 [Min Grade: C] or INTR 233 [Min Grade: C]) and ARCH 131 [Min Grade: C]

ARCH 113 Studio 1-3 4.0 Credits

Investigates the interrelationships of scale, context, and building elements and the nature of materials and structure and their impact on the process of creating spaces for human activity through simple architectural problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ARCH 112 [Min Grade: C] and ARCH 132 [Min Grade: C]) or (INTR 233 [Min Grade: C] and INTR 220 [Min Grade: C])

ARCH 121 Studio 2-1 3.0 Credits

Stresses the impact of function, materials, and the issue of building image on the design process. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 113 [Min Grade: C-] and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-]) and ARCH 161 [Min Grade: C-]

Corequisite: ARCH 141

ARCH 122 Studio 2-2 3.0 Credits

Continues ARCH 121. Investigates projects of greater programmatic complexity and more stringent site constraints. Projects begin to deal with buildings in an urban context. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 121 [Min Grade: C-]

Corequisite: ARCH 142

ARCH 123 Studio 2-3 3.0 Credits

Continues ARCH 122. Poses design problems of increased complexity to enable students to explore in greater detail the issues presented in the previous term. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 122 [Min Grade: C-]

Corequisite: ARCH 143

ARCH 131 Architectural Representation I-Drawing Basics 3.0 Credits

Introduces the basic skills of architectural representation through drawing, including drafted and freehand techniques in a variety of media. Also introduces techniques of digital documentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 132 Architectural Representation II-Drawing 3.0 Credits

Continues ARCH 131 Architectural Representation I. Introduces advanced skills of architectural representation through drawing, including drafted and freehand techniques in a variety of media. Also introduces advanced techniques of digital documentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 101 [Min Grade: C-] or ARCH 111 [Min Grade: C-]) and ARCH 131 [Min Grade: C-]

ARCH 133 Architectural Representation III-Digital 4.0 Credits

Continues ARCH 132 Architectural Representation II. Introduces basic digital representation skills in 2D and 3D, the creation and manipulation of three-dimensional architectural models and the resultant two-dimensional drawings as well as renderings using various computer techniques and software programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 102 [Min Grade: C-] or ARCH 113 [Min Grade: C-]) and ARCH 132 [Min Grade: C-]

ARCH 134 Architectural Representation IV-3D Modeling 4.0 Credits

Continues ARCH 133. Further investigates and demonstrates the computer's capabilities in architectural design, 3D modeling and representation using various computer techniques and software programs. May also introduce digital fabrication techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 104 [Min Grade: C-] or ARCH 113 [Min Grade: C-]) and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-])

ARCH 135 Architectural Representation V-Advanced Methods 3.0 Credits

Continues ARCH 134. Examines advanced techniques of architectural representation and visual communications for use in the architectural design process. Emphasizes presentation methods to describe design concepts. Content may vary. Contact Architecture program for details. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 106 [Min Grade: C-] or ARCH 233 [Min Grade: C-]) and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-])

ARCH 141 Architecture and Society I 3.0 Credits

Examines the evolution of Western architectural thought, form, space, and structures in light of changing human values and institutions. Covers Western architecture from the prehistoric era through the Romanesque, and contemporary architecture in Asia and Central America as well as Islamic architecture in the Middle East and Spain.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

ARCH 142 Architecture and Society II 3.0 Credits

Examines the evolution of Western architectural thought, form, space and structures in light of changing human values and institutions. Course covers early monumental architecture of the Western Hemisphere and then considers the evolution of Western architecture from the "Dark Ages" through the development and spread of Renaissance architecture across Europe and Latin America.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Prerequisites: ARCH 141 [Min Grade: D]

ARCH 143 Architecture and Society III 3.0 Credits

Examines the evolution of Western architectural thought, form, space and structures in light of changing human values and institutions. Covers Western architecture and urbanism from the 16th C through the early 20th C. Also considered is the architecture of the Aztec and Inca empires, Islamic architecture and architecture and landscape designs of 16th C and 17th C Japan.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Prerequisites: ARCH 142 [Min Grade: D]

ARCH 144 Architecture and Society IV 3.0 Credits

Examines the evolution of architectural thought, form, space and structures in light of changing human values and institutions. Surveys the crucial buildings and thematic development of modern architecture and urbanism beginning in the late 19th C. through the mid-20th C.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Prerequisites: ARCH 143 [Min Grade: D]

ARCH 161 Architectural Construction 3.0 Credits

Architecture majors only. Covers basic construction principles and the use of materials in developing architectural assemblies, providing a conceptual framework to integrate construction and design.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if major is ARCH.
Prerequisites: (ARCH 103 [Min Grade: C-] or ARCH 112 [Min Grade: C-]) and (ARCH 132 [Min Grade: C-] or ARCH 152 [Min Grade: C-] or ARCH 156 [Min Grade: C-])

ARCH 170 Architectural Technology I 3.0 Credits

Introduction to the fundamental aspects of building technology with exposure to materials, structure and building systems that are frequently used in building construction. Provides a framework for the exploration of construction in the context of design.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if major is ARCH.
Prerequisites: ARCH 213 [Min Grade: C]

ARCH 172 Architectural Technology II 3.0 Credits

Further exploration of materials, structure and building systems and their influence on passive systems and sustainable design principles. Begins the development of systematic thinking regarding architectural technology.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if major is ARCH.
Prerequisites: ARCH 170 [Min Grade: C]

ARCH 173 Architectural Technology III 3.0 Credits

Introduction to the technical building analysis including the organizing principles for materials, structure and systems. Includes envelope assembly, thermal comfort, structural and passive building systems.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if major is ARCH.
Prerequisites: ARCH 172 [Min Grade: C]

ARCH 181 Architecture Studio 1A 4.0 Credits

Introduces basic architectural design principles. Elementary concepts of space, surface and form will be explored in two and three dimensional abstract exercises. Exercises incorporate observational analysis and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if major is ARCH.

ARCH 182 Architecture Studio 1B 4.0 Credits

Transitions from abstract design principles to simple architectural exercises, considering function, scale, user and ordering strategies in relation to form-making in three-dimensional space. Exercises heighten observation and graphic skills while developing an architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if major is ARCH.
Prerequisites: (ARCH 181 [Min Grade: C] and ARCH 211 [Min Grade: C])

ARCH 183 Architecture Studio 1C 4.0 Credits

Focuses on a series of basic architectural problems developed around issues of context and material use in relationship to the organization of space and human activity. Design exercises will cultivate the design process through developing a conceptual idea through graphic and oral communication.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if major is ARCH.
Prerequisites: (ARCH 182 [Min Grade: C] and ARCH 212 [Min Grade: C])

ARCH 191 Studio 1-AE 3.0 Credits

Architectural engineering majors only. Covers basic design principles using three-dimensional abstract and applied projects. Exercises heighten observation skills.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Can enroll if major is AE.

ARCH 192 Studio 2-AE 3.0 Credits

Architectural engineering majors only. Continues ARCH 191. Uses design exercises to emphasize the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE.

Prerequisites: ARCH 191 [Min Grade: D]

ARCH 211 Architectural Representation I 2.0 Credits

Introductory course that will provide a survey of drawing types with an emphasis on process and visual literacy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 212 Architectural Representation II 2.0 Credits

Emphasis on craft and composition in the architectural representation of the built environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 211 [Min Grade: C]

ARCH 213 Architectural Representation III 2.0 Credits

Exploration of digital representation with an emphasis on making combining process drawing, digital fabrication and analog craft to develop three-dimensional representation skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 212 [Min Grade: C]

ARCH 224 Architectural Representation IV 2.0 Credits

Emphasizes the communication of design through perspective, view-making and rendering. Through the use of digital and analog techniques, the ability to select the proper media to visually convey a design concept will be developed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 213 [Min Grade: C]

ARCH 225 Architectural Representation V 2.0 Credits

Emphasizes the tools to complete a final quality architectural presentation in a variety of venues including portfolios, digital presentations and online media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 224 [Min Grade: C]

ARCH 226 Architectural Representation VI 2.0 Credits

Explores parametric thinking and the iterative design process while reinforcing critical skills in detailing and design development through various software programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 225 [Min Grade: C]

ARCH 231 Studio 3-1 3.0 Credits

Investigates specific building types to help students reach a basic level of competence in the language of architecture, problem-solving, and the means of communicating design solutions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 123 [Min Grade: C-] and ARCH 143 [Min Grade: C-] and ARCH 161 [Min Grade: C-] and ARCH 134 [Min Grade: C-]

ARCH 232 Studio 3-2 3.0 Credits

Continues ARCH 231. Design projects expand students' vocabulary and understanding of the process of creating solutions to the problems of architecture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 231 [Min Grade: C-]

ARCH 233 Studio 3-3 3.0 Credits

Continues ARCH 232. Addresses the interaction and coordination between the language of architecture and the languages of the other disciplines that influence the process of design. More complex programs are assigned.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 232 [Min Grade: C-]

ARCH 241 Studio 4-1 4.0 Credits

Investigates the design relationship between the man-made and the natural environment in a study of large-scale site design and building development in relation to natural forces. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 106 [Min Grade: C-] or ARCH 233 [Min Grade: C-]) and (PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-])

ARCH 242 Studio 4-2 4.0 Credits

Continues ARCH 241. Studies the relationship between building and site. A series of smaller-scale problems in site design investigates the architecture of the exterior. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 241 [Min Grade: D] and CIVE 261 [Min Grade: C-]

ARCH 243 Studio 4-3 4.0 Credits

Addresses architectural problems with specific environmental and site restraints and criteria. Issues of sustainable design will also be explored. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 242 [Min Grade: D] and CIVE 262 [Min Grade: C-]

Corequisite: CIVE 263

ARCH 261 Environmental Systems I 3.0 Credits

Introduces heating, ventilation, and air conditioning systems and site utility planning. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 262 Environmental Systems II 3.0 Credits

Introduces plumbing systems, including site distribution, water distribution, and waste systems. Fire protection is also covered. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 263 Environmental Systems III 3.0 Credits

Covers application of electrical systems and lighting to architectural design and construction. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 271 Materials & Structural Behavior I 3.0 Credits

Introduces the basics of construction (timber, masonry, steel, and concrete). Covers their behavior as ingredients of the structural system.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 184 [Min Grade: D] or PHYS 104 [Min Grade: D]

ARCH 272 Materials & Structural Behavior II 3.0 Credits

Second part of a three course sequence that introduces students to building structures and materials. The course will introduce structural design methodologies and students will learn how to design wood floor systems, beams, columns, steel beams and tension elements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 271 [Min Grade: C] or CIVE 261 [Min Grade: D]

ARCH 273 Materials & Structural Behavior III 3.0 Credits

Third part of a three course sequence that introduces students to building structures and materials. The course will introduce masonry and foundation design. Students will learn how to design concrete beams and columns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 272 [Min Grade: C] or CIVE 262 [Min Grade: D]

ARCH 274 Architectural Technology IV 3.0 Credits

Intermediate development of architectural technology with a focus on application of analysis of primary materials, structure and systems. Depth and range of analytical tools are addressed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 173 [Min Grade: C]

ARCH 275 Architectural Technology V 3.0 Credits

Further development of analytical skills for building technology. Case studies and real world precedents examine materials, structure and systems in the support of larger architectural objectives.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 274 [Min Grade: C]

ARCH 276 Architectural Technology VI 3.0 Credits

Examination of technical analysis and design in support of iterative architectural concepts. Materials, structure and systems are utilized to develop strong design synergies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 275 [Min Grade: C]

ARCH 281 Architecture Studio 2A 4.0 Credits

Introduces issues of architectural form, site and programmatic concerns. Design exercises will explore simple issues of structure, building and material systems and sustainability.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 183 [Min Grade: C] and ARCH 213 [Min Grade: C])

ARCH 282 Architecture Studio 2B 4.0 Credits

Covers architectural design problems of incremental complexity that emphasizes the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 281 [Min Grade: C] and ARCH 224 [Min Grade: C] and ARCH 170 [Min Grade: C]

ARCH 283 Architecture Studio 2C 4.0 Credits

Explores architectural design problems that introduce the full range of challenges in the areas of organization, program, context, systems and formal expression.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 282 [Min Grade: C] and ARCH 225 [Min Grade: C] and ARCH 272 [Min Grade: C]

ARCH 315 Sustainable Built Environment I 3.0 Credits

Provides an overview of contemporary sustainable design principles and systems involved to posit novel solutions to various design challenges. Combining theoretical knowledge, field trips and case studies enabling students to critically assess sustainability as it relates to the built environment through five key subsystems: materials, air, water, energy and life.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ARCH 320 Sustainable Built Environment II 3.0 Credits

Students will examine the work of scientists, designers, authors, artists, architects, engineers, planners, etc to gain a deeper conceptual understanding of current and emerging strategies in sustainability and the complex and integrated systems approach to the built environment in the present and near future.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ARCH 315 [Min Grade: C-]

ARCH 335 Professional Practice I 3.0 Credits

This seminar is the first of a two-course sequence that introduces students to varying topics related to architectural practice in today's society. It addresses the following issues: Community and Social Responsibility, Leadership, Ethics & Professional Judgment, Client Role in Architecture, Basic Principles of Architectural Practice.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

Prerequisites: ARCH 243 [Min Grade: C-] or ARCH 333 [Min Grade: C]

ARCH 336 Professional Practice II 3.0 Credits

This seminar is the second of a two-course sequence that introduces students to varying topics related to architectural practice in today's society. It addresses the following issues: Practice Management, Project Management, Financial Considerations, Legal Responsibilities, Ethics & Professional Judgment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

Prerequisites: ARCH 335 [Min Grade: C]

ARCH 340 American Architecture & Urbanism 3.0 Credits

Surveys the development of American architecture and urbanism from its Native American origins through the arrival of early Modernism in the 1930s and 1940s. Writing Intensive.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 143 [Min Grade: C-])

ARCH 341 [WI] Theories of Architecture I 3.0 Credits

Seminar that examines theories and principles of Western architecture before 1700. History/theory elective. Fall. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 342 [WI] Theories of Architecture II 3.0 Credits

Continues ARCH 341. Seminar that examines theories and principles of Western architecture from the Baroque era of the 17th century to the beginning of Modernism in the 20th century. History/theory elective. Winter. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 343 Theories of Architecture III 3.0 Credits

Seminar that examines 20th-century theories of architecture, including analysis and discussion of current theoretical positions. History/theory elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 344 [WI] History of Modern Architecture I 3.0 Credits

Surveys the crucial buildings and thematic development of modern architecture and urbanism beginning in the late nineteenth Century continuing through the mid-20th Century. History/theory elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 345 [WI] History of Modern Architecture II 3.0 Credits

Continuation of ARCH 344. Surveys the crucial buildings and thematic development of modern architecture and urbanism from the mid-20th Century to the present. History/theory elective. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 346 [WI] History of Philadelphia Architecture 3.0 Credits

Covers the architecture of the city of Philadelphia from 1682, examining its architects, styles, and sources through lectures, walking tours, and student reports. History/theory elective. Fall. Alternate years. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 347 [WI] Architectural Study Tour 1.0-6.0 Credit

An intensive study tour of selected domestic and foreign destinations focusing on architecture and related design disciplines. Combines lecture, site visits, sketching and individual research. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C-] or INTR 200 [Min Grade: C-] or ARTH 103 [Min Grade: C-]

ARCH 348 [WI] Studies in Vernacular Architecture 3.0 Credits

A topical survey of world traditions of vernacular architecture, with emphasis on houses and dwelling environments. The survey topics include basics of shelter, construction methods, response to climate, patterns of settlement, social and economic organization, cultural expression, and methods of research and analysis.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 350 Contemporary Architecture 3.0 Credits

Survey and analysis of significant developments in architecture and urbanism over the past 50+ years. Writing Intensive.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 351 Studio 5-1 4.0 Credits

Poses problems that address the relationship of form, site, program, and theory within the constraints of the basic systems (structural, mechanical, etc.).

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (CIVE 263 [Min Grade: D] or ARCH 273 [Min Grade: C]) and ARCH 243 [Min Grade: C]

ARCH 352 Studio 5-2 4.0 Credits

Continues ARCH 351. Emphasizes the strengthening of students' ability to solve complex problems in architecture. Expects students to demonstrate understanding and control of basic architectural systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 351 [Min Grade: C] and ARCH 261 [Min Grade: C-]

ARCH 353 Studio 5-3 4.0 Credits

Continues ARCH 352. Stresses the coordination of all architectural criteria in a large scale and complex architectural problem.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 352 [Min Grade: C] and ARCH 262 [Min Grade: C-]

ARCH 361 Studio 6-1 4.0 Credits

Introduces problems of urban design. Case studies demonstrate the relationship between the manmade environment and the natural environment as well as the relationship between many buildings and other manmade environments and the natural environment. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 353 [Min Grade: D] and ARCH 263 [Min Grade: C-]

Corequisite: ARCH 335

ARCH 362 Studio 6-2 4.0 Credits

Continues ARCH 361. A large urban-design project is undertaken to learn the design process required to solve problems of such magnitude. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 361 [Min Grade: D]

Corequisite: ARCH 336

ARCH 363 Studio 6-3 4.0 Credits

Continues ARCH 362. Requires students to develop architectural solutions for a portion of the problem addressed in Studio 6-2, demonstrating an understanding of the relationship between buildings and the exterior environment established in the previous course. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 362 [Min Grade: D]

Corequisite: PHIL 317

ARCH 377 Architectural Technology VII 3.0 Credits

Advanced building technology concepts are explored through case studies and focused design examples. Materials, construction, methods, structure, systems and envelope are studied as integrated aspect of larger iterative design processes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 276 [Min Grade: C]

ARCH 378 Architectural Technology VIII 3.0 Credits

Building technology and analysis are explored through design precedents and sketch problems to develop integrated design and analytical skills. Focuses on large and small scale elements that can become generative and performative aspects of major design decisions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 377 [Min Grade: C]

ARCH 379 Architectural Technology IX 3.0 Credits

Advanced building technology design and analysis is utilized in iterative and integrated design methods to support comprehensive design processes. Materials, structure and systems are developed qualitatively and quantitatively through design and analysis exercises.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 378 [Min Grade: C]

ARCH 381 Architecture Studio 3A 4.0 Credits

Investigates the design relationship between man-made and the natural environment. Cultivates advanced analysis methods and the development of informed and resolved design solutions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 283 [Min Grade: C] and ARCH 226 [Min Grade: C] and ARCH 173 [Min Grade: C]

ARCH 382 Architecture Studio 3B 4.0 Credits

Studies the relationship between building, site and context. Architectural design problems emphasize concept development that translates careful analysis into the building ideas with a progressing understanding of architectural concerns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 381 [Min Grade: C] and ARCH 274 [Min Grade: C]

ARCH 383 Architecture Studio 3C 4.0 Credits

Focuses on architectural problems with intermediate complexity. Integrates issues of context, site, program, function, and architectural systems into advanced design proposals.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 382 [Min Grade: C] and ARCH 275 [Min Grade: C]

ARCH 399 Independent Study in Architecture 0.5-12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ARCH 421 [WI] Environmental Psychology and Design Theory 3.0 Credits

Examines the relationship between human behavior and architecture from the perspective of environmental psychology. Topics include aesthetics, environmental experience, social interaction, social organization, and culture. This is a writing intensive course. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C]

ARCH 431 [WI] Architectural Programming 3.0 Credits

Introduces current techniques of building programming and their relationship to building design. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 363 [Min Grade: C] or ARCH 473 [Min Grade: C]

ARCH 432 The Development Process 3.0 Credits

Introduces the process of land development. Explores traditional and emerging development models (the architect as the equity participant and developer) in relation to new construction and rehabilitation. Covers various methods of initiating building projects and financing and tax issues. Professional elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 441 Urban Design Seminar 3.0 Credits

Expands the concept of architecture to urban design scale and presents the principles of city planning through a series of case studies. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 451 Advanced Drawing 3.0 Credits

Covers advanced architectural rendering, concentrating on the effects of light, shade, and color using the techniques of water-color rendering. Professional elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C] or INTR 341 [Min Grade: C]

ARCH 455 Computer Applications in Architecture I 3.0 Credits

Covers two-dimensional and three-dimensional computer representations and applications. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C]

ARCH 456 Computer Applications in Architecture II 3.0 Credits

Further investigates and demonstrates the computer's capabilities in architectural design and representation. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C]

ARCH 463 Emerging Architectural Technology 3.0 Credits

A holistic study of design and construction technology of significant buildings by leading architects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 464 Building Enclosure Design 3.0 Credits

Examines the integrations of aesthetics, building science, and technology in the design of building enclosures. Professional Elective. Summer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 465 Energy and Architecture 3.0 Credits

Creates an awareness of the availability of energy resources and their effect on the built environment. Discusses alternative sources of energy. Professional elective. Summer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 481 Architecture Studio 4A 4.0 Credits

Focuses on more complex architectural challenges through analysis of case studies that address the relationship between the man-made built environment and the natural environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 383 [Min Grade: C] and ARCH 276 [Min Grade: C]

ARCH 482 Architecture Studio 4B 4.0 Credits

Further the understanding of context and design and the application of solutions and strategies surrounding more complex architectural and environmental problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 481 [Min Grade: C] and ARCH 377 [Min Grade: C]

ARCH 483 Architecture Studio 4C 4.0 Credits

Challenges to develop and refine architectural solutions through an advanced understanding of the relationship between buildings and environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 482 [Min Grade: C] and ARCH 378 [Min Grade: C]

ARCH 487 Architecture Studio 5A 4.0 Credits

Addresses the complex relationship through analysis and synthesis of form, site, program, building technology and theory within specific building context.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 483 [Min Grade: C] and ARCH 379 [Min Grade: C]

ARCH 488 Architecture Studio 5B 4.0 Credits

Emphasizes complex architectural problems while demonstrating understanding and appropriate application.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 487 [Min Grade: C]

ARCH 489 Architecture Studio 5C 4.0 Credits

Integrates in-depth application and coordination of all architectural building criteria in a large scale and complex architectural problem.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 488 [Min Grade: C]

ARCH 491 Advanced Topics in Architecture 1.0-6.0 Credit

Covers advanced topics in architectural design, practice, technology or history and theory that satisfy professional or historical/theory elective requirements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 493 Senior Project I 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part one of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 363 [Min Grade: C] or ARCH 473 [Min Grade: C]

Corequisite: ARCH 431

ARCH 494 Senior Project II 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part two of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 493 [Min Grade: C]

ARCH 495 Senior Project III 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part three of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 494 [Min Grade: C]

ARCH 496 Thesis I 8.0 Credits

An individually structured year-long design problem that enables students to work independently and explore complex issues in depth. Periodic individual review sessions are scheduled with faculty adviser. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 363 [Min Grade: D] and ARCH 143 [Min Grade: C-]

and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-]) and

ARCH 263 [Min Grade: C-] and CIVE 263 [Min Grade: C-]

ARCH 497 Thesis II 8.0 Credits

Continues ARCH 496. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 496 [Min Grade: C-]

ARCH 498 Thesis III 8.0 Credits

Continues ARCH 497. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 497 [Min Grade: C-]

ARCH 499 [WI] Special Topics in Architecture 3.0 Credits

Covers special topics in architectural history, theory, or technology that satisfy history/theory or professional elective requirements and university writing intensive requirements. Course may be repeated for credit when different topics are offered. Fall, Winter, Spring, Summer. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH I199 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I299 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I399 Independent Study in Architecture 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I499 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C]

ARCH T180 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T280 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T380 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T480 Special Topics in Architecture 1.0-6.0 Credit

Covers special topics in architectural history, theory, or technology that satisfy history/theory or professional elective requirements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C]

Courses

ARCH 101 Studio 1-A 4.0 Credits

2+4 Option Architecture Majors only. Introduces basic architectural design principles. Elementary concepts of space, surface, and form will be explored in two- and three-dimensional abstract exercises. Incorporates observational analysis and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 102 Studio 1-B 4.0 Credits

2+4 Option Architecture Majors only. Transitions from abstract principles to simple architectural exercises, considering function, scale, user and ordering strategies in relationship to form-making in three-dimensional space. Exercises heighten observation and graphic skills while developing an architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 101 [Min Grade: C] and ARCH 131 [Min Grade: C]

ARCH 103 Studio 2-A 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 102. Introductory architectural design studio in which simple architectural problems develop issues of context and the use of materials with issues of space and human activity.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 102 [Min Grade: C-] and (ARCH 132 [Min Grade: C-] or ARCH 152 [Min Grade: C-])

ARCH 104 Studio 2-B 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 103. Introductory architectural design studio in which issues of architectural form are balanced with site and programmatic concerns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 103 [Min Grade: C-] and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-])

Corequisite: ARCH 161

ARCH 105 Studio 3-A 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 104. Covers intermediate architectural design problems of increasing complexity that emphasize the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 104 [Min Grade: C-] and ARCH 161 [Min Grade: C-]

Corequisite: ARCH 134

ARCH 106 Studio 3-B 4.5 Credits

2+4 Option architecture majors only. Continues ARCH 105. Continues exploration of intermediate architectural design problems that present a full range of challenges in the areas of organization, context, and expression.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 105 [Min Grade: C-] and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-])

ARCH 107 Foundation Design I 2.0 Credits

Introduces basic design principles through investigation of abstract and applied design projects using two-dimensional media. Exercises heighten observation and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 108 Foundation Design II 2.0 Credits

Investigates basic design principles through abstract and applied design projects in two-dimensional and three-dimensional media. Design exercises will advance understanding of the design process by exploring conceptual ideas through graphic and oral communication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 107 [Min Grade: C]

ARCH 109 Foundation Design III 2.0 Credits

Investigates basic design principles that emphasize the inter-relationship between the scale of the human body and its movement within three-dimensional space. More in-depth design exercises will address the design process, development of a conceptual idea and a higher-level graphic and oral presentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 108 [Min Grade: C]

ARCH 111 Studio 1-1 4.0 Credits

Introduces basic architectural design principles and concepts of space, surface and form explored in two and three-dimensional abstract exercises. Exercises incorporate observational analysis and graphic skills while developing architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 109 [Min Grade: C] or ARCH 192 [Min Grade: C]

ARCH 112 Studio 1-2 4.0 Credits

Emphasizes the nature of function, structure, and material and their impact on the design process, and therefore their solutions to architectural problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ARCH 111 [Min Grade: C] or INTR 233 [Min Grade: C])

and ARCH 131 [Min Grade: C]

ARCH 113 Studio 1-3 4.0 Credits

Investigates the interrelationships of scale, context, and building elements and the nature of materials and structure and their impact on the process of creating spaces for human activity through simple architectural problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ARCH 112 [Min Grade: C] and ARCH 132 [Min Grade: C]) or (INTR 233 [Min Grade: C] and INTR 220 [Min Grade: C])

ARCH 121 Studio 2-1 3.0 Credits

Stresses the impact of function, materials, and the issue of building image on the design process. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 113 [Min Grade: C-] and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-]) and ARCH 161 [Min Grade: C-]

Corequisite: ARCH 141

ARCH 122 Studio 2-2 3.0 Credits

Continues ARCH 121. Investigates projects of greater programmatic complexity and more stringent site constraints. Projects begin to deal with buildings in an urban context. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 121 [Min Grade: C-]

Corequisite: ARCH 142

ARCH 123 Studio 2-3 3.0 Credits

Continues ARCH 122. Poses design problems of increased complexity to enable students to explore in greater detail the issues presented in the previous term. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 122 [Min Grade: C-]

Corequisite: ARCH 143

ARCH 131 Architectural Representation I-Drawing Basics 3.0 Credits

Introduces the basic skills of architectural representation through drawing, including drafted and freehand techniques in a variety of media. Also introduces techniques of digital documentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 132 Architectural Representation II-Drawing 3.0 Credits

Continues ARCH 131 Architectural Representation I. Introduces advanced skills of architectural representation through drawing, including drafted and freehand techniques in a variety of media. Also introduces advanced techniques of digital documentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 101 [Min Grade: C-] or ARCH 111 [Min Grade: C-]) and ARCH 131 [Min Grade: C-]

ARCH 133 Architectural Representation III-Digital 4.0 Credits

Continues ARCH 132 Architectural Representation II. Introduces basic digital representation skills in 2D and 3D, the creation and manipulation of three-dimensional architectural models and the resultant two-dimensional drawings as well as renderings using various computer techniques and software programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 102 [Min Grade: C-] or ARCH 113 [Min Grade: C-]) and ARCH 132 [Min Grade: C-]

ARCH 134 Architectural Representation IV-3D Modeling 4.0 Credits

Continues ARCH 133. Further investigates and demonstrates the computer's capabilities in architectural design, 3D modeling and representation using various computer techniques and software programs. May also introduce digital fabrication techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 104 [Min Grade: C-] or ARCH 113 [Min Grade: C-]) and (ARCH 133 [Min Grade: C-] or ARCH 150 [Min Grade: C-])

ARCH 135 Architectural Representation V-Advanced Methods 3.0 Credits

Continues ARCH 134. Examines advanced techniques of architectural representation and visual communications for use in the architectural design process. Emphasizes presentation methods to describe design concepts. Content may vary. Contact Architecture program for details. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 106 [Min Grade: C-] or ARCH 233 [Min Grade: C-]) and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-])

ARCH 141 Architecture and Society I 3.0 Credits

Examines the evolution of Western architectural thought, form, space, and structures in light of changing human values and institutions. Covers Western architecture from the prehistoric era through the Romanesque, and contemporary architecture in Asia and Central America as well as Islamic architecture in the Middle East and Spain.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 142 Architecture and Society II 3.0 Credits

Examines the evolution of Western architectural thought, form, space and structures in light of changing human values and institutions. Course covers early monumental architecture of the Western Hemisphere and then considers the evolution of Western architecture from the "Dark Ages" through the development and spread of Renaissance architecture across Europe and Latin America.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 141 [Min Grade: D]

ARCH 143 Architecture and Society III 3.0 Credits

Examines the evolution of Western architectural thought, form, space and structures in light of changing human values and institutions. Covers Western architecture and urbanism from the 16th C through the early 20th C. Also considered is the architecture of the Aztec and Inca empires, Islamic architecture and architecture and landscape designs of 16th C and 17th C Japan.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 142 [Min Grade: D]

ARCH 144 Architecture and Society IV 3.0 Credits

Examines the evolution of architectural thought, form, space and structures in light of changing human values and institutions. Surveys the crucial buildings and thematic development of modern architecture and urbanism beginning in the late 19th C. through the mid-20th C.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: D]

ARCH 161 Architectural Construction 3.0 Credits

Architecture majors only. Covers basic construction principles and the use of materials in developing architectural assemblies, providing a conceptual framework to integrate construction and design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 103 [Min Grade: C-] or ARCH 112 [Min Grade: C-]) and (ARCH 132 [Min Grade: C-] or ARCH 152 [Min Grade: C-] or ARCH 156 [Min Grade: C-])

ARCH 170 Architectural Technology I 3.0 Credits

Introduction to the fundamental aspects of building technology with exposure to materials, structure and building systems that are frequently used in building construction. Provides a framework for the exploration of construction in the context of design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 213 [Min Grade: C]

ARCH 172 Architectural Technology II 3.0 Credits

Further exploration of materials, structure and building systems and their influence on passive systems and sustainable design principles. Begins the development of systematic thinking regarding architectural technology.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 170 [Min Grade: C]

ARCH 173 Architectural Technology III 3.0 Credits

Introduction to the technical building analysis including the organizing principles for materials, structure and systems. Includes envelope assembly, thermal comfort, structural and passive building systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 172 [Min Grade: C]

ARCH 181 Architecture Studio 1A 4.0 Credits

Introduces basic architectural design principles. Elementary concepts of space, surface and form will be explored in two and three dimensional abstract exercises. Exercises incorporate observational analysis and graphic skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 182 Architecture Studio 1B 4.0 Credits

Transitions from abstract design principles to simple architectural exercises, considering function, scale, user and ordering strategies in relation to form-making in three-dimensional space. Exercises heighten observation and graphic skills while developing an architectural vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 181 [Min Grade: C] and ARCH 211 [Min Grade: C])

ARCH 183 Architecture Studio 1C 4.0 Credits

Focuses on a series of basic architectural problems developed around issues of context and material use in relationship to the organization of space and human activity. Design exercises will cultivate the design process through developing a conceptual idea through graphic and oral communication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 182 [Min Grade: C] and ARCH 212 [Min Grade: C])

ARCH 191 Studio 1-AE 3.0 Credits

Architectural engineering majors only. Covers basic design principles using three-dimensional abstract and applied projects. Exercises heighten observation skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE.

ARCH 192 Studio 2-AE 3.0 Credits

Architectural engineering majors only. Continues ARCH 191. Uses design exercises to emphasize the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE.

Prerequisites: ARCH 191 [Min Grade: D]

ARCH 211 Architectural Representation I 2.0 Credits

Introductory course that will provide a survey of drawing types with an emphasis on process and visual literacy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

ARCH 212 Architectural Representation II 2.0 Credits

Emphasis on craft and composition in the architectural representation of the built environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 211 [Min Grade: C]

ARCH 213 Architectural Representation III 2.0 Credits

Exploration of digital representation with an emphasis on making combining process drawing, digital fabrication and analog craft to develop three-dimensional representation skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 212 [Min Grade: C]

ARCH 224 Architectural Representation IV 2.0 Credits

Emphasizes the communication of design through perspective, view-making and rendering. Through the use of digital and analog techniques, the ability to select the proper media to visually convey a design concept will be developed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 213 [Min Grade: C]

ARCH 225 Architectural Representation V 2.0 Credits

Emphasizes the tools to complete a final quality architectural presentation in a variety of venues including portfolios, digital presentations and online media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 224 [Min Grade: C]

ARCH 226 Architectural Representation VI 2.0 Credits

Explores parametric thinking and the iterative design process while reinforcing critical skills in detailing and design development through various software programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 225 [Min Grade: C]

ARCH 231 Studio 3-1 3.0 Credits

Investigates specific building types to help students reach a basic level of competence in the language of architecture, problem-solving, and the means of communicating design solutions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 123 [Min Grade: C-] and ARCH 143 [Min Grade: C-] and ARCH 161 [Min Grade: C-] and ARCH 134 [Min Grade: C-]

ARCH 232 Studio 3-2 3.0 Credits

Continues ARCH 231. Design projects expand students' vocabulary and understanding of the process of creating solutions to the problems of architecture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 231 [Min Grade: C-]

ARCH 233 Studio 3-3 3.0 Credits

Continues ARCH 232. Addresses the interaction and coordination between the language of architecture and the languages of the other disciplines that influence the process of design. More complex programs are assigned.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 232 [Min Grade: C-]

ARCH 241 Studio 4-1 4.0 Credits

Investigates the design relationship between the man-made and the natural environment in a study of large-scale site design and building development in relation to natural forces. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 106 [Min Grade: C-] or ARCH 233 [Min Grade: C-]) and (PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-])

ARCH 242 Studio 4-2 4.0 Credits

Continues ARCH 241. Studies the relationship between building and site. A series of smaller-scale problems in site design investigates the architecture of the exterior. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 241 [Min Grade: D] and CIVE 261 [Min Grade: C-]

ARCH 243 Studio 4-3 4.0 Credits

Addresses architectural problems with specific environmental and site restraints and criteria. Issues of sustainable design will also be explored. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 242 [Min Grade: D] and CIVE 262 [Min Grade: C-]

Corequisite: CIVE 263

ARCH 261 Environmental Systems I 3.0 Credits

Introduces heating, ventilation, and air conditioning systems and site utility planning. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 262 Environmental Systems II 3.0 Credits

Introduces plumbing systems, including site distribution, water distribution, and waste systems. Fire protection is also covered. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 263 Environmental Systems III 3.0 Credits

Covers application of electrical systems and lighting to architectural design and construction. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: C-] or PHYS 184 [Min Grade: C-]

ARCH 271 Materials & Structural Behavior I 3.0 Credits

Introduces the basics of construction (timber, masonry, steel, and concrete). Covers their behavior as ingredients of the structural system.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 184 [Min Grade: D] or PHYS 104 [Min Grade: D]

ARCH 272 Materials & Structural Behavior II 3.0 Credits

Second part of a three course sequence that introduces students to building structures and materials. The course will introduce structural design methodologies and students will learn how to design wood floor systems, beams, columns, steel beams and tension elements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 271 [Min Grade: C] or CIVE 261 [Min Grade: D]

ARCH 273 Materials & Structural Behavior III 3.0 Credits

Third part of a three course sequence that introduces students to building structures and materials. The course will introduce masonry and foundation design. Students will learn how to design concrete beams and columns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 272 [Min Grade: C] or CIVE 262 [Min Grade: D]

ARCH 274 Architectural Technology IV 3.0 Credits

Intermediate development of architectural technology with a focus on application of analysis of primary materials, structure and systems. Depth and range of analytical tools are addressed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 173 [Min Grade: C]

ARCH 275 Architectural Technology V 3.0 Credits

Further development of analytical skills for building technology. Case studies and real world precedents examine materials, structure and systems in the support of larger architectural objectives.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 274 [Min Grade: C]

ARCH 276 Architectural Technology VI 3.0 Credits

Examination of technical analysis and design in support of iterative architectural concepts. Materials, structure and systems are utilized to develop strong design synergies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 275 [Min Grade: C]

ARCH 281 Architecture Studio 2A 4.0 Credits

Introduces issues of architectural form, site and programmatic concerns. Design exercises will explore simple issues of structure, building and material systems and sustainability.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 183 [Min Grade: C] and ARCH 213 [Min Grade: C])

ARCH 282 Architecture Studio 2B 4.0 Credits

Covers architectural design problems of incremental complexity that emphasizes the nature of function, structure, and material and their impact on the design process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 281 [Min Grade: C] and ARCH 224 [Min Grade: C] and ARCH 170 [Min Grade: C]

ARCH 283 Architecture Studio 2C 4.0 Credits

Explores architectural design problems that introduce the full range of challenges in the areas of organization, program, context, systems and formal expression.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 282 [Min Grade: C] and ARCH 225 [Min Grade: C] and ARCH 272 [Min Grade: C]

ARCH 315 Sustainable Built Environment I 3.0 Credits

Provides an overview of contemporary sustainable design principles and systems involved to posit novel solutions to various design challenges. Combining theoretical knowledge, field trips and case studies enabling students to critically assess sustainability as it relates to the built environment through five key subsystems: materials, air, water, energy and life.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ARCH 320 Sustainable Built Environment II 3.0 Credits

Students will examine the work of scientists, designers, authors, artists, architects, engineers, planners, etc to gain a deeper conceptual understanding of current and emerging strategies in sustainability and the complex and integrated systems approach to the built environment in the present and near future.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ARCH 315 [Min Grade: C-]

ARCH 335 Professional Practice I 3.0 Credits

This seminar is the first of a two-course sequence that introduces students to varying topics related to architectural practice in today's society. It addresses the following issues: Community and Social Responsibility, Leadership, Ethics & Professional Judgment, Client Role in Architecture, Basic Principles of Architectural Practice.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

Prerequisites: ARCH 243 [Min Grade: C-] or ARCH 333 [Min Grade: C]

ARCH 336 Professional Practice II 3.0 Credits

This seminar is the second of a two-course sequence that introduces students to varying topics related to architectural practice in today's society. It addresses the following issues: Practice Management, Project Management, Financial Considerations, Legal Responsibilities, Ethics & Professional Judgment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

Prerequisites: ARCH 335 [Min Grade: C]

ARCH 340 American Architecture & Urbanism 3.0 Credits

Surveys the development of American architecture and urbanism from its Native American origins through the arrival of early Modernism in the 1930s and 1940s. Writing Intensive.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (ARCH 143 [Min Grade: C-])

ARCH 341 [WI] Theories of Architecture I 3.0 Credits

Seminar that examines theories and principles of Western architecture before 1700. History/theory elective. Fall. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 342 [WI] Theories of Architecture II 3.0 Credits

Continues ARCH 341. Seminar that examines theories and principles of Western architecture from the Baroque era of the 17th century to the beginning of Modernism in the 20th century. History/theory elective. Winter. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 343 Theories of Architecture III 3.0 Credits

Seminar that examines 20th-century theories of architecture, including analysis and discussion of current theoretical positions. History/theory elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 344 [WI] History of Modern Architecture I 3.0 Credits

Surveys the crucial buildings and thematic development of modern architecture and urbanism beginning in the late nineteenth Century continuing through the mid-20th Century. History/theory elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 345 [WI] History of Modern Architecture II 3.0 Credits

Continuation of ARCH 344. Surveys the crucial buildings and thematic development of modern architecture and urbanism from the mid-20th Century to the present. History/theory elective. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 346 [WI] History of Philadelphia Architecture 3.0 Credits

Covers the architecture of the city of Philadelphia from 1682, examining its architects, styles, and sources through lectures, walking tours, and student reports. History/theory elective. Fall. Alternate years. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 347 [WI] Architectural Study Tour 1.0-6.0 Credit

An intensive study tour of selected domestic and foreign destinations focusing on architecture and related design disciplines. Combines lecture, site visits, sketching and individual research. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C-] or INTR 200 [Min Grade: C-] or ARTH 103 [Min Grade: C-]

ARCH 348 [WI] Studies in Vernacular Architecture 3.0 Credits

A topical survey of world traditions of vernacular architecture, with emphasis on houses and dwelling environments. The survey topics include basics of shelter, construction methods, response to climate, patterns of settlement, social and economic organization, cultural expression, and methods of research and analysis.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 350 Contemporary Architecture 3.0 Credits

Survey and analysis of significant developments in architecture and urbanism over the past 50+ years. Writing Intensive.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 351 Studio 5-1 4.0 Credits

Poses problems that address the relationship of form, site, program, and theory within the constraints of the basic systems (structural, mechanical, etc.).

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: (CIVE 263 [Min Grade: D] or ARCH 273 [Min Grade: C]) and ARCH 243 [Min Grade: C]

ARCH 352 Studio 5-2 4.0 Credits

Continues ARCH 351. Emphasizes the strengthening of students' ability to solve complex problems in architecture. Expects students to demonstrate understanding and control of basic architectural systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 351 [Min Grade: C] and ARCH 261 [Min Grade: C-]

ARCH 353 Studio 5-3 4.0 Credits

Continues ARCH 352. Stresses the coordination of all architectural criteria in a large scale and complex architectural problem.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 352 [Min Grade: C] and ARCH 262 [Min Grade: C-]

ARCH 361 Studio 6-1 4.0 Credits

Introduces problems of urban design. Case studies demonstrate the relationship between the manmade environment and the natural environment as well as the relationship between many buildings and other manmade environments and the natural environment. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 353 [Min Grade: D] and ARCH 263 [Min Grade: C-]

Corequisite: ARCH 335

ARCH 362 Studio 6-2 4.0 Credits

Continues ARCH 361. A large urban-design project is undertaken to learn the design process required to solve problems of such magnitude. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 361 [Min Grade: D]

Corequisite: ARCH 336

ARCH 363 Studio 6-3 4.0 Credits

Continues ARCH 362. Requires students to develop architectural solutions for a portion of the problem addressed in Studio 6-2, demonstrating an understanding of the relationship between buildings and the exterior environment established in the previous course. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 362 [Min Grade: D]

Corequisite: PHIL 317

ARCH 377 Architectural Technology VII 3.0 Credits

Advanced building technology concepts are explored through case studies and focused design examples. Materials, construction, methods, structure, systems and envelope are studied as integrated aspect of larger iterative design processes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 276 [Min Grade: C]

ARCH 378 Architectural Technology VIII 3.0 Credits

Building technology and analysis are explored through design precedents and sketch problems to develop integrated design and analytical skills. Focuses on large and small scale elements that can become generative and performative aspects of major design decisions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 377 [Min Grade: C]

ARCH 379 Architectural Technology IX 3.0 Credits

Advanced building technology design and analysis is utilized in iterative and integrated design methods to support comprehensive design processes. Materials, structure and systems are developed qualitatively and quantitatively through design and analysis exercises.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 378 [Min Grade: C]

ARCH 381 Architecture Studio 3A 4.0 Credits

Investigates the design relationship between man-made and the natural environment. Cultivates advanced analysis methods and the development of informed and resolved design solutions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 283 [Min Grade: C] and ARCH 226 [Min Grade: C] and ARCH 173 [Min Grade: C]

ARCH 382 Architecture Studio 3B 4.0 Credits

Studies the relationship between building, site and context. Architectural design problems emphasize concept development that translates careful analysis into the building ideas with a progressing understanding of architectural concerns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 381 [Min Grade: C] and ARCH 274 [Min Grade: C]

ARCH 383 Architecture Studio 3C 4.0 Credits

Focuses on architectural problems with intermediate complexity. Integrates issues of context, site, program, function, and architectural systems into advanced design proposals.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 382 [Min Grade: C] and ARCH 275 [Min Grade: C]

ARCH 399 Independent Study in Architecture 0.5-12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ARCH 421 [WI] Environmental Psychology and Design Theory 3.0 Credits

Examines the relationship between human behavior and architecture from the perspective of environmental psychology. Topics include aesthetics, environmental experience, social interaction, social organization, and culture. This is a writing intensive course. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C]

ARCH 431 [WI] Architectural Programming 3.0 Credits

Introduces current techniques of building programming and their relationship to building design. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 363 [Min Grade: C] or ARCH 473 [Min Grade: C]

ARCH 432 The Development Process 3.0 Credits

Introduces the process of land development. Explores traditional and emerging development models (the architect as the equity participant and developer) in relation to new construction and rehabilitation. Covers various methods of initiating building projects and financing and tax issues. Professional elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 441 Urban Design Seminar 3.0 Credits

Expands the concept of architecture to urban design scale and presents the principles of city planning through a series of case studies. History/Theory Elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH 451 Advanced Drawing 3.0 Credits

Covers advanced architectural rendering, concentrating on the effects of light, shade, and color using the techniques of water-color rendering. Professional elective. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C] or INTR 341 [Min Grade: C]

ARCH 455 Computer Applications in Architecture I 3.0 Credits

Covers two-dimensional and three-dimensional computer representations and applications. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C]

ARCH 456 Computer Applications in Architecture II 3.0 Credits

Further investigates and demonstrates the computer's capabilities in architectural design and representation. Professional elective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 134 [Min Grade: C] or ARCH 236 [Min Grade: C]

ARCH 463 Emerging Architectural Technology 3.0 Credits

A holistic study of design and construction technology of significant buildings by leading architects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 464 Building Enclosure Design 3.0 Credits

Examines the integrations of aesthetics, building science, and technology in the design of building enclosures. Professional Elective. Summer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 465 Energy and Architecture 3.0 Credits

Creates an awareness of the availability of energy resources and their effect on the built environment. Discusses alternative sources of energy. Professional elective. Summer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 481 Architecture Studio 4A 4.0 Credits

Focuses on more complex architectural challenges through analysis of case studies that address the relationship between the man-made built environment and the natural environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 383 [Min Grade: C] and ARCH 276 [Min Grade: C]

ARCH 482 Architecture Studio 4B 4.0 Credits

Furthers the understanding of context and design and the application of solutions and strategies surrounding more complex architectural and environmental problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 481 [Min Grade: C] and ARCH 377 [Min Grade: C]

ARCH 483 Architecture Studio 4C 4.0 Credits

Challenges to develop and refine architectural solutions through an advanced understanding of the relationship between buildings and environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 482 [Min Grade: C] and ARCH 378 [Min Grade: C]

ARCH 487 Architecture Studio 5A 4.0 Credits

Addresses the complex relationship through analysis and synthesis of form, site, program, building technology and theory within specific building context.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 483 [Min Grade: C] and ARCH 379 [Min Grade: C]

ARCH 488 Architecture Studio 5B 4.0 Credits

Emphasizes complex architectural problems while demonstrating understanding and appropriate application.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 487 [Min Grade: C]

ARCH 489 Architecture Studio 5C 4.0 Credits

Integrates in-depth application and coordination of all architectural building criteria in a large scale and complex architectural problem.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 488 [Min Grade: C]

ARCH 491 Advanced Topics in Architecture 1.0-6.0 Credit

Covers advanced topics in architectural design, practice, technology or history and theory that satisfy professional or historical/theory elective requirements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 161 [Min Grade: C] or ARCH 173 [Min Grade: C]

ARCH 493 Senior Project I 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part one of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 363 [Min Grade: C] or ARCH 473 [Min Grade: C]

Corequisite: ARCH 431

ARCH 494 Senior Project II 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part two of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 493 [Min Grade: C]

ARCH 495 Senior Project III 4.0 Credits

Students develop a three-term capstone design project to pursue and explore architectural concepts in depth. Students take a project from concept, research, programming to complete design development. Part three of three.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 494 [Min Grade: C]

ARCH 496 Thesis I 8.0 Credits

An individually structured year-long design problem that enables students to work independently and explore complex issues in depth. Periodic individual review sessions are scheduled with faculty adviser. Fall.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH.

Prerequisites: ARCH 363 [Min Grade: D] and ARCH 143 [Min Grade: C-] and (ARCH 134 [Min Grade: C-] or ARCH 153 [Min Grade: C-]) and ARCH 263 [Min Grade: C-] and CIVE 263 [Min Grade: C-]

ARCH 497 Thesis II 8.0 Credits

Continues ARCH 496. Winter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 496 [Min Grade: C-]

ARCH 498 Thesis III 8.0 Credits

Continues ARCH 497. Spring.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 497 [Min Grade: C-]

ARCH 499 [WI] Special Topics in Architecture 3.0 Credits

Covers special topics in architectural history, theory, or technology that satisfy history/theory or professional elective requirements and university writing intensive requirements. Course may be repeated for credit when different topics are offered. Fall, Winter, Spring, Summer. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C-]

ARCH I199 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I299 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I399 Independent Study in Architecture 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I499 Independent Study in Architecture 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C]

ARCH T180 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T280 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T380 Special Topics in Architecture 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH T480 Special Topics in Architecture 1.0-6.0 Credit

Covers special topics in architectural history, theory, or technology that satisfy history/theory or professional elective requirements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ARCH 143 [Min Grade: C]

Art History

Courses

ARTH 101 History of Art I: Ancient to Medieval 3.0 Credits

Traces the rise of Western civilization from ancient Egypt and Mesopotamia, through Greek and Roman culture to the late Middle Ages, with an emphasis on the evolution of style and symbolism in art.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 102 History of Art II: High Renaissance to Modern 3.0 Credits

Surveys painting and sculpture created between the 15th century and the mid-19th century, placing artists such as Donatello, Michelangelo, Rubens, and Rembrandt in the context of the evolution of style and symbolism in Western culture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 103 History of Art: Early to Late Modern 3.0 Credits

Examines the history of modern painting and sculpture from 1850 to the present and the phenomenon of Modernism in terms of individual artists, movements, attitudes, and values. Movements to be covered include Impressionism, Symbolism, Expressionism, Cubism, Surrealism, Non-figurative Abstraction, the New York School, and Postmodernism.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 111 Introduction to Studio Methods and Materials 3.0 Credits

A hands-on introduction to the methods and materials traditionally used by artists. Many of the techniques of printmaking, drawing, painting, photography, and sculpture will be covered. This course is studio-based in that students will be asked to carefully observe artists at work, through a combination of instructional videos and studio visits with local artists and on-campus studio classes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 150 Art History Research Methods 3.0 Credits

This course introduces students to research methods that guide the physical, contextual and interpretive analysis of objects categorized by design and/or use as “works of art.” Students will learn how to identify materials and media, as well as how to conduct archival and library research. From these foundations, students will explore the circumstances of artifact production and function as well as histories of excavation and/or preservation, documentation, display and interpretation. The course includes mandatory on-campus and off-campus field trips. Students will gain valuable skills that may be required for co-ops in museums or galleries as well as to honing their skills for writing research papers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARTH 101 [Min Grade: B-], ARTH 102 [Min Grade: B-], ARTH 103 [Min Grade: B-] (Can be taken Concurrently)

ARTH 200 Principles and Methods of Art History 3.0 Credits

This course will critically examine the interpretive principles and methods that have been used in the discourse of art history from the Renaissance to the present day.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 300 [WI] History of Modern Design 3.0 Credits

Examines the products of applied design during the past 150 years, including examples of furnishings, industrial design, fashion, and graphic design, in relation to demand, technology and production, standards, fine art, social reform, and the dynamics of consumption. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ARTH 301 Asian Art and Culture 3.0 Credits

Explores the diverse visual languages and cultures of Asia including the Buddhist and Hindu traditions from India and Southeast Asia, the imperial art of China with its refined taste for ceramics and painting, and the Japanese.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 302 Art of India 3.0 Credits

This course explores the diverse artistic traditions of the Indian subcontinent from ancient times to the modern period, focusing on the art of the Buddhist, Hindu and Islamic communities. The survey ends with an examination of the colonial, post-colonial and contemporary art scene.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 303 Art of China 3.0 Credits

From the first empires to modern times, this course explores the art of painting ceramics, as well as the sculptural and architectural traditions of China.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 304 Art of Japan 3.0 Credits

This course examines the art of Japan from the Shinto traditional forms to the creation of a Buddhist Japanese idiom, from the courtly and military art to the Zen aesthetics and the establishment of a modern urban culture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 310 Early American Art 3.0 Credits

This course will survey paintings, sculpture, graphic arts, and material culture of North America from the moment of Columbus’s “discovery” to the mid-nineteenth century. It will trace a wide range of artistic and visual works from the Colonial, Federal and Antebellum periods, including some works that were made during and after the Civil War. Along with the study of art emerging out of a European tradition, we will simultaneously be studying the art and culture of the indigenous peoples of Latin and North America, paying special attention to the interactions between indigenous and immigrant visual cultures.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 311 Twentieth-Century American Art 3.0 Credits

This course tracks the development of select artistic movements and the careers of notable American artists, from 1900-1939. This course will study the impact of immigration, WWI, industrialization and mechanization, urbanization, economic crisis, and radical politics on American art, and also how American art contributed to the production of specific racial, classed, and gendered American subjects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 312 Early Modernism (1850-1900) 3.0 Credits

This course is an introduction to European art of the late nineteenth century, from roughly 1850 to 1900—the decades when modernism exploded. Beginning with a close look at the Realist and Impressionist movements in Paris, we will study the artistic styles, techniques, and materials characteristic of the modern era, as well as the changing social, historical and political circumstances that helped shaped artistic production.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 313 20th Century Modernism (1900-1955) 3.0 Credits

This course will critically examine the development of Modernism in Western art during the first half of the 20th century in light of socio-economic and political factors, philosophical and scientific ideas, technological developments, stylistic movements, and art theories.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 314 Contemporary Art 3.0 Credits

This course will survey current global art production in light of socio-economic and political factors, philosophical and scientific theories, and new approaches to media and technology.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 315 History of African-American Art 3.0 Credits

This course traces the history of African American art, beginning with the African-inspired material culture of slaves, and, later, encompassing the works of formally-trained as well as self-taught painters, sculptors, photographers, and artists working in multimedia up to the present. These works will be situated within the contexts of critical race theory, social and political movements, collectors and patrons, early critics and theorists of the black avant garde, influential exhibitions, and the opposition between elite and popular cultures.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 316 African Art 3.0 Credits

This course will explore historical and contemporary African sculpture, textiles, painting, drawing, photography and mixed media in relationship to particular themes such as religion, trade, political power and healing. With emphasis on select objects from West and Central Africa, the course will also consider the visual arts in relationship to ideas of improvisation, aesthetics, identity and self-representation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 317 Modern Art Theory and Criticism 3.0 Credits

This course will critically examine the development of art theory and criticism in the discourse of Western art from the early 20th century to the present day. Specific theories will be analyzed in relation to stylistic developments as well as the socio-economic, political, scientific, and technological developments that have determined these changes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 320 Art in the Age of Technology 3.0 Credits

An inquiry into the ideas, concerns, and values that constitute the worldview of modern Western science and technology and the impact that this view, as well as specific technologies, have had upon the visual arts.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 325 Ancient Greek and Roman Art 3.0 Credits

This course will survey the art produced by the ancient cultures of Greece and Rome, from the archaic period to the fall of the Roman Empire. The art will be considered as an expression of the social, political, economic and intellectual histories of these two civilizations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 326 Medieval Art 3.0 Credits

This course is a survey of Medieval Art between the 3rd and 14th centuries C.E.. Architecture, mural painting, stained glass, sculpture, illuminated manuscripts, enamel, tapestry and other objects of ceremonial and everyday use will be studied as expressions of the political, social, and religious contexts of the time. Emphasis will be placed upon Christian art, but Islamic, Jewish, and secular traditions in the arts will also be examined.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 327 Italian Renaissance Art 3.0 Credits

This course will survey paintings, sculpture, architecture and graphic art from Italy during the 15th and 16th centuries. Artworks will be analyzed not only in terms of their formal characteristics, but also as expressions of concurrent social, political, economic, religious, and philosophical developments.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 328 Northern Renaissance 3.0 Credits

This course will survey paintings, sculpture, and graphic arts from Northern Europe during the 15th and 16th centuries. Artworks will be analyzed not only in terms of their formal characteristics, but also as expressions of concurrent social, political, economic, religious, and philosophical developments.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 329 Art of the 17th and 18th Centuries 3.0 Credits

This course will examine the history of European art and architecture from the late 1500s to approximately 1800—a period that bridges the gap from the Renaissance to the earliest days of the Modern era. Beginning with the Baroque in Counter-Reformation Italy and concluding with Neoclassicism in the late 18th century, the course will trace the stylistic developments in Europe and America through a variety of religious, political, and philosophical movements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 330 History of Interior Space and Furnishings 3.0 Credits

Examines social and architectural influences from preclassical through Classic Revival, including materials, workmanship, resulting forms, and design influence on subsequent periods.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ARTH 101 [Min Grade: D] or ARTH 102 [Min Grade: D]

ARTH 335 [WI] History of Costume I: Preclassical to Directoire 3.0 Credits

Examines costumes of the ancient world and Western civilization through the Directoire period, including political, economic, and social influence on aesthetic development in dress. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ARTH 101 [Min Grade: D] or ARTH 102 [Min Grade: D]

ARTH 336 [WI] History of Costume II: Directoire to World War I 3.0 Credits

Examines political, social, and economic influences on costume. Uses the Drexel Historic Costume collection as primary source material. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ARTH 335 [Min Grade: D]

ARTH 337 History of Costume: Post World War I to Present 3.0 Credits

Examines major trends in mid-to-late 20th-century fashionable apparel in their sociocultural, political, and economic contexts. Also examines counter-fashion movements and explores current media and marketing influences.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ARTH 103 [Min Grade: D]

ARTH 340 Women in Art 3.0 Credits

A historical survey of the art created by women in Western civilization, with a special focus upon the art created since the women's movement of the 1970s. Images are analyzed in relation to the sociopolitical and psychological context of Western, patriarchal culture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 350 History of the Art Museum in America 3.0 Credits

American art museums have an interesting and unique history from Charles Wilson Peale's first museum to the current boom in "starchitecture" buildings. This course introduces students to the history and theory of museums and museum practices, administration, exhibition planning, education, and museum careers. Students will examine how museum functions have changed over time and consider the trends that have impacted how museums are structured and how they view their roles and responsibilities. Several visits to area museums will be included in the course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 352 Careers in Museums 3.0 Credits

This course will examine roles in museums including curators, conservators, registrars, educators, programmers, audience development, fundraising, volunteers, etc. Individual roles will be studied as well as the interactions within internal systems in museums. Students will also learn how to develop and manage their own museum careers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 354 Technology in the Museum 3.0 Credits

The question of how and when to use technology is one that all museums face in the 21st century. What is a productive use of technology? How much is too much? What is the cost to the museum object? This course will consider these questions through readings, trips to local museums, and case studies of several museums around the country.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 356 Understanding Museum Audiences 3.0 Credits

This course will introduce students to the variety of ways that museums think about their diverse audiences and the programs that they develop to meet audience needs. Our society is changing. Learning is no longer confined to the classroom and museums have become an important resource for this lifelong, self-directed learning. This course will introduce students to educational theory, research and practice in museums. Students will experience different techniques for teaching with and interpreting art in the museum setting.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 399 Independent Study In Art His 0.5-12.0 Credits

Provides individualized study in art history in a specialized area. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ARTH 400 Art History Senior Thesis 3.0 Credits

A scholarly research project, at least 15-20 pages in length, to be written during the Spring term of the senior year under the advisement of a thesis director chosen from among the art history faculty. The thesis student will meet at least once every three weeks with their advisor to determine a suitable topic for their thesis, provide direction for their research by helping them to identify appropriate scholarly resources, discuss interpretive strategies, determine the expository structure of the paper, and provide clarity on specific requirements for bibliography, illustrations, and a citation system.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARTH 465 [WI] Special Topics in Art History 3.0 Credits

Provides study in art history on a special topic or on an experimental basis. May be repeated for credit. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ARTH 477 Art History Seminar 3.0 Credits

Provides reading, discussion, and research on pertinent topics in art history.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

ARTH I199 Independent Study in Art History 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARTH I299 Independent Study in Art History 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARTH I399 Independent Study in Art History 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARTH I499 Independent Study in Art History 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARTH T180 Special Topics in Art History 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARTH T280 Special Topics in Art History 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARTH T380 Special Topics in Art History 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARTH T480 Special Topics in Art History 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Arts & Sciences-Interdisp Stud

Courses

AS-I 100 Community-Engaged Learning 1.0-4.0 Credit

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-I 103 AIDS 101 3.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

AS-I 180 Interdisciplinary Study in the Arts & Sciences 1.0-3.0 Credit

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

AS-I 265 Special Interdisciplinary Study in Arts & Sciences 0.5-6.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

AS-I T180 Special Topic in Arts & Sciences-Interdisp Stud 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-I T280 Special Topic in Arts & Sciences-Interdisp Stud 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-I T380 Special Topic in Arts & Sciences-Interdisp Stud 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-I T480 Special Topic in Arts & Sciences-Interdisp Stud 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Behavioral & Addictions Couns

Courses

BACS 100 Life Span Human Development 3.0 Credits

This course introduces students to the physical, cognitive and psychological aspects of human development from birth through advanced old age. Topics include: environmental influences, perception, gender roles and sexuality, spirituality, motivation, life styles, and psychiatric disorders.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 200 Foundation of Behavioral Health Care 3.0 Credits

This course introduces the students to the historical and current contexts of program components that comprise community-based behavioral health systems. Topics include: work-force roles; regulatory policies and program practices; federal, state, and county program organizations; advocacy issues; and managed care systems issues.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 205 Strategies for Academic Success 1.0 Credit

This course helps students to explore the learning process, to gain essential skills needed to achieve academic success and to develop the ability to make effective use of university resources. Discussion, personal reflection, and relevant electronic resources are used to foster students' development as self-directed learners. Specific attention will be given to the following topics: study skills, learning strategies, time management, academic planning, test-taking techniques, and goal-setting. The goal of this course is to help improve students' efficacy in the areas of academic self-management, self-direction, and resource utilization.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 210 Behavioral Disorders 3.0 Credits

Clinical characteristics and diagnostic features of major psychiatric disorders are reviewed within the contexts of community-based treatment approaches. Topics include: etiological models, differential symptoms, diagnostic/functional assessment and treatment interventions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 220 Counseling Theory and Practice 3.0 Credits

Surveys major counseling theories with emphasis upon study and practice of basic counseling competencies. Topics include: relationship building, effective communication and helping skills, common stages in counseling process, and helping skills with special populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 230 Genetics and Mental Health 3.0 Credits

This course explores genetic concepts and principles as they pertain to human variation in behavioral and general health disorders. Students obtain a firm grounding in the basic science and the tools used by researchers to explore the contribution of the genes (and their essential counterpart, the environment) to behavior.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 232 Ethics and Professional Responsibility 3.0 Credits

This course discusses the philosophical, legal and moral responsibilities of professionals in behavioral health and human services setting with a strong emphasis on counseling relationships. A wide array of ethical issues are presented and discussed. Moral dilemmas comprised of competing moral obligations are examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 234 Introduction to Addictive Disorders 3.0 Credits

This course introduces the nature of addictions and the impairment in individuals who suffer from addictions. It includes a review of theories on substance disorders and approaches to identification, prevention and treatment. Topics include: historical perspectives, diagnosis, types of addictive behaviors, treatment, and current research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 236 Psychiatric Rehabilitation Principles and Practices 3.0 Credits

This is an introductory survey courses which acquaints the student with the principles and practices of Psychiatric (or Psychosocial) Rehabilitation. It provides the student with an understanding of the manner in which Psychiatric Rehabilitation approaches, understands and assists the person with serious and persistent mental illness.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 250 Behavioral Health Informatics 3.0 Credits

This course introduces students to the uses and importance of computer technologies in transforming behavioral health care practice. Course sections cover both the science and practice applications of emerging technologies from psychotherapies, to medication management, and to quality care management.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 255 Multicultural Counseling 3.0 Credits

This course provides didactic information for use in the development of awareness and skills necessary for effective therapeutic relationships with clients of diverse cultural backgrounds.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 301 Group Counseling I 3.0 Credits

This course is an introduction to the theoretical base and skills used in conducting group counseling. Included are theories of group work, facilitation techniques, types and styles of groups and models of group functioning. Students participate in a group as a group member and to act as a group co-leader in order to practice leadership skills.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 304 Cognitive and Behavioral Counseling I 3.0 Credits

This course familiarizes the student with key cognitive-behavioral models used in therapy today. Differences and similarities are explored. Students are exposed to the philosophical models and the related techniques stemming from these models. Skills on how to conceptualize and work with a client are taught.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 310 Recovery and Relapse Prevention 3.0 Credits

The goal of recovery and relapse preventions is the development personal strategies that will help the person restructure their life in a way that will prevent a return to active addiction. This course helps define the role of professional counselor in understanding the dynamic of recovery from a clinical perspective.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 312 Case Management Methods 3.0 Credits

This course is an in-depth explorations of the definitions and methodologies of case management services. The course is designed to provide students with the most up to date research and clinical applications of services management in the practice of addictions counseling.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 320 Crisis and Brief Intervention 3.0 Credits

This course introduces student to the fundamental concepts, theories, strategies, and skills needed to understand and conduct effective crisis and brief intervention counseling. Particular attention is given to several types of crises commonly encountered in working within settings serving people who have long-term disabling psychiatric disorders.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 325 Psychopharmacology for Counselors 3.0 Credits

This course focuses on the mechanisms of action of psychiatric medications, and uses and limitations of psychopharmacology in the overall management of serious mental illness. The student will learn to work collaboratively with the consumer, and others, and the importance of integrating the use of medications with psychiatric rehabilitation approaches.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 345 Careers in Behavioral Health 3.0 Credits

There are numerous career choices available within the field of Behavioral Health. In order to help you prepare for the future, this course explores the roles, responsibilities, and healthcare settings associated with careers such as counselor, psychiatric rehabilitation practitioner, social worker, therapist, psychologist, psychiatrist, advocate, and others. We explore opportunities to work with children, adults, and seniors in hospital and community treatments settings as well as in schools and in the community at large. We also examine the educational requirements of different fields of professional practice and review graduate schools options. Students explore their strengths and preferences related to future employment and begin to formulate personal plans for academic and professional success.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 350 Child Psychopathology 3.0 Credits

This course provides an understanding of childhood-onset behavioral, emotional, developmental, and learning disorders. Review of theories on the development of child psychopathology and approaches to identification, prevention and treatment of disorders. Students learn about assessment and ethical treatment of children.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 360 Preventing Substance Abuse 3.0 Credits

This course provides a comprehensive overview of prevention theories and prevention programming applications as regards substance use disorders. Course topics include: theories and models basic to prevention, science-based prevention strategies and model programs, strategic planning and outcome evaluation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 367 Advanced Counseling Intervention 3.0 Credits

This course introduces students to current best practices when counseling clients with behavioral health disorders. Students are provided with training in the advanced counseling skills of Motivational Interviewing and Solution-Focused Therapy as well as introduced to experimental approaches to counseling this population.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: BACS 220 [Min Grade: C]

BACS 368 Addictions Counseling with Special Populations 3.0 Credits

This course involves the student in examinations of challenges for addictions counselors in working with frequently underserved populations represented by adolescents and elderly persons. Effective approaches to assessing and treating both youthful and older adult individuals with addiction disorders are explored and defined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 370 Problem Gambling Interventions 3.0 Credits

This course covers basic areas of treatment knowledge and counseling skills necessary to effectively diagnose and assess the pathological gambler and define the necessary components for effective counseling interventions with problem gamblers.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 380 Trauma-Informed Care 3.0 Credits

This is an introduction to the psychophysiology of complex trauma in children and adolescents, and an overview of assessment and treatment modalities in both youth and adults. The course focuses on neurobiology and how trauma impairs brain development and the life domains of children, adolescents, and adults. It also covers various issues of assessment, diagnosis, and treatment. The stages of stabilization, reprocessing and reintegration, and the multiple models helpers utilize when working with survivors of trauma are explored. Course work will culminate with students reviewing and presenting case studies of assessment and treatment interventions for children and adolescents experiencing traumatic effects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 390 Special Topics in Mental Health 3.0 Credits

This course covers topics of particular interest to students in health sciences. In different terms, a variety of topics will be presented to the students. May be repeated twice for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 6 credits

BACS 401 Assessment and Treatment Planning 3.0 Credits

The focus of this course is learning the systematic, multi-disciplinary approach for gathering, interpreting, applying and recording data regarding clients in addictions and other behavioral health treatment settings. The most current screening, assessment, treatment planning and documentation approaches are covered.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 404 Cognitive and Behavioral Counseling II 3.0 Credits

This course extends BACS 304 by deepening the exploration of cognitive-behavioral therapy theory and methods. More emphasis on developing skills in conceptualization and treatment. Some focus on how clients can manage anger better and how therapists can take care of themselves appropriately.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: BACS 304 [Min Grade: C]

BACS 405 Family-Focused Interventions 3.0 Credits

This course gives students the knowledge, skills and attitudes to: identify and overcome the barriers that prevent family members from being full partners in the mental health treatment of their family member; define family from a culturally competent perspective; and provide mental health intervention in full partnership with families.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 410 Child and Adolescent Support 3.0 Credits

This course is based on the principles of Child and Adolescent Service System Program (CASSP). The course gives students the knowledge, skills important to implementing a comprehensive care system for families and their children endorsed by the Commonwealth of Pennsylvania.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 411 Forensic Behavior Health Service 3.0 Credits

The intersection between law and behavioral health services in the focus of this course. Topics include: the criminal justice system, criminal thinking, community and ethical barriers, biopsychosocial models that are specific to the forensic client and the growing base of knowledge about community corrections.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 412 Group Counseling II 3.0 Credits

This is an advanced course in the facilitation of group processes, with an emphasis on group counseling. The course provide skills in group facilitation including application of theory, tracking process and initiating interventions, working with special populations, incident management, treatment planning processes, and recording progress.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 414 Co-Occurring Disorders 3.0 Credits

This course introduces an integrated treatment approach for working with individuals who have both mental illness and substance use disorders. Topics include: assessment and treatment planning, strategies for coordinating dual interventions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 420 Psychiatric Rehabilitation Competencies 3.0 Credits

The purpose of this advanced course is to help students develop the competencies necessary to implement the principles and practices of Psychiatric Rehabilitation. This is accomplished by engaging the student in an in-depth analysis of the tools and processes used to bring about outcomes related to community integration and the life quality.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 430 Behavioral Health and Aging 3.0 Credits

Students will explore concepts, issues, and research pertaining to the psycho-social and behavioral health aspects of working with older adults. Students will learn about and practice interventions, competencies, and strategies designed to improve the quality of life of older adults.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

BACS 490 Senior Research Project 3.0 Credits

The students, with faculty supervision, plan and execute a term project that will integrate the academic and practical knowledge the students have acquired in their curriculum. The students develop objectives relevant to the project, critique the literature, present a plan for implementation, and complete the term project. May be repeated twice for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 6 credits

BACS 499 Readings in Behavioral Health 1.0-6.0 Credit

This course is designed to allow upper-class students to pursue specialized interest in specific topics in behavioral health science. May be repeated three times for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 9 credits

Biomedical Engineering & Sci

Courses

BMES 124 Biomedical Engineering Freshman Seminar I 1.0 Credit

This course is intended to introduce freshman biomedical engineering students in the School of Biomedical Engineering, Science and Health Systems at Drexel University to academic programs and opportunities, ongoing research projects and University resources to ensure a successful educational experience at Drexel and beyond. Through class discussions and guest lecture presentations, the students are provided with information and contacts necessary to begin a plan of academic study.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 125 Foundations of Biomedical Engineering 2.0 Credits

This course is intended to introduce new transfer biomedical engineering students in the School of Biomedical Engineering, Science and Health Systems at Drexel University academic programs and opportunities, ongoing research projects and University resources to ensure a successful educational experience at Drexel and beyond. Through class discussions and guest lecture presentations, the students are provided with information and contact necessary to begin a plan of academic study.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 126 Biomedical Engineering Freshman Seminar II 1.0 Credit

This course is intended to introduce freshman biomedical engineering students to the career embodied by the School's current concentration areas. Each area will be discussed in terms of the current state of the art, research possibilities and career opportunities. The curricula for each concentration will be discussed in detail so as to facilitate students' knowledge of how each curriculum relates to the research and employment opportunities in that field.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 130 Problem Solving in Biomedical Engineering 2.0 Credits

This course integrates fundamental principles of biology, chemistry, engineering, mathematics and physics into a framework for the study of biomedical engineering. In this course, students will use both engineering and scientific approaches to problem-solving. They will learn about the differences between engineering design and biological evolution. They will also learn to apply basic principles of chemistry, physics and mathematics to specific biological and physiological problems.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 201 Programming and Modeling for Biomedical Engineers I 3.0 Credits

This course aims to introduce students with some fundamental concepts about programming in MATLAB to give the ability to solve basic bioengineering problems. The course introduces the basics of programming using Matlab, including programming environment and tools. Fundamental programming techniques and concepts such as loops, switches and logical operators, functions and file handling are covered. Applications in bioengineering for basic numerical problem solving are discussed.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D] and PHYS 102 [Min Grade: D] and BIO 122 [Min Grade: D]

BMES 202 Programming and Modeling for Biomedical Engineers II 3.0 Credits

The course aims to introduce students to advanced programming concepts and tools to solve numerical problems in bioengineering. It provides the foundation for biosimulation and biocomputation classes. This course introduces advanced programming methods and computational tools for numerical analysis, model design and graphics. Higher level level functionality in Matlab such as SIMULINK, symbolic processing and CAD related tools are discussed.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 201 [Min Grade: D]

BMES 212 The Body Synthetic 3.0 Credits

The Body Synthetic introduces concepts underlying biological and engineering principles involved in the design and construction of prosthetic devices used to replace various parts of the human body.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D]

BMES 235 Living Systems Engineering 4.0 Credits

This course introduces the biomedical engineering students to engineering principles applied to biological and physiological systems. This course focuses on evolution, adaptation, energy, thermodynamics, fluid dynamics and control systems in living organisms.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D] and CHEM 102 [Min Grade: D] and MATH 200 [Min Grade: D] and PHYS 102 [Min Grade: D] and BIO 201 [Min Grade: D]

BMES 301 Laboratory I: Experimental Biomechanics 2.0 Credits

This course deals with experimental aspects of biomechanics, specifically with the testing mechanical properties of biological tissues.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 200 [Min Grade: D] and PHYS 201 [Min Grade: D] and (MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D]) and MEM 202 [Min Grade: D]

BMES 302 Laboratory II: Biomeasurements 2.0 Credits

This course introduces students to the measurement of physiological/biological/functional signals. Four specific signals will be collected and analyzed. Students are expected to analyze type of signal to be collected, possible measurement techniques and potential data analysis and then collect and analyze each signal.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: ECE 201 [Min Grade: D] (Can be taken Concurrently) (BMES 222 [Min Grade: D] or BIO 201 [Min Grade: D]) and (TDEC 231 [Min Grade: D] or ENGR 103 [Min Grade: D])

BMES 303 Laboratory III: Biomedical Electronics 2.0 Credits

This course introduces students to the widespread application of electronics and electronic devices in biomedical engineering. The course reinforces concepts learned in ECE 201 with hands-on experimentation related to biomedical applications such as telemedicine and medical devices.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECE 201 [Min Grade: D] and (ENGR 232 [Min Grade: D] or MATH 262 [Min Grade: D])

BMES 304 Laboratory IV: Ultrasound Images 2.0 Credits

This course introduces students to the engineering principles of acoustical measurements by combining hands-on laboratory experiences with lectures. Students will learn the engineering/physical principles of measuring sound velocity in different materials, attenuation, and directivity of a circular transducers.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: (BIO 201 [Min Grade: D] or BMES 235 [Min Grade: D]) and ECE 201 [Min Grade: D] and (TDEC 231 [Min Grade: D] or ENGR 103 [Min Grade: D])

BMES 305 Laboratory V: Musculoskeletal Anatomy for Biomedical Engineers 2.0 Credits

This course provides an opportunity for students to study the anatomy and biomechanics of select articulations of the human body. While the main emphasis will be on the musculoskeletal structures associated with each articulation, major neural and vascular structures will be studied as well.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: (BIO 201 [Min Grade: D] or BMES 235 [Min Grade: D]) and MEM 202 [Min Grade: D]

BMES 310 Biomedical Statistics 4.0 Credits

This course is designed to introduce biomedical engineering students to the fundamentals of biostatistics necessary for medical research.

Topics covered include measurements, sampling, basic hypothesis testing, analysis of variance and regression. Medical applications are emphasized.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 231 [Min Grade: D] or MATH 261 [Min Grade: D]

BMES 315 Experimental Design in Biomedical Research 4.0 Credits

This course is designed to introduce students to the fundamental principles of experimental design and statistical analysis as applied to biomedical research with animals and humans. Topics to be covered include experimental design, clinical design, and protocol submission and review.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 310 [Min Grade: D]

BMES 325 Principles of Biomedical Engineering I 3.0 Credits

This course is the first part of a two-term sequence which introduces biomedical engineering students to engineering principles applied to biological and physiological systems. This course focuses on bioethical questions, biomechanics, human performance engineering, biomaterials and tissue engineering.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: MEM 202 [Min Grade: D] (Can be taken Concurrently) BIO 122 [Min Grade: D] and CHEM 102 [Min Grade: D] and (BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]) and ENGR 220 [Min Grade: D] and (ENGR 232 [Min Grade: D] or MATH 262 [Min Grade: D])

BMES 326 Principles of Biomedical Engineering II 3.0 Credits

This course is the second part of a two-term sequence which introduces biomedical engineering students to engineering principles applied to biological and physiological systems. This course focuses on bioinformatics, neuroengineering, biosignal processing, biosensors, and medical imaging.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: ECE 201 [Min Grade: D] (Can be taken Concurrently) BMES 325 [Min Grade: D]

BMES 330 Biological Rhythm in Pharmacology and Toxicology 3.0 Credits

This course covers the fundamentals of biological rhythms with particular emphasis on the influence these cycles have on the susceptibility of organism to physical, chemical, and /or toxic agents.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]

BMES 331 Computers in Health Systems I 3.0 Credits

Introduces the allied health professional to basic computer applications on personal computers. Includes word processing, spreadsheets, databases, and networking (e.g., e-mail and information search and retrieval) in a primarily Windows environment. Designed for individuals with little or no computer background. Students are encouraged to bring in their own work-related problems or projects to provide immediate application of knowledge learned to the student's professional healthcare environment.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 332 Computers in Health Systems II 3.0 Credits

Continues the general overview of computers for people in the allied health professions, using specific examples from health care. Offers further study of and practice with special scientific (e.g., statistics, graphing) and medical clinical decision-support software. Introduces algorithms and formal programming methods.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BMES 335 Biomedical Informatics I 3.0 Credits

Introduces information and information handling systems for people in the allied health professions, with specific examples drawn from health care. Covers locating, manipulating, and displaying information in the health system setting.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

BMES 336 Biomedical Informatics II: Hospital and Patient Information 3.0 Credits

Continues BMES 335. Emphasizes medical records and hospital and patient information handling. Examines the problems of patient information flow within the health care system. Introduces conventional and proposed patient and hospital information systems.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 335 [Min Grade: D]

BMES 338 Biomedical Ethics and Law 3.0 Credits

Introduces the wide spectrum of ethical, regulatory, and legal issues facing health care practitioners and health-related research workers. Helps students become aware of the ethical and legal issues involved in their work. Helps students understand how legal and ethical decisions should be made in health-related matters, as well as what sources of help and guidance are available.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BMES 340 Health Care Administration 3.0 Credits

This course provides students with an analysis of health care administration process, including: planning, organizing, designing, decision-making, leading, and controlling. Presents methods and techniques that can contribute to the effective performance of administrative duties.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BMES 345 Mechanics of Biological Systems 3.0 Credits

This course introduces the fundamentals of mechanics of deformable bodies as they relevant to biological tissues and biomaterials. Major topics include stress and strain, mechanical properties of biological tissues and biomaterials, axial loading, torsion, bending, and viscoelasticity. These concepts will be applied to biological examples such as long bones, the heart, blood vessels, and orthopaedic implants.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: MEM 202 [Min Grade: D] and (BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D])

BMES 350 Med & Bio Effects Of Light 3.0 Credits

Examines the role of environmental lighting in human physiological and psychological processes. Topics include vitamin D synthesis and calcium regulation; light effects on bilirubin in newborns; photoactivation and DNA in skin; effects of nonionizing radiation on the immune systems; environmental lighting and human vision; light effects on biological rhythms and sleep; photosensitivity diseases related to interior lighting; the therapeutic uses of light; and light and the aging eye.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]

BMES 363 Robotics in Medicine I 3.0 Credits

This course provides an introduction to the use of haptics (the use of somatosensory information) in the design of robotic devices in surgery. Topics covered include actuators, sensors, nonportable feedback, portable force feedback, tactile feedback interfaces, haptic sensing and control systems.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: MEM 238 [Min Grade: D]

BMES 365 Robotics in Medicine II 3.0 Credits

This course covers the use of robots in surgery and included aspects of safety, robot kinematics, analysis of surgical performance using robotic devices, inverse kinematics, velocity analysis and acceleration analysis. Various types of surgeries in which robotic devices are or could be used are presented on a case study basis.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 363 [Min Grade: D]

BMES 372 Biosimulation 3.0 Credits

This course provides the foundation for the mathematical analysis of biomedical engineering systems. It focuses on the essential mathematical methods necessary for further development of modeling and simulation skills in other courses (materials, mechanics, fluids/transport, signals/control system, etc). The course applies calculus, differential equations and linear algebra to developing analytical techniques for biomedical applications.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: (BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]) and (ENGR 232 [Min Grade: D] or MATH 262 [Min Grade: D]) and BMES 202 [Min Grade: D]

BMES 375 Computational Bioengineering 4.0 Credits

This course introduces undergraduate students to the mathematical and computational analysis of biological systems. The systems analyzed include the genome, protein and gene networks, cell division cycles, and cellular level disease. Mathematical tools include matrix algebra, differential equations, cellular automata, cluster analysis, etc.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: (BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]) and BMES 325 [Min Grade: D] and BMES 372 [Min Grade: D] and (MATH 262 [Min Grade: D] or ENGR 232 [Min Grade: D])

BMES 381 Junior Design Seminar I 2.0 Credits

This is the first course in a two-course sequence intended to present the basics of engineering design, project management, product development and translational research. This first course focuses on engineering design and product development. A case-study approach is used to illustrate best practices and common mistakes in engineering design.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

BMES 382 Junior Design Seminar II 2.0 Credits

This is the second course in a two-course sequence intended to present the basics of engineering design, project management, product development and translational research. This second course focuses on project management and quality control. A case-study approach is used to illustrate best practices and common mistakes in management and evaluation of engineering projects.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: BMES 381 [Min Grade: D]

BMES 391 Biomedical Instrumentation I 3.0 Credits

This course introduces the student to the medical instrumentation and provides background on the physical, chemical, electronic and computational fundamentals by which medical instrumentation operates. It is an analytical course exploring the design, operation, safety aspects and calibration of primary electronic instruments.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECE 201 [Min Grade: D] and ENGR 210 [Min Grade: D] and (MATH 262 [Min Grade: D] or ENGR 232 [Min Grade: D]) and (BMES 235 [Min Grade: D] or BIO 203 [Min Grade: D])

BMES 392 Biomedical Instrumentation II 3.0 Credits

Continues BMES 391. Explores the operation, safety aspects, and calibration of primarily optical and acoustical instruments, as well as those involving ionizing radiation. Also examines instrumentation primarily intended for particular departments and areas, such as anesthesia and infusion.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: BMES 391 [Min Grade: D]

BMES 401 Biosensors I 4.0 Credits

Introduces the general topic of microsensors, discusses basic sensing mechanisms for microsensors, and presents various types of conductometric, acoustic, silicon, and optical microsensors. Uses two case studies that include an acoustic immunosensor and silicon glucose sensor to provide students with in-depth knowledge and hands-on experience. Provides additional experience through three laboratory sessions that support the lectures and familiarize students with practical aspects of microsensors. Also discusses applications of microsensors in the medical, chemical, pharmaceutical, environmental, aeronautical, and automotive industries.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: BMES 326 [Min Grade: D] and ENGR 210 [Min Grade: D] and ECE 201 [Min Grade: D] and (ENGR 232 [Min Grade: D] or MATH 262 [Min Grade: D])

BMES 402 Biosensors II 4.0 Credits

Investigates modern biosensor design methods and addresses the challenges associated with fabrication technologies and instrumentation techniques. Topics include theory and modeling of biosensors, biosensor fabrication steps, and electronic and clinical testing methods. Discusses local and distant sensor data acquisition techniques. Students will design, fabricate and test a biosensor. Essential stages of biosensor manufacturing processes will be outlined. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: BMES 401 [Min Grade: D] (Can be taken Concurrently)

BMES 403 Biosensors III 4.0 Credits

Covers recent advances in biosensor technology and applications, business aspects, and technology transfer issues. Topics include new sensing mechanisms, new technologies, new biomedical applications, the starting of small sensor companies, and the introduction of new sensor technologies into industrial settings. Requires students to develop a technical proposal in the area of biosensors and to review proposals written by their peers. Presentations by regular faculty and industrial and government researchers form an integral part of the course.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: BMES 402 [Min Grade: D]

BMES 405 Physiological Control Systems 3.0 Credits

Introduces the basic concepts of feedback and feed forward controls systems, including characterizations in terms of prescribed constraints, study of input and output relationships for various types of physiological systems, and stability and time-delay problems. Covers mathematical models of physiological systems, with emphasis on non-linear and adaptive systems study.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BIO 201 [Min Grade: D] and (BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]) and ECES 356 [Min Grade: D] and BMES 372 [Min Grade: D]

BMES 409 Entrepreneurship for BMES 3.0 Credits

This course serves as the foundation course in entrepreneurship and is designed to provide students with a complete working knowledge of the modern entrepreneurial and business planning process.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 411 Chronoengineering I: Biological Rhythms in Health and Performance 3.0 Credits

Introduces students to the concepts of biological, and especially circadian, rhythmicity. Advances students' knowledge of biological time-keeping and adaptive functions of biological clocks. Topics include biochemical and physiological models of biological clocks, adjustment to environmental cycles, rhythms in behavior and physiological functions, sleep-wake cyclicity, adaptability of circadian systems, and influences of rhythms on human physiology and behavior. Designed to give students a thorough understanding of the role rhythms play in animal and human behavior, physiology, and medicine.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: (BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]) and (BMES 222 [Min Grade: D] or BMES 326 [Min Grade: D])

BMES 412 Chronoengineering II: Sleep Functions in Health and Performance 3.0 Credits

Continues BMES 411. Enhances students' education in the concepts of biological, and especially circadian, rhythmicity. Focuses on sleep patterns, rhythms, evolution, neurology, psychology, and overall function.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: BMES 411 [Min Grade: D]

BMES 421 Biomedical Imaging Systems I: Images 4.0 Credits

Provides an overview of the field of medical imaging. Covers aspects of light imaging; systems theory, convolutions, and transforms; photometry, lenses, and depth of field; image perception and roc theory; three-dimensional imaging; image acquisition and display; and image processing operations, including scanning and segmentation.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: (ECES 302 [Min Grade: D] or ECES 303 [Min Grade: D]) and BMES 326 [Min Grade: D] and PHYS 201 [Min Grade: D] and (MATH 311 [Min Grade: D] or BMES 310 [Min Grade: D])

BMES 422 Biomedical Imaging Systems II: Ultrasound 4.0 Credits

Intended for students who would like to gain an adequate understanding of diagnostic ultrasound imaging principles and become familiar with developments in this rapidly expanding field. Introduces medical visualization techniques based on ultrasound propagation in biological tissues. Topics include generation and reception of ultrasound, imaging techniques (A-mode, B-mode, M-mode, and Doppler), typical and emerging diagnostic applications, elements of ultrasound exosimetry, and safety aspects from the clinical point of view.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BMES 421 [Min Grade: D]

BMES 423 Biomedical Imaging Systems III 4.0 Credits

Covers volumetric and functional imaging systems. Discusses the principles and algorithms of projection tomography, XCAT, SPECT, PET; the principles of MRI: Bloch equation, slice selection, K-space scanning, volumetric MRI; biochemical imaging; chemical equilibrium equations and Scatchard plots, specific and nonspecific labeling; autoradiography; and flow and dynamical systems: Doppler, mass transport, and phase (MRI) measurement of flow.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BMES 422 [Min Grade: D]

BMES 430 Neural Aspects of Posture and Locomotion 3.0 Credits

Students will study the physiology of sensory/motor systems, with emphasis on modeling of neural systems and biomechanical aspects of functional tasks. Combines information on basic nerve cell activities, synaptic communication and structure/function relationships of skeletal muscle with basic mechanics to study spinal, vestibular and ocular reflexes. Culminates with the study of the control of motor systems with respect to bipedal motion.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BIO 201 [Min Grade: D] and (BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]) and (BMES 201 [Min Grade: D] and BMES 202 [Min Grade: D]) or (ENGR 201 [Min Grade: D] and ENGR 202 [Min Grade: D]) and MEM 202 [Min Grade: D]

BMES 432 Biomedical Systems and Signals 3.0 Credits

Introduces various aspects of biomedical signals, systems, and signal processing. Covers topics in the origin and acquisition of biomedical signals; discrete-time signals and linear systems; frequency analysis of discrete-time signals, spectral estimation, data records and digital filters; and compression of biomedical signals through time-domain and frequency-domain coding.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: ECES 302 [Min Grade: D] and ECES 304 [Min Grade: D]

BMES 440 Introduction to Biodynamics 3.0 Credits

The objective of the course is to prepare students for biomechanical modeling, modeling methods, formulation of equations of motion and methods of determination of strength will be applied to human body dynamics. Particular emphasis is placed on the use of Rigid Body and Multi-Body Dynamics.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: MEM 202 [Min Grade: D] and (MEM 230 [Min Grade: D] or BMES 345 [Min Grade: D]) and MEM 238 [Min Grade: D] and (BMES 235 [Min Grade: D] or BIO 203 [Min Grade: D])

BMES 441 Biomechanics I: Introduction to Biomechanics 4.0 Credits

Teaches students to use mechanical tools to get an introductory appreciation for solving biomechanical problems. Models human performance by using static, quasi-static, and dynamic approaches. Assesses overall loading of the musculoskeletal system during functional activities. Demonstrates introductory methods of estimation of forces in the joints and muscles and evaluates the endurance of the human tissues under traumatic loading conditions. Builds on existing knowledge in mechanics to illustrate the practical application of mechanical tools in the determination of human systems performance.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MEM 202 [Min Grade: D] and (MEM 230 [Min Grade: D] or BMES 345 [Min Grade: D]) and MEM 238 [Min Grade: D] and (BMES 222 [Min Grade: D] or BMES 326 [Min Grade: D]) and BIO 203 [Min Grade: D]

Corequisite: BMES 440

BMES 442 Biomechanics II: Musculoskeletal Modeling and Human Performance 4.0 Credits

Teaches students to think biomechanically. Reviews and categorizes the various functional components (tissues) of the musculoskeletal system. Considers constraints of the joints and action of the soft and hard tissues, along with corresponding models. Computes joint and muscle forces. Discusses some aspect of postural stability of the whole musculoskeletal structure and reviews various methods of task performance.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BMES 441 [Min Grade: D]

BMES 443 Biomechanics III: Mechanics of Biological Tissues, Implant Technology and Prosthetics 4.0 Credits

Provides more advanced knowledge of mechanics of materials and offers a general description of mechanical behavior of the variety of the soft and hard tissues of the human body. Considers some prosthetic replacements of tissues as well as entire bone, joint, soft tissue, and system prosthetics. Reviews some specific orthopedic appliances and covers limb prosthetics if time permits. Students plan design projects.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BMES 442 [Min Grade: D]

BMES 444 Biofluid Mechanics 3.0 Credits

This course introduces flow-related anatomy and pathophysiology, and biomedical flow devices and their design challenges. Analysis methods to solve biological fluid mechanics design problems will be introduced and several interdisciplinary team projects will be assigned to apply fluid mechanics to practical biological or medical problems.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 451 [Min Grade: D]

BMES 451 Transport Phenomena in Living Systems 4.0 Credits

Introduces students to applications of chemical engineering concepts in biological systems. Shows that chemical engineering approaches to problem solving are ideally suited to investigation of biology. Approaches include material and energy balances, transport phenomena, and kinetics.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: PHYS 201 [Min Grade: D] and BMES 326 [Min Grade: D] and (BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]) and ENGR 210 [Min Grade: D] and (ENGR 232 [Min Grade: D] or MATH 262 [Min Grade: D])

BMES 452 Transport Phenomena in Living Systems II 3.0 Credits

Continues BMES 451. Advances students' understanding of the engineering principles of membrane transport and its consequences at the subcellular (mitochondria), cellular (neuron), and organ (kidney) level. Introduces concepts associated with pharmacokinetics. Provides students with a kinetic approach to analysis of receptors, including the kinetics of ligand-receptor binding, rate constants, and signal transduction.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: BMES 451 [Min Grade: D]

BMES 460 Biomaterials I 4.0 Credits

First course in a three-quarter sequence designed to acquaint students with the behavior of materials used in biomedical application under load (i.e., mechanical properties), their modes of failure and as a function of their environment. This course provides students with the fundamentals needed to proceed with Biomaterials II.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: (MEM 230 [Min Grade: D] or BMES 345 [Min Grade: D]) or (MATE 221 [Min Grade: D] and MATE 370 [Min Grade: D]) and CHEM 241 [Min Grade: D] and CHEM 242 [Min Grade: D]

BMES 461 Biomaterials II 4.0 Credits

Second course in a three-quarter sequence in biomaterials. The goal of this course is with an understanding of, and ability to select, appropriate materials for specific applications taking into account mechanical, thermal, and rheological properties taught in Biomaterials I and combining them with the biocompatibility issues covered in the present course.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BMES 460 [Min Grade: D]

BMES 466 Robotics in Medicine III 3.0 Credits

This course covers topics in the design of medical robotic systems, including force and movement analysis for robotic arms, dynamics, computer vision and vision-based control. Thus use of haptics, vision systems and robot dynamics are examined in a cohesive framework.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 365 [Min Grade: D]

BMES 471 Cellular and Molecular Foundations of Tissue Engineering 4.0 Credits

Course is designed to familiarize students with the advanced concepts of cellular and molecular biology and physiology relevant to tissue engineering. The initial part of a two-quarter sequence combining material from cellular/molecular biology, evolutionary/developmental biology with engineering design and biomaterials to educate students in the principles, methods, and technology of tissue engineering.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BIO 218 [Min Grade: D] and BIO 122 [Min Grade: D] and BIO 219 [Min Grade: D] and CHEM 242 [Min Grade: D] and (MEM 230 [Min Grade: D] or BMES 345 [Min Grade: D])

BMES 472 Developmental and Evolutionary Foundations of Tissue Engineering 4.0 Credits

Familiarizes students with advanced concepts of developmental and evolutionary biology relevant to tissue engineering. This second part of the two-quarter sequence combines material from cellular/molecular biology and evolutionary design and biomaterials to educate students in the principles, methods, and technology of tissue engineering.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BMES 471 [Min Grade: D]

BMES 475 Biomaterials and Tissue Engineering III 4.0 Credits

This course provides students with in-depth knowledge of factor-mediated tissue engineering and regenerative medicine. Students learn about fundamental repair and regenerative processes and gain an understanding of specific biomaterials being used to mimic and/or enhance such processes. Students also learn about the delivery methods of agents which promote the proper functional development of specialized tissues.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BMES 460 [Min Grade: D] and BMES 461 [Min Grade: D] and BMES 471 [Min Grade: D] and BMES 472 [Min Grade: D]

BMES 477 Neuroengineering I: Neural Signals 3.0 Credits

Introduces the theory of neural signaling. Students will learn the fundamental theory of cellular potentials and chemical signaling, the Hodgkin Huxley description of action potential generation, circuit representations of neurons and be able to derive and integrate equations describing the circuit as well as design computer models.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECES 302 [Min Grade: D] and ECES 304 [Min Grade: D] and ECES 356 [Min Grade: D] and BIO 203 [Min Grade: D] and BMES 405 [Min Grade: D] and BMES 430 [Min Grade: D]

BMES 478 Neuroengineering II: Principles of Neuroengineering 3.0 Credits

This course investigates cutting edge technologies in neuroengineering in a seminar-style format with faculty from the School of Biomedical Engineering and College of Medicine. Three modules cover topics, which vary from year to year. Students are expected to submit written and oral presentations covering each topic.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BMES 477 [Min Grade: D]

BMES 483 Quantitative Systems Biology 4.0 Credits

This course uses a data-driven systems engineering approach to provide a foundation in systems biology. Topics covered include the organization of robust networks of genes and proteins; intercellular communication; and cells as basic units of life.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: (TDEC 222 [Min Grade: D] or ENGR 232 [Min Grade: D]) and (BIO 203 [Min Grade: D] or BMES 235 [Min Grade: D]) and (BMES 202 [Min Grade: D] or ENGR 202 [Min Grade: D]) and BMES 372 [Min Grade: D] and BMES 375 [Min Grade: D] and CS 172 [Min Grade: D]

BMES 484 Genome Information Engineering 4.0 Credits

This course is designed to provide students with hands-on experience in the application of genomic, proteomic, and other large-scale information to biomedical engineering. The underlying goal is to develop an understanding of high-throughput technologies, biological challenges, and key mathematical and computational methods relevant to biomedical engineering.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BMES 375 [Min Grade: D] and BIO 218 [Min Grade: D]

BMES 488 Medical Device Development 3.0 Credits

Medical device product development must take into account a diverse set of disciplines to achieve a safe and successful product. This course exposes the student to several of these disciplines with the objective of raising the student's awareness of safety throughout the product development life cycle. Students will learn to appreciate the complex engineering decisions that support development of a safe medical device through an examination of risk management, regulatory processes, human factors and clinical studies.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

BMES 491 [WI] Senior Design Project I 3.0 Credits

This is the first course in a three-quarter capstone design experience for senior biomedical engineering students.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

BMES 492 Senior Design Project II 2.0 Credits

Continues senior design activities begun in BMES 492.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

BMES 493 Senior Design Project III 3.0 Credits

Continues the design project begun in BMES 491 and continued through BMES 492.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

BMES 494 Clinical Practicum I 3.0 Credits

This course provides biomedical engineering students with an extensive exposure to live clinical cardiology procedures, including cardiac catheterization, electrophysiology, echocardiography and nuclear stress testing. Emphasis is placed on identifying important interfaces between engineering and clinical medicine, particularly in areas where clinical needs may be addressed by advances in biomedical engineering.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BME.

BMES 495 Clinical Practicum II 3.0 Credits

This course provides biomedical engineering students with an extensive exposure to live operations in an emergency department and intensive care unit. The students are expected to analyze specific operations within these environments and develop a solution to a process problem within one of these environments. System analysis, design and evaluation are emphasized.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BME.

BMES 496 Clinical Practicum III 3.0 Credits

This course provides biomedical engineering students with an opportunity to observe basic operative and postoperative procedures with the idea of both learning about such procedures and identifying the role of biomedical engineering in these clinical settings.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BME.

BMES I199 Independent Study in BMES 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

BMES I299 Independent Study in BMES 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

BMES I399 Independent Study in BMES 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

BMES I499 Independent Study in BMES 0.5-6.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

BMES T180 Special Topics in BMES 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

BMES T280 Special Topics in BMES 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

BMES T380 Special Topics in BMES 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

BMES T480 Special Topics in BMES 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

Biomedical Engineering Tech

Courses

BET 301 Healthcare Technology 3.0 Credits

An overview of medical equipment used in hospitals and other medical environments to diagnose and treat patients. Sensors and physiological signals will be explained. Equipment found in various hospital departments and medical specialties will also be discussed. Patient safety and regulations will be emphasized.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 201 [Min Grade: D] and EET 202 [Min Grade: D]

BET 302 Biomedical Electronics 4.0 Credits

This course is an introduction to the fundamentals of analog electronics with an emphasis on biomedical applications. Students will be introduced to solid state devices including diodes, transistors, operational amplifiers, oscillators, and mixers and their use in power supplies, amplifiers and active filters.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 201 [Min Grade: D] and EET 202 [Min Grade: D]

BET 303 Medical Imaging Systems 3.0 Credits

The fundamentals of medical imaging equipment will be explored. The principles of x-ray, computed tomography, ultrasonic, and magnetic resonance imaging systems will be discussed. Focus will be on principles of operation, applications, safety, and quality.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: BET 301 [Min Grade: D]

BET 305 Clinical Laboratory Equipment 3.0 Credits

Clinical laboratory instrumentation and automation is described with emphasis on the demands of clinicians for diagnostic information. Special attention is given to reliability, ease of training, and cost effectiveness.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 201 [Min Grade: D] and EET 202 [Min Grade: D] and BET 301 [Min Grade: D]

BET 307 Applied Biomedical Instrumentation 3.0 Credits

The course introduces students to the engineering design process and provides design experience through hands-on design and implementation of biomedical instruments. Using a generalized step-by-step approach that consists of (1) understanding the physiological sources, (2) selecting appropriate transducers, (3) designing analog processing electronics, and (4) implementing digital signal processing, student will gain extensible knowledge and skills to design and implement various biomedical instruments.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 201 [Min Grade: D] and EET 202 [Min Grade: D] and BET 301 [Min Grade: D] and BMES 391 [Min Grade: D]

BET I199 Independent Study in BET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

BET I299 Independent Study in BET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

BET I399 Independent Study in BET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

BET I499 Independent Study in BET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

BET T180 Special Topics in BET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

BET T280 Special Topics in BET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

BET T380 Special Topics in BET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

BET T480 Special Topics in BET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Bioscience & Biotechnology

Courses

BIO 100 Applied Cells, Genetics & Physiology 3.0 Credits

This course is designed to provide a topical and interactive introduction to biology for non-majors. Students will learn how trillions of tiny cells of our bodies work together in organ systems to use food for energy, to keep us alive, moving and healthy, and how information passes to subsequent generations. This course is identical to BIO 107.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO

Corequisite: EXAM 080

BIO 101 Applied Biological Diversity, Ecology & Evolution 3.0 Credits

An interactive course for the non-major that discusses the variety of living things and how we ended up with them and what makes them unique. This course also explores how living things affect each other and the world as well as the impacts that humans have on the living world. This course is identical to BIO 109.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO

Corequisite: EXAM 080

BIO 107 Cells, Genetics & Physiology 3.0 Credits

This course is designed to provide a topical and interactive introduction to biology for non-majors. Students will learn how trillions of tiny cells of our bodies work together in organ systems to use food for energy, to keep us alive, moving and healthy, and how information passes to subsequent generations. This course is identical to BIO 100.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO

Corequisites: BIO 108, EXAM 080

BIO 108 Cells, Genetics and Physiology Laboratory 1.0 Credit

This course is designed to be a companion course to the BIO 107 lecture. Labs are focused on providing students with a hands-on approach to science. Topics include how cells generate energy from food, how certain characteristics are genetically encoded and the physiology of human systems and diseases.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO

Corequisite: BIO 107

BIO 109 Biological Diversity, Ecology & Evolution 3.0 Credits

An interactive course for the non-major that discusses the variety of living things and how we ended up with them and what makes them unique. This course also explores how living things affect each other and the world as well as the impacts that humans have on the living world. This course is identical to BIO 101.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO

Corequisites: BIO 110, EXAM 080

BIO 110 Biological Diversity, Ecology and Evolution Laboratory 1.0 Credit

A companion course to BIO 109 that provides a hands on exploration of the diversity of life including microbes, plants and animals as well as the processes that give rise to this diversity. The labs also provide practical exploration of the impacts of human beings on the planet.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO

Corequisite: BIO 109

BIO 112 Biotechnology for Society 3.0 Credits

In Biotechnology for Society, students will become familiar with the fundamentals of genomic and cellular-based biotechnologies to begin to understand the roles that biotechnology is currently playing and is poised to play in society. Students will appreciate the complexity of those roles by investigating both the intended consequences and the potential and inadvertent ethical, legal and social implications of these technologies. This course is intended for non-science majors.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO or major is BME or major is CHEM or major is ENVS or major is HSCI

BIO 116 How Your Body Works-Or Not 3.0 Credits

How Your body Works-or Not is geared for non-major students hoping to explore the workings of their bodies. Students will explore why we evolved to have various organ systems, and how some systems accomplish their roles. We will explore how these systems can malfunction or fail, resulting in disease.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO or major is BME or major is CHEM or major is ENVS or major is HSCI

BIO 118 Basics of Cancer 3.0 Credits

This course provides an opportunity for students with little or no biology background to learn about cancer. Students can expect to learn what cancer is from a biological perspective, and how it is caused and treated. Students will also gain a basic understanding of how tumors form, and metastasize.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO or major is BME

BIO 122 Cells and Genetics 4.5 Credits

An introduction to the concepts of cell and function, cell and reproduction, cell communication, genetic inheritance, and population genetics. The relevance of genetics to society and ethical issues are included.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

BIO 124 Evolution & Organismal Diversity 4.5 Credits

Students will learn about the theory of evolution and the mechanisms of how organisms change. Using this knowledge, students will explore the diversity of organisms on Earth that is a hallmark of biology and the result of evolution by examining the representative members from the five major kingdoms of life. This course has a lecture, lab and recitation component.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

BIO 126 Physiology and Ecology 4.5 Credits

The first half of the course will survey physiological systems, including the respiratory, circulatory, homeostatic, excretory, and digestive systems in animals. The second half of the course will emphasize the relationships between organisms and the environment, including how humans impact ecosystems and the biosphere. This course has a lecture, lab and recitation component.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

BIO 141 Essential Biology 4.5 Credits

Introduces essential biological concepts to engineering students. Content covers five core topics: cells, genetics, evolution, ecology and physiology with application to societal concerns about biotechnology, health, conservation biodiversity and bioethics. Evolution will be woven throughout the course as a unifying theme in understanding all aspects of biology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is CS

Prerequisites: CHEM 102 [Min Grade: D]

Corequisite: EXAM 080

BIO 161 General Biology I 3.0 Credits

Covers structure and function of the cell and the organ-system plan of organization of the human body.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO or classification is Freshman

BIO 162 General Biology II 3.0 Credits

Continues BIO 161. Covers the mechanics of heredity, including growth, differentiation, and development. Winter.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 161 [Min Grade: D]

BIO 163 General Biology III 3.0 Credits

Continues BIO 162. Covers the plant and animal kingdoms, radiobiology, evolution, and ecology. Spring.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 162 [Min Grade: D]

BIO 164 General Biology Laboratory I 1.0 Credit

In this course students will perform computer simulations of laboratory exercises related to photosynthesis, enzyme activity and kinetics, the cardiovascular, muscle and bone systems, regulation of human organ systems as well as plant growth and development.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: BIO 161

BIO 165 General Biology Laboratory II 1.0 Credit

In this course students will perform computer simulations of laboratory exercises related to cell division, mendelian genetics, DNA replication, translation and mutations. They will work with simulated microscopes to observe viral and microbial specimens. Additionally, students will learn and simulate biotechnology techniques such as DNA fingerprinting.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 161 [Min Grade: D]

Corequisite: BIO 162

BIO 166 General Biology Laboratory III 1.0 Credit

Involves experiments demonstrating the key principles in ecology and evolution including: population parameters, food webs, species interactions, succession, eutrophication, natural selection, sexual selection and evolutionary trees.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 162 [Min Grade: D]

Corequisite: BIO 163

BIO 200 Connections in Biology 3.0 Credits

Connections in Biology is an open enrollment course which will give students the opportunity to make exactly that: connections. Building upon a new theme in biology each week, students will connect that material to their current Philadelphia community as well as to their future professional and personal pursuits. The course is designed on the Community Based Learning platform (CBL) and is scheduled to meet twice a week: one meeting will be a formal lecture on campus and one meeting will be at a partnered middle school with the instructor and Drexel students leading an 9 week after school science club. Students will gain volunteer hours, get an introduction to civic engagement, benefit from community based learning practices and connect their Drexel course material to the bigger picture in their lives.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO 201 Human Physiology I 4.0 Credits

Intensive survey of the basic physiological mechanisms of cellular and human electrophysiology and the physiology of the muscular, cardiovascular, respiratory, renal, and gastrointestinal systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 141 [Min Grade: D] or BIO 122 [Min Grade: D]

BIO 202 Human Physiology Laboratory 2.0 Credits

Laboratory course in human physiology. Designed to accompany BIO 201 and 203 Human Physiology I and II. Uses simulation, experimenters and data acquisition techniques to provide practical experience in the design and execution of physiological experiments and analysis of physiological data. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 201 [Min Grade: D] (Can be taken Concurrently)

BIO 203 Human Physiology II 4.0 Credits

Intensive survey of the control mechanisms of cellular and human physiology including introductions to control theory, neurophysiology, endocrine control, and control mechanisms in locomotion, cardiovascular, respiratory, renal, acid/base, gastrointestinal, and reproductive physiology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 201 [Min Grade: D]

BIO 207 Applications in Biology I 1.0 Credit

The aim of this course is to allow students to apply knowledge from biology courses to understand important articles from the frontiers of biology research, in order to develop critical thinking and problem solving skills. Students will learn to read primary research, to think critically about research and interpret data.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D]

BIO 208 Applications in Biology II 1.0 Credit

In this course, students will further develop and practice skills introduced in the Applications in Biology I course by reading and interpreting research from primary articles. This will include historical experiments and controversial research. This will help students develop critical thinking, scientific reasoning and problem solving skills.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 207 [Min Grade: D]

BIO 209 Cell, Molecular & Developmental Biology I 4.0 Credits

In this course, students will cover essential topics in cell, molecular, and developmental biology. Topics, such as protein structure function relationships, enzymes, structural & functional properties of nucleic acids, transcription & translation, regulation of gene expression, eukaryotic cell structure, cell membranes and membrane transport. Commonly used techniques in biochemistry, molecular & cellular biology will be discussed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D]

BIO 211 Cell, Molecular & Developmental Biology II 4.0 Credits

In this course, students will learn about molecular, cellular and developmental biology at a higher level than in introductory coursework. This second course in the sequence will focus on cell biological processes such as: vesicular trafficking, signaling, cytoskeletal dynamics, cell cycle, cell death, tissue organization, stem cells and development. At the end of this course, students should have a strong foundation in cell and developmental biology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 209 [Min Grade: D]

BIO 212 Biotechnology 3.0 Credits

Covers the use of recombinant DNA techniques in biotechnology. Explores the many uses of biotechnology in the biological, agricultural and medical field. Also covers the social, ethical and environmental issues involved in this discipline.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D]

BIO 213 Drosophila Neural Research 3.0 Credits

In this course, you will be introduced to the basics of performing directed research in Drosophila genetics and neurobiology. This research will be informed by its relevance to disease. You will be working on one of a variety of diseases that is related to neurodevelopmental and/or neurodegenerative diseases. Diseases include (but are not limited to) CHARGE syndrome, Alzheimer's disease, Pitt-Hopkins disease, and schizophrenia. In this course, you will be testing for potential genetic modifiers and/or drugs that modify disease phenotypes associated with an established models of these diseases.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman or Sophomore .

Prerequisites: BIO 122 [Min Grade: D]

BIO 214 Principles of Cell Biology 3.0 Credits

The course familiarizes students with the basic fundamentals and principles of cell biology. Topics include protein and enzymes as metabolic facilitators, the source and function of cellular energy, cell structure and function, cellular protein transport, cell communication, cell cycle control, apoptosis, and cell differentiation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO

Prerequisites: BIO 104 [Min Grade: D] or BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

BIO 215 [W] Techniques in Cell Biology 3.0 Credits

A course designed to introduce students to the lab techniques used by cell biologists. The lab is project-based focusing on various assays to assess cell viability/survival and fluorescence microscopy is used for cell structure and their organelles, apoptosis, cytoskeletal structure, muscle contraction and cell motility. Other topics include protein separation and quantification, and gel electrophoresis. Analytical thinking and data analysis are emphasized to help foster the development of a project built on multiple experiments. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: or BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

BIO 218 Principles of Molecular Biology 4.0 Credits

The course is designed to familiarize students with the details and concepts revolving around molecular biology's "central dogma." Specifically the chemical nature of DNA and RNA, the molecular structure of DNA and chromosomes, the definition of a gene, how DNA is replicated, and how genes are expressed and regulated.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO

Prerequisites: BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

BIO 219 [WI] Techniques in Molecular Biology 3.0 Credits

Designed to familiarize student with laboratory techniques utilized in molecular biology, specifically DNA isolation, characterization, and manipulation. Students work in teams to collect and analyze data and explain results in laboratory reports. Weekly recitations preview and review theory and techniques used in the lab. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

BIO 220 Essential Microbiology 3.0 Credits

Covers morphological, physiological, and biochemical characteristics of bacteria, fungi, algae, and protozoa, and viruses. Introduces the principles of microbial genetics, disease, and control of microorganisms. This course is identical to BIO 221.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO

Prerequisites: BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

BIO 221 Microbiology 3.0 Credits

Covers morphological, physiological, and biochemical characteristics of bacteria, fungi, algae, protozoa, and viruses. Introduces the principles of microbial genetics, disease, and control of microorganisms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

Corequisite: BIO 222

BIO 222 Microbiology Laboratory 2.0 Credits

An introduction to microbiological techniques, and culture of prokaryotic and eukaryotic organisms. Includes sterile techniques, and use of specialized microscopic techniques. Classical and molecular techniques of microbial identification are also covered.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

Corequisite: BIO 221

BIO 223 Parasitology 3.0 Credits

Parasitology explores the most predominant lifestyle on earth, parasitism. Students will learn how parasites invade and exploit their hosts, the resultant damage to the hosts, and the mechanisms by which hosts defend and protect themselves from these invaders.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 122 [Min Grade: D] or BIO 124 [Min Grade: D]

BIO 224 Form, Function & Evolution of Vertebrates 4.0 Credits

This course is an introduction to principles of organismal biology from the perspective of form, function and evolution of fish, amphibians, reptiles, mammals and birds. Many biological principles are well known in this group of animals. Data from areas as diverse as paleontology, ecology and molecular biology will be presented.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 121 [Min Grade: D] or BIO 122 [Min Grade: D] or BIO 124 [Min Grade: D] or BIO 126 [Min Grade: D]

BIO 225 Vertebrate Biology and Evolution Laboratory 2.0 Credits

A hands-on laboratory course that complements BIO 224: Form, Function & Evolution of Vertebrates. Students use the comparative approach to learn about the anatomy, physiology and evolution of vertebrates. Laboratory work will be on campus and in the field trips to observe vertebrates in nature.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 224 [Min Grade: D] (Can be taken Concurrently)

BIO 226 Microbiology for Health Professionals 5.0 Credits

An introduction to microbiology for students in the health professions. Covers the diversity of microorganisms, their growth and how to control them. An introduction to the principles of disease and pathogenicity, host interaction and immunological response. Laboratories focus on the basic techniques to culture and student microorganisms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

BIO 227 Exploring Parasites 2.0 Credits

Exploring Parasites Laboratory will safely introduce students to hands-on experiences with a vast diversity of human parasites to understand their evolutionary adaptations. Students will learn to culture *Giardia lamblia*, an enteric parasite, and design a term-long research project to study an aspect of *Giardia* biology of student interest.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 223 [Min Grade: C] (Can be taken Concurrently)

BIO 228 Evolutionary Biology & Human Health 3.0 Credits

This course illustrates the importance and utility of evolutionary perspectives on various topics related to human health. In addition to the "how" questions, this course also introduces the "why" questions. Various evolutionary hypotheses are examined. Arguments for and counter-arguments against each hypothesis are presented to foster understanding of each topic. Selected topics include infectious diseases, pathogen virulence, allergies/asthma, mental health/addiction, genetic disorders, diseases of civilization, sex, pregnancy, aging, and public health concerns.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D] and BIO 124 [Min Grade: D]

BIO 229 Dictyostelium Research 3.0 Credits

We will be developing and progressing molecular and cellular projects to study cellular function in *Dictyostelium discoideum* as a model to investigate human cellular dysfunction. This exploratory and experimental course is designed to provide opportunities for students to experience authentic laboratory investigation in the context of a course which runs like a research group. Projects progress from term to term so students are welcome to continue in subsequent terms to further progress their projects or switch to other ongoing projects.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Prerequisites: BIO 209 [Min Grade: C], BIO 219 [Min Grade: C] (Can be taken Concurrently)

BIO 231 Cell Physiology 3.0 Credits

Molecular biology of the cell, including regulation of function, genetic mechanisms, chemistry and structure of cellular components, and cell-to-cell interactions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 232 Discovering Antibiotics 3.0 Credits

The focus of this course is the process of research and inquiry that leads to the isolation, characterization and identification of potential antibiotic producing microbial strains and species from soil. Students will work in small groups to collaboratively design and carry out their own experiments that will isolate these microorganisms. During this course, you will learn about the structure, metabolism, nutrition, and diversity of soil microorganisms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 122 [Min Grade: D]

BIO 244 Genetics I 3.0 Credits

Surveys Mendelian, microbial, molecular, and population genetics. Discusses model systems and analytical methods used by geneticists to understand gene functions at cellular, organismal, and population levels.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 122 [Min Grade: D]

BIO 256 Vertebrate Morphology and Physiology 3.0 Credits

Provides comparative study of the major vertebrate groups, relationships between physiology and organismal structure, evolutionary history, comparative anatomy, and development.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 224 [Min Grade: D]

Corequisite: BIO 257

BIO 257 Vertebrate Morphology & Physiology Lab 2.0 Credits

A hands-on laboratory course that complements BIO 256: Vertebrate Morphology and Physiology. Students will use comparative dissections of representative vertebrates to understand the anatomy and evolution of major vertebrate groups.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 224 [Min Grade: D]

Corequisite: BIO 256

BIO 264 Ethnobotany 3.0 Credits

This course explores the relation between ancient/cultural botanical knowledge and its current application in modern pharmacology and alternative forms of medicine. It provides an interdisciplinary approach to the study of plants for food, medicine, stimulation, religious rituals and death.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

BIO 270 Development Biology 3.0 Credits

Covers molecular, cellular and physiological mechanisms underlying development of animals from gametes to adults. Covers the major stages and selected aspects of vertebrate development in importance animal model systems. Particular focus in on the importance of differential gene expression and its regulation in development.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (BIO 214 [Min Grade: D] and BIO 218 [Min Grade: D]) or BIO 211 [Min Grade: D]

BIO 271 Developmental Biology Laboratory 2.0 Credits

Includes observations into development processes in a diverse group of organisms including developmental principles in simple multicellular protists, gametogenesis in diverse animal, fertilization in sea urchins, embryonic development of vertebrates, regeneration of planarians, and the role of gene regulation in fruit fly development. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 270 [Min Grade: D] (Can be taken Concurrently)

BIO 284 Biology of Stress 3.0 Credits

This course focuses on the biological responses to the physical and psychological stress, discussing in turn stress responses in various organ systems. Emphasis is given to the analysis and evaluation of conflicting biological evidence on stress effects.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 100 [Min Grade: D] or BIO 101 [Min Grade: D] or BIO 107 [Min Grade: D] or BIO 109 [Min Grade: D] or BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

BIO 285 Forensic Biology 3.0 Credits

This course will introduce students to the fascinating subject of forensic science, and specifically the role that biology can play in solving crimes.

Topics being covered will include examining a crime scene, and the analysis of biological materials such as fingerprints, blood, plant material and human remains. During the course students will have to play the role of a forensic scientist, applying the knowledge that they will learn each week to see if they can determine who committed the crime. Case studies from real crimes will also be used to illustrate the points being made.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D]

BIO 286 Forensic Toxicology 3.0 Credits

In this online course students will study forensic toxicology, the study of chemicals- drugs, alcohol and poisons (to name a few), in relation to legal cases. These cases may involve identification of a powder, or examination of an envelope for traces of poisons, or the analysis of a blood samples to identify and quantify the presence of a substance which may have results in intoxication or even death.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 285 [Min Grade: D]

BIO 306 Biochemistry Laboratory 2.0 Credits

Covers biochemical techniques ranging from basic laboratory preparatory work such as making solutions to the measurement of enzyme kinetics and substrate specificity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 242 [Min Grade: D]

BIO 310 Comparative Physiology 3.0 Credits

Provides comparative study of the physiology of vertebrate and invertebrate animals. Examines physiological principles by studying cardiovascular adaptations, water balance, respiratory adaptations, and other homeostatic mechanisms in model systems, including fish, amphibians, mammals, birds, and invertebrates.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 201 [Min Grade: D] or BIO 224 [Min Grade: D] or ENVS 284 [Min Grade: D]

BIO 311 Biochemistry 4.0 Credits

Covers bioenergetics and metabolism; enzymes, substrates, products, coenzymes, transporters, pathways (catabolic and anabolic for carbohydrates, lipids, amino acids, and nucleotides). Intracellular regulation, intercellular regulation, and how all this serves to meet the need of the cell and organism.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 242 [Min Grade: D]

BIO 312 Genetically Modified Foods 2.0 Credits

Covers the application of recombinant DNA techniques in the creation of genetically modified foods. Explores the many uses of these food. Also covers the social, ethical and environmental issues involved in the use of genetically modified foods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 100 [Min Grade: D] or BIO 107 [Min Grade: D] or BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

BIO 313 Comparative Physiology Laboratory 2.0 Credits

Computational laboratory examining quantitative facets of vertebrate physiology through simulation experiments. Complements BIO 310 Comparative Physiology. Example systems examined include gas and solute exchangers, open vs closed circulations, and thermoregulatory controllers. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 310 [Min Grade: D] (Can be taken Concurrently)

BIO 314 Pharmacology 3.0 Credits

In this course, students will apply their studies of chemistry and biology to understand how drugs: are designed, affect the body, and are affected by the body. Students can expect to learn the fundamentals of pharmacology, and to discuss current topics and novel approaches being used to design new therapeutics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 318 Biology of Cancer 3.0 Credits

In this course, students will apply their studies of cell and molecular biology to understand cancer pathology. Starting with a fundamental knowledge of normal cellular processes, students will learn how normal processes go awry in tumor development and metastasis, and the current approaches being used to develop new cancer therapeutics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (BIO 214 [Min Grade: D] and BIO 218 [Min Grade: D]) or BIO 211 [Min Grade: D]

BIO 320 Microbial Pathogenesis 3.0 Credits

Covers mechanisms of pathogenesis in microbial disease: transmission, prevention, public health. Also covers molecular basis of microbial pathogenesis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]) and BIO 221 [Min Grade: D]

BIO 322 Mycology 4.5 Credits

Covers morphology, taxonomy, and physiology of yeasts and molds, with emphasis on species of economic importance; plant and animal pathogens; industrial fermentations; toxin production; decomposition of organic materials; and fungal morphogenesis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 221 [Min Grade: D]

BIO 331 Bioinformatics I 3.0 Credits

This course uses a combination of lecture and hands-on exercises to develop computational, algorithmic, and database navigation skills used in the analysis of genes and genomes. Topics include genomic databases, genome assembly and annotation, sequence alignment, phylogenetics, and comparative genomics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 122 [Min Grade: D] or BIO 141 [Min Grade: D]

BIO 332 Bioinformatics II 3.0 Credits

This course uses a combination of lecture and hands-on exercises to develop programming and software skills used in the study of functional genomics. Topics include genetics, transcriptomics, proteomics, and metabolomics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 331 [Min Grade: D]

BIO 333 Bioinformatics Laboratory 2.0 Credits

In this course, students develop and apply computational skills in bioinformatics to address a quarter-long research project. Topics generally focus on the ecology and evolution of microbes, which have become much easier to study thanks to the advent of molecular tools and software for the analysis of DNA sequences.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 122 [Min Grade: D] (Can be taken Concurrently) or BIO 141 [Min Grade: D]

BIO 346 Stem Cell Research 3.0 Credits

This course will focus on recent and important topics relevant to stem cell research and development. Topics will include nuclear reprogramming and epigenetics, environmental influences on stem cell differentiation, stem cells and cancer, stem-cell-based therapies for heart and neurodegenerative disorders, stem cells and ageing, and politics of stem cell research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 348 Neuroscience: From Cells to Circuits 3.0 Credits

This course provides an introduction to the biological basis of human and animal behavior. This course will emphasize fundamental aspects of neuroscience including how individual neurons respond to stimuli, how these neurons connect to form circuits during development, and how ensembles of neurons work together to mediate simple tasks.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D] or BIO 107 [Min Grade: D]

BIO 349 Behavioral Neuroscience 3.0 Credits

This course provides an introduction to the biological basis of human and animal behavior. This course will emphasize fundamental aspects of neuroscience with a focus on the principles of how circuits function in the nervous system. Topics covered will include how neural circuits mediate sensory perception, drive behavioral output, and generate thoughts and emotions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D] or BIO 107 [Min Grade: D]

BIO 368 Embryology 4.0 Credits

This course surveys general features of developing systems, and focuses on the developmental history of adult structures and functions in humans. Human developmental defects are also discussed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 214 [Min Grade: D] or BIO 224 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 370 Teratology 3.0 Credits

This course will expand on the concepts of developmental biology by examining the agents that interfere with normal development. We will be exploring these agents through presentations and discussion of current peer reviewed literature. The focus will be on an understanding of mechanisms of action and how they are influenced by dose pharmacology and genetics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 270 [Min Grade: D] or BIO 368 [Min Grade: D]

BIO 372 Histology 4.0 Credits

This course is designed to give students an understanding of the established fundamentals and principles of histology. Histology lies at the interface between cell biology and physiology: here we examine how cells work together as tissues and organs to create a functional pump (the heart), filters (the kidneys), and bellows (the lungs). While considerable focus will be on the structural details of select systems, there are recurring patterns that emerge in tissue construction. These patterns reflect regional variations in the functional role of the assembled tissue; studying these principles offers us a view of how small differences in cell number, type, and interaction can lead to the wide variety of tissue/organ properties seen in the human body.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 386 Gross Anatomy I 2.0 Credits

This course is to give students an understanding of Human Anatomy in a clinical format. Anatomy will be studied in a regional manner with an emphasis placed on landmarks and relationships of structure within a region. Regions covered to include the back, upper limb, thorax, and abdomen.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: (BIO 214 [Min Grade: D] and BIO 218 [Min Grade: D]) or BIO 211 [Min Grade: D]

Corequisite: BIO 387

BIO 387 Gross Anatomy I Laboratory 2.0 Credits

This course is to accompany the Gross Anatomy lecture course and complements the students study of human anatomy by allowing the student to hone their dissection skills through dissection of a preserved mammalian specimen.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: (BIO 214 [Min Grade: D] and BIO 218 [Min Grade: D]) or BIO 211 [Min Grade: D]

Corequisite: BIO 386

BIO 388 Gross Anatomy II 2.0 Credits

This course is a continuation of the clinically focused study of Human Anatomy begun in BIO 386 (Gross Anatomy I). Anatomy will be studied in a regional fashion, with a focus on the pelvis, lower limb, head, and neck.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (BIO 386 [Min Grade: D])

Corequisite: BIO 389

BIO 389 Gross Anatomy II Lab 2.0 Credits

This course is to accompany the Gross Anatomy lecture course and complements the students study of human anatomy by allowing the student to hone their dissection skills through dissection of a preserved mammalian specimen. This course is a direct continuation of BIO 387 (Gross Anatomy I Lab).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 387 [Min Grade: D]

Corequisite: BIO 388

BIO 404 Structure and Function of Biomolecules 4.0 Credits

Covers the weak interactions which govern structure and function of biomolecules, including amino acids, proteins (structural organization, isolation, and methods of analysis). Enzymes (structure, catalytic mechanisms, kinetics), lipids and biomembranes, and DNA and RNA folding.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 242 [Min Grade: D]

BIO 406 Computational Biochemistry Laboratory 2.0 Credits

This course uses kinetic analysis of biochemical data to increase the computational and numerical sophistication used to build sound models of the underlying biological processes. Students start with Excel as the analytical tool. MATLAB is then used as the complexity of the problems demands it.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 242 [Min Grade: D]

BIO 410 Advanced Molecular Biology 3.0 Credits

This course will provide students the opportunity to learn about molecular mechanisms of gene expression and control, genome analysis and manipulation, and the use of advanced tools and techniques in molecular biology. The principles of molecular biology and techniques will be discussed in the context of model organisms commonly used for molecular biology research. The course will have a strong focus on experimental approaches, problem solving and on understanding literature in the field. At the conclusion of the course, students should have the background to design experiments, and read and discuss papers from the primary literature regarding different aspects of molecular biology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 211 [Min Grade: D]

BIO 412 Biology of Aging 3.0 Credits

Discusses ageing at the organismal, organ, cellular, and molecular levels. Discussions include chronological versus biological aging, normal and abnormal human physiology of aging, current theories of aging, the effect of caloric restriction on aging, and the molecular mechanisms that underlie normal and abnormal aging.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 413 Genomics 3.0 Credits

This course aims to elucidate current technologies, theory, and applications of genomic research. Though a large emphasis will be placed on the use of genomic tools to study human health, we will also study the genomes, transcriptomes, and proteomes of bacteria, fungi, plants, and other animals.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 414 Behavioral Genetics 3.0 Credits

This course explores the role of genetics in determining variation in animal (including human) behavior, and the role of gene expression in regulating behavioral development. The course surveys techniques for quantifying and analyzing genetic variation, behavioral effects, and gene expression.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: BIO 122 [Min Grade: D] or BIO 107 [Min Grade: D]

BIO 415 Proteins 3.0 Credits

Discusses protein structure, function, and isolation. Emphasizes biochemical, biophysical, and molecular biological techniques.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 416 Biochemistry of Major Diseases 3.0 Credits

This course focuses on the biochemical bases of several selected human disorders including neoplasm, cardiovascular disorders, diabetes and obesity. Biochemical changes and their regulation by signaling pathways under the disease conditions will be examined. The relevance of diagnosis and treatment will be discussed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 203 [Min Grade: C] or BIO 311 [Min Grade: C]

BIO 420 Virology 3.0 Credits

Discusses the major viral groups, including biochemistry and molecular genetics of viral replication, structure, gene expression, latency, and role in disease.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 421 Biomembranes 3.0 Credits

The experimental and theoretical basis for the structure and function of biological membranes will be surveyed. Topics include membrane self assembly, bilayer phase behavior and dynamics, membrane protein structure, passive and active transport, membrane fusion and trafficking.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 424 Microbial Physiology 3.0 Credits

Covers physiology and metabolism of microorganisms with emphasis on aspects unique to prokaryotes, including envelope structure, transport systems, modes of nutrition, biosynthesis, growth, and mechanisms of action of antibiotics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 221 [Min Grade: D]

BIO 426 Immunology 3.0 Credits

Covers the fundamental concepts of innate and adaptive immunity, including the molecular and cellular mechanisms that generate responses to a broad spectrum of infectious threats, self-non-self recognition, immune regulation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 427 Immunology Laboratory 2.0 Credits

Students will gain a more thorough understanding of the complexities of the mammalian immune system and will receive hands on experience with common models used in immunology labs. This course complements the Immunology lecture course (BIO 426). Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 426 [Min Grade: D] (Can be taken Concurrently)

BIO 430 Cell Biology of Disease 3.0 Credits

An introduction to the pathobiology of human disease as it relates to principles of cytoskeleton and membrane biology. The course reviews basic intracellular mechanisms and examines how they go awry in respiratory, heart and kidney diseases, diabetes, cancer, neurodegeneration and during viral and microbial infections.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 433 Advanced Cell Biology 3.0 Credits

Course covers chemical composition and cellular function of organelles and other cellular structures, intra- and inter- cellular regulatory processes, intercellular communication, genetic mechanisms and analytical techniques.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BIO.

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 434 [WI] Advanced Cell Biology Laboratory 2.0 Credits

Course covers fundamentals of growth, division and homeostasis of mammalian cells grown in culture. Students perform experiments on cells to monitor cellular morphology, including subcellular structures and specific regulatory proteins. Techniques include fluorescent microscopy, cell transfection and subcellular fractionation. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BIO and classification is Senior.

Prerequisites: BIO 433 [Min Grade: D] (Can be taken Concurrently)

BIO 435 Immunobiology of Disease 3.0 Credits

This course will expand on the concepts of molecular immunology focusing on emerging concepts in immunology research, immunopathologies, failure of host defense and current clinical concepts.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 426 [Min Grade: D]

BIO 436 Human Population Genetics 4.0 Credits

This course surveys population genetics theory as applied to studies of micro-evolutionary changes. We will examine the forces of evolution—mutation, selection, inbreeding, gene flow, genetic drift—and how they can (and cannot) change allele frequencies in populations over time. We will apply the theory that you have learned by also examining current primary literature on human evolutionary history, population genetics and patterns of adaptation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D] and BIO 124 [Min Grade: D] and (BIO 211 [Min Grade: D] or BIO 217 [Min Grade: D] or BIO 218 [Min Grade: D] or ENV5 212 [Min Grade: D])

BIO 442 Modeling Methods in Biology I 3.0 Credits

Offers practical experience in the modeling of simple biological systems, including the applications of linear, trigonometric, and exponential functions in biology and the use of differential and integral calculus, simple differential equations, and the Eulerian approach to simulation. Emphasizes practical computational use of such tools in biological problems. Offered in alternate years.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BIO 443 Modeling Methods in Biology II 3.0 Credits

Offers a practical introduction to the modeling of dynamic biological processes, including deterministic and stochastic processes. Emphasizes the development and construction of working models and the interpretation of results. Discusses both mechanistic and empirical/predictive models. Students develop their own model of a real-world biological process. Offered in alternate years.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 442 [Min Grade: D]

BIO 444 Human Genetics 3.0 Credits

Covers the fundamentals and principles of genetics with an emphasis on their relevance to human genetics and disease. Topics include human genetic disorders, pedigree analysis and genetic testing, cytogenetics, epigenetics, genetics of cancer, gene therapy, stem cell research, human genomics and biotechnology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 445 Microbial Genetics 3.0 Credits

Covers genetic organization and regulation in bacteriophage and bacteria, techniques of genetic manipulation of microbial genomes, genetic interactions of microbes under natural conditions and the use of microbial genome modification in industry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]) and BIO 221 [Min Grade: D]

BIO 447 Advanced Genetics and Molecular Biology 3.0 Credits

Covers classical prokaryotic and eukaryotic genetics; DNA/RNA structure; DNA replication, transcription, translation and regulation of these processes. Also covers major molecular techniques used for characterizing prokaryotic and eukaryotic genes, tools for analysis of genomes, and applications of molecular genetics research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BIO.

Cannot enroll if classification is Freshman

Prerequisites: (BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]) and BIO 244 [Min Grade: D]

BIO 449 Recombinant DNA Laboratory 5.0 Credits

Covers procedures of DNA isolation and purification, insertion of DNA sequences into plasmid cloning vectors, introduction of plasmids into appropriate host cells, and methods of recovering and analyzing cloned DNA.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 451 Genetic Reg Development 3.0 Credits

Covers molecular and genetic control of morphogenesis and cellular differentiation. Focuses on differential gene function and the interaction between the nucleus and the cytoplasm.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 270 [Min Grade: D]

BIO 453 Protein Dysfunction in Disease 3.0 Credits

Proteins are essential for the function and health of the cell. Misfolded and damaged proteins are at the root of numerous human diseases, known collectively as conformational diseases. In this course we will examine cellular mechanisms involved in biosynthesis, folding and maintenance of proteins, and discuss how the failure of these mechanisms contributes to disease.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 461 Neurobiology of Autism Disorders 3.0 Credits

Autism disorders arise from changes in neurodevelopment that deeply affect how individuals interact with the world around them. As study of autism has increased over the past several decades, it has become clear that autism actually comprises a large, heterogeneous set of similar disorders, most of which are genetic in origin. In this class, we will study how neuronal cell biology is disrupted in known forms of autism, and how distinct forms of autism can arise from alterations in common cellular pathways. Further, we will discuss how these discoveries may lead to eventual treatments or cures.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D] or BIO 348 [Min Grade: D] or BIO 349 [Min Grade: D]

BIO 462 Biology of Neuron Function 3.0 Credits

Covers molecular and cellular mechanisms underlying neuron function. Topics include: molecular and cellular biology of neurons and neural development; molecular biology and physiology of sensory and motor neurons; molecular biology of muscle function; molecular and cellular basis of learning and memory in model organisms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 201 [Min Grade: D] or BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D] or BIO 348 [Min Grade: D] or BIO 349 [Min Grade: D]

BIO 463 Molecular Mechanisms of Neurodegeneration 3.0 Credits

This is an advanced course on the current, primary literature in the area of neurodegeneration. Students are expected to be conversant in areas of Genetics, Cell Biology, Molecular Biology, Biochemistry, and Neurobiology. This is a discussion course based on reading current manuscripts from the primary literature. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D] or BIO 348 [Min Grade: D] or BIO 349 [Min Grade: D]

BIO 465 Neurobiology of Disease 3.0 Credits

The objective of the course is to provide a basic understanding of molecular and cellular biology of disorders of the human nervous system. Advances developed from experimental models that have armed clinicians and basic scientists with new tools for diagnosis and treatment of disease and injury will be presented.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 462 [Min Grade: D] or BIO 211 [Min Grade: D] or BIO 348 [Min Grade: D] or BIO 349 [Min Grade: D]

BIO 466 Endocrinology 4.0 Credits

Describes the classical hormones, their regulation and major clinical abnormalities. New directions in endocrinology, such as cellular regulation and cellular mediators of hormonal action are also considered. The major focus of the course will be on mammals, although some examples involving other vertebrates are included.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 468 Pathophysiology 4.0 Credits

This course is designed to give students an appreciation of the many ways to think about the diseased organism, with an emphasis on the cellular- and systems-level malfunctions that contribute to the disease state. Having established an understanding of the normal physiology of the system in question, we will investigate the underlying cause, origin, and symptoms of the pathophysiology, as well as exploring the successes and limitations of available treatment options. Considerable emphasis will be placed on the importance of model systems that mimic aspects of the diseased state, as well as the role epidemiological data plays in helping to clarify the genetic and environmental contributors.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (BIO 214 [Min Grade: D] or BIO 211 [Min Grade: D]) and BIO 201 [Min Grade: D]

BIO 471 Seminar in Biological Sciences 2.0 Credits

Discusses and evaluates selected current topics in bioscience and biotechnology. Includes presentations by outside speakers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BIO and classification is Senior.

Prerequisites: BIO 218 [Min Grade: D] or BIO 211 [Min Grade: D]

BIO 472 Seminar in Biological Sciences 2.0 Credits

In the second term of senior seminar, we will continue to host professional seminars with speakers presenting current research in the various biological disciplines. Professional development sessions will be available that will be helpful to the student's maturation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BIO and classification is Senior.

Prerequisites: BIO 471 [Min Grade: D]

BIO 473 [WI] Seminar in Biological Sciences 2.0 Credits

This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BIO and classification is Senior.

Prerequisites: BIO 472 [Min Grade: D]

BIO 474 Thesis in Biology 2.0 Credits

Through this course, research-active students will engage in activities intended to help them develop a written thesis, and learn how to present their research effectively in both written and oral formats. Students will be encouraged to improve their skills in reading and analyzing the literature and their own data. Students will communicate their ideas through the development of a formal thesis, an in-class oral presentation, and a poster presentation. Seminar attendance will be a part of this course. Students must complete BIO 471 and 473 before registering for this course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BIO and classification is Senior.

Prerequisites: BIO 473 [Min Grade: D] (Can be taken Concurrently)

BIO 497 Research 0.5-12.0 Credits

Provides guided research in biology, molecular biology, microbiology, cell or human physiology, genetics, biochemistry, or biotechnology.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

BIO I199 Independent Study in BIO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO I299 Independent Study in BIO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO I399 Independent Study in BIO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO I499 Independent Study in BIO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO T180 Special Topics in Bioscience & Biotechnology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO T280 Special Topics in Bioscience & Biotechnology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO T380 Special Topics in Bioscience & Biotechnology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO T480 Special Topics in Bioscience & Biotechnology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Business Statistics

Courses

STAT 201 Introduction to Business Statistics 4.0 Credits

This introductory first course in business statistics focuses on applications of data analysis and statistics in business and economics. Topics covered include descriptive statistics and graphical presentation, probability, statistical inference, and simple regression analysis.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 102 [Min Grade: D] or MATH 121 [Min Grade: D] or MATH 183 [Min Grade: D]

STAT 202 Business Statistics II 4.0 Credits

This second course in business statistics focuses on widely used data analysis techniques in business and economics. Topics include two sample procedures, categorical data analysis, analysis of variance, regression analysis and other statistical applications as time permits. Applications are covered through practical data analysis examples.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: STAT 201 [Min Grade: C]

STAT 205 Statistical Inference I 4.0 Credits

Commerce and Engineering students only. Covers descriptive statistics, elementary probability theory, discrete and continuous random variables and probability distributions, joint distribution functions, expected values, statistical measures, sampling distributions, and point and interval estimation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MATH 122 [Min Grade: D]

STAT 206 Statistical Inference II 4.0 Credits

Commerce and Engineering students only. Topics include hypothesis testing, two sample procedures, analysis of variance models, regression analysis, use of computer statistical programs and other statistical applications as time permits.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: STAT 205 [Min Grade: D]

STAT 261 Statistics I 3.0 Credits

Studies methods for organizing and summarizing data, elementary probability concepts, and important probability distributions and sampling distributions. Introduces confidence interval estimation. Fall, Winter.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 183 [Min Grade: D]

STAT 262 Statistics II 3.0 Credits

Studies the principles and techniques of interval estimation and hypotheses testing, and testing for means and proportions. Winter, Spring.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: STAT 261 [Min Grade: D]

STAT 263 Statistics III 3.0 Credits

Covers linear regression and correlation models, anova, statistical quality control, non-parametric statistics, and applications of the chi-square distribution. Fall, Spring.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: STAT 262 [Min Grade: D]

STAT 325 Six-Sigma Quality Implementation 4.0 Credits

Focuses on current theory and practice in Six-Sigma implementation for quality monitoring and improvement. Topics include the dynamic nature of quality, Six-Sigma implementation, and the roles of management in planning and guiding quality efforts. The fundamentals of managerial and statistical methods for quality monitoring and improvements are covered.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 201 [Min Grade: C-] or STAT 205 [Min Grade: C-]

STAT 331 Introduction to Data Mining for Business 4.0 Credits

This course introduces students to the fundamental ideas of data mining methods, including dimension reduction, cluster, classification and regression trees, and logistic regression. The emphasis is understanding the application of methods rather than on mathematical and computational foundations. All applications are business-oriented.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 202 [Min Grade: C-] or STAT 206 [Min Grade: C-]

STAT 335 Introduction to Experimental Design 4.0 Credits

The purpose of this course is to introduce the student to the fundamentals of experimental design, including the planning, conducting, and analysis of statistically designed experiments. Randomized, factorial, fractional and Plackett-Burman designs are covered with an emphasis on business applications.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 202 [Min Grade: C-] or STAT 206 [Min Grade: C-]

STAT E313 Quantitative Analysis III 3.0 Credits

Covers descriptive statistics, elementary probability theory, discrete and continuous random variables and probability distributions, central limit theorem, expected value, statistical estimations, hypothesis testing, and linear regression and correlation analysis. All terms.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: STAT 312 [Min Grade: D]

STAT I199 Independent Study in STAT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

STAT I299 Independent Study in STAT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

STAT I399 Independent Study in STAT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

STAT I499 Independent Study in STAT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

STAT T180 Special Topics in STAT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

STAT T280 Special Topics in STAT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

STAT T380 Special Topics in STAT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

STAT T480 Special Topics in STAT 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Cardiovascular Perfusion

Courses

CVPT 101 Perfusion Technology I 3.0 Credits

In Perfusion Technology I, the student is introduced to the various components that comprise the perfusion hardware, such as perfusion pumps, oxygenators, tubing packs and ancillary equipment used in CPB circuits. In this course, students receive extensive wet-lab experience and should be able to demonstrate a pump set-up.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CVPT 289 Cardiac Anatomy and Physiology 4.0 Credits

Cardiac Anatomy and Physiology expands knowledge learned in basic anatomy and physiology coursework. Explores the structure and mechanisms by which the cardiovascular system functions in relation to other organ systems, with an emphasis on how cardiopulmonary bypass alters normal function.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CVPT 293 Basic Surgery and Monitoring 3.0 Credits

Basic Surgery and Monitoring introduces basic surgical aspects, including sterile and aseptic techniques, interrelationships of various personnel in the operating room and various surgical techniques as they relate to perfusion. Explores all facets of patient monitoring, with an emphasis on changes associated with the conduct of perfusion.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CVPT 295 Clinical Practicum I 4.0 Credits

Clinical Practicum I exposes students to the operating room, where their primary responsibilities are observing and assisting senior students and staff perfusionists. Provides experience including pump set-up, handling case records, gathering lab data, and limited perfusion management.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CVPT 300 Clinical Practicum II 6.0 Credits

Clinical Practicum II is a course focused entirely on clinical perfusion. Includes responsibility for pump set-up and cardiopulmonary bypass case management. Includes close supervision for each individual case.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 295 [Min Grade: D]

CVPT 305 Pediatric Clinical Practicum 2.0 Credits

Pediatric Clinical Practicum examines the differences among adult, infant and neonate perfusion methods during a one-month rotation to Children's Hospital of Philadelphia. Emphasizes circuit preparation, priming volumes, flow rates and hemodynamic changes, pharmacological agents, direct visualization of various congenital anomalies and surgical corrections.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 307 [Min Grade: D] and CVPT 330 [Min Grade: D]

CVPT 307 Clinical Practicum III 6.0 Credits

Clinical Practicum III provides clinical work aimed at increasing the level of proficiency in the conduct of patient perfusion. Under supervision, students are responsible for all aspects of clinical perfusion and are exposed to specialized techniques and adjunctive technology used for cardiopulmonary bypass.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 300 [Min Grade: D]

CVPT 310 Perfusion Technology II 4.0 Credits

Perfusion Technology II reinforces the operating room techniques observed in CVPT 295 in a classroom setting. Examines ancillary and perfusion support systems, including ventricular-assist devices, extracorporeal membrane oxygenation, CPS, intra-aorta Balloon pumps and others.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 101 [Min Grade: D]

CVPT 320 Physiologic Management of Bypass 4.0 Credits

Physiologic Management of Bypass provides an understanding of the many physiologic changes that occur during bypass and a method for safely and effectively addressing these changes. Emphasis is placed on hemodynamics, fluid balance, blood coagulation and electrocardiographic activity as they apply to perfusion.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CVPT 330 Cardiovascular Pathology 4.0 Credits

Cardiovascular Pathology provides an understanding of pathological conditions that exist in all organ systems, with special emphasis on the cardiovascular system. Discusses both acquired and congenital defects, with attention given to pathological conditions requiring cardiopulmonary bypass.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 320 [Min Grade: D]

CVPT 340 Cardiovascular Pharmacology 4.0 Credits

Cardiovascular Pharmacology details the various pharmacologic interventions used for cardiovascular patients, highlighting their classification, dosage, site of action, duration of action, interactions with other drugs, precautions and side effects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 289 [Min Grade: D]

CVPT 350 Clinical Practicum IV 12.0 Credits

Clinical Practicum IV is designed to complete the students' clinical experience. Expects students, under staff supervision at all times, to act as though unsupervised in all routine cardiovascular procedures.

Allows the operation of complex devices as well as student participation in emergency procedures.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 307 [Min Grade: D]

CVPT 360 Cardiac Surgical Practicum 2.0 Credits

A multi-faceted course incorporating many of the disciplines found in an acute care setting. Rotations include the following observational areas: catheterization lab, recovery room, anesthesia, intra-aortic balloon pumps, surgical assisting and ventricular assist devices.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 365 [Min Grade: D]

CVPT 365 Clinical Practicum V 12.0 Credits

Clinical Practicum V is an advanced course designed to focus on the initiation and discontinuation of cardiopulmonary bypass. Interaction with the surgeon and anesthesiologist is essential and proper communication skills are developed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 350 [Min Grade: D]

CVPT 370 Clinical Practicum VI 10.0 Credits

Clinical Practicum VI is an advanced course designed to focus on the patient's hemodynamic status during the preoperative, perioperative, and post operative time periods. The student is educated in proper drug and fluid administration. EKG rhythms are assessed in conjunction with post operative expectations and heart function.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 365 [Min Grade: D]

CVPT 375 Clinical Practicum VII 10.0 Credits

Clinical Practicum VII is an advanced course designed to prepare the student for handling complications which may occur during an open heart procedure. Senior students are involved in simulations which mimic actual clinical situations/problems. The students utilize their clinical experience and knowledge base to assess the operating room situations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CVPT 370 [Min Grade: D]

Chemical Engineering

Courses

CHE 201 Process Material Balances 3.0 Credits

Covers elementary principles of chemical engineering, use of stoichiometry and material balances to analyze chemical processing operations, and application to specific commercial processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: TDEC 121 [Min Grade: D] or CHEM 102 [Min Grade: D] or CHEM 162 [Min Grade: D]

CHE 202 Process Energy Balances 3.0 Credits

Covers use of first law to analyze chemical processing operations, energy balances for non-reactive and reactive processes, chemical reaction equilibria, and application to specific commercial processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 201 [Min Grade: D]

Corequisite: CHE 206

CHE 206 Basic Chemical Engineering Thermodynamics 3.0 Credits

First and second laws of thermodynamics, use of state functions to solve macroscopic problems, distinction between solving ideal gas and real fluid problems. An introduction to phase equilibrium and mixtures. Concepts of fugacity and activity as measures of nonideality.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHE.

Prerequisites: CHE 201 [Min Grade: D] and MATH 200 [Min Grade: D]

Corequisite: CHE 202

CHE 211 Material and Energy Balances I 4.0 Credits

Covers elementary principles of chemical engineering, use of stoichiometry and material and energy balances to analyze chemical processing operations, and application to specific commercial processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D]

Corequisite: CHE 220

CHE 212 Material and Energy Balances II 4.0 Credits

Covers application of material and energy balances to analyze chemical processing operations, with application to both small-scale and commercial processes. Emphasis is on simultaneous solution of material and energy balances and on time-dependent analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 211 [Min Grade: D] and CHE 220 [Min Grade: D]

Corequisite: CHE 230

CHE 220 Computational Methods in Chemical Engineering I 3.0 Credits

Introduces computational approaches and software applied to solve problems in chemical engineering. Software includes spreadsheet programs (Excel), high level computing languages (MATLAB), and chemical process simulation tools (Aspen, HYSYS).

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 122 [Min Grade: D]

Corequisite: CHE 211

CHE 230 Chemical Engineering Thermodynamics I 4.0 Credits

First and second laws of thermodynamics, use of state functions to solve macroscopic problems, distinction between solving ideal gas and real fluid problems. An introduction to phase equilibrium and mixtures. Concepts of fugacity and activity as measures of nonideality.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D] and CHE 211 [Min Grade: D] and CHE 220 [Min Grade: D]

Corequisite: CHE 212

CHE 250 Chemical Engineering Process Principles 3.0 Credits

Applies heuristics to the art process synthesis and analysis. Identify key parameters in reaction and separation in processes. Examine common and divergent elements of major chemical processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 201 [Min Grade: D]

Corequisite: CHE 202

CHE 301 Process Thermodynamics 3.0 Credits

Covers mixture thermodynamics, multi-component, multi-phase equilibrium calculations, and chemical equilibrium calculations for real fluids.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ENGR 210 [Min Grade: D] or CHE 206 [Min Grade: D]) and CHE 201 [Min Grade: D] and CHE 202 [Min Grade: D]

CHE 302 Process Fluid Mechanics 4.0 Credits

Within the context of processes previously introduced, introduces fluid flow of gases, liquids, and particulates; momentum transport; skin friction; drag; piping networks; filtration; and fluidization.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: TDEC 221 [Min Grade: D] or MATH 210 [Min Grade: D] or MATH 262 [Min Grade: D] or ENGR 232 [Min Grade: D]

CHE 303 Process Heat Transfer 3.0 Credits

Covers, within the context of processes previously introduced, transfer of energy by conduction, convection, and radiation; continuation of transport phenomena; design of heat exchangers; and applications in industry and in nature.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 302 [Min Grade: D] and CHE 201 [Min Grade: D] and CHE 202 [Min Grade: D]

CHE 304 Process Mass Transfer 4.0 Credits

Covers, within the context of processes previously introduced, mass transfer in mixtures; diffusion, convection, and continuation of transport phenomena; component separation in continuous contractors; gas absorption; liquid-liquid extraction; and simultaneous heat and mass transfer.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 303 [Min Grade: D] and CHE 201 [Min Grade: D] and CHE 202 [Min Grade: D]

CHE 305 Process Separations 4.0 Credits

Covers, within the context of processes previously introduced, the application of thermodynamics and equilibrium stage concepts to the unit operations involved in chemical processing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 301 [Min Grade: D] and CHE 201 [Min Grade: D] and CHE 202 [Min Grade: D]

CHE 307 Process Modeling I 4.0 Credits

Models simple chemical and biochemical processes such as heating, cooling, and separation systems. Covers analytical and numerical methods for solving algebraic and ordinary differential equations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 201 [Min Grade: D] and CHE 202 [Min Grade: D] and (ENGR 232 [Min Grade: D] or MATH 262 [Min Grade: D])

CHE 308 Process Modeling II 4.0 Credits

Covers mathematical modeling of chemical and biochemical processes such as chemical and biochemical reactors and heating and cooling systems, analytical methods for solving algebraic and ordinary-differential equations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 305 [Min Grade: D] and CHE 307 [Min Grade: D]

Corequisite: CHE 304

CHE 310 Transport Phenomena 4.0 Credits

Non-chemical engineering students only. Examines mass, momentum, and energy transport in processes applied to electrical and materials engineering.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is CHE or classification is Freshman

Prerequisites: TDEC 202 [Min Grade: D] or MEM 210 [Min Grade: D] or ENGR 210 [Min Grade: D]

CHE 311 Fluid Flow and Transport 3.0 Credits

Non-chemical engineering students only. Examines fluid flow and heat and mass transfer in processes associated with civil, environmental, and materials engineering disciplines.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is CHE or classification is Freshman

Prerequisites: TDEC 202 [Min Grade: D] or MEM 210 [Min Grade: D]

CHE 320 Computational Methods in Chemical Engineering II 3.0 Credits

This course introduces computational approaches and software applied to solve problems in chemical engineering. The course includes finite element software for solving differential equations (COMSOL Multiphysics) and computer programming.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 341 [Min Grade: D]

CHE 330 Chemical Engineering Thermodynamics II 4.0 Credits

Covers mixture thermodynamics, multi-component, multi-phase equilibrium calculations, and chemical equilibrium calculations for real fluids.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 230 [Min Grade: D]

CHE 331 Separation Processes 3.0 Credits

Covers application of thermodynamics and equilibrium stage concepts to separation unit operations in chemical processing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 330 [Min Grade: D] and CHE 343 [Min Grade: D]

CHE 332 [WI] Chemical Engineering Laboratory 2.0 Credits

Requires students to perform experiments illustrating the fundamentals of chemical engineering process analysis. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 302 [Min Grade: D] (Can be taken Concurrently) CHE 301 [Min Grade: D]

CHE 333 [WI] Chemical Engineering Laboratory II 2.0 Credits

Offers laboratory experiments illustrating the fundamentals of chemical engineering process analysis. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 303 [Min Grade: D] (Can be taken Concurrently)

CHE 334 [WI] Chemical Engineering Laboratory III 2.0 Credits

Offers laboratory experiments illustrating the fundamentals of chemical engineering process analysis. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 304 [Min Grade: D] (Can be taken Concurrently) CHE 303 [Min Grade: D]

CHE 335 Statistics and Design of Experiments 3.0 Credits

Provides statistical treatment of engineering data, including application of statistical techniques to process model formulation, statistical designs of engineering experiments, and analysis of probabilistic systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 210 [Min Grade: D] or MATH 262 [Min Grade: D] or ENGR 232 [Min Grade: D]

CHE 341 Fluid Mechanics 4.0 Credits

Introduces, within the context of processes, transport phenomena, fluid flow, momentum transport, skin friction, drag, and piping networks.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 212 [Min Grade: D] and CHE 230 [Min Grade: D] and MATH 210 [Min Grade: D]

CHE 342 Heat Transfer 4.0 Credits

Covers, as a continuation of transport phenomena and within the context of processes, transfer of energy by conduction, convection, and radiation and design of heat exchangers.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 341 [Min Grade: D]

Corequisite: CHE 343

CHE 343 Mass Transfer 4.0 Credits

Covers, within the context of processes previously introduced, mass transfer in mixtures; diffusion, convection, and continuation of transport phenomena; component separation in continuous contactors; gas absorption; liquid-liquid extraction; and simultaneous heat and mass transfer.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 341 [Min Grade: D]

Corequisite: CHE 342

CHE 344 Transport Phenomena in Bioengineering Processes 3.0 Credits

Covers gas-liquid mass transfer in microbial systems, mass transfer in cells and biofilms, membrane transport, fluid mechanics of fermentation broth, power consumption in agitated vessels, heat transfer, and scale-up of mass transfer equipment.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (CHE 343 [Min Grade: D] or CHE 304 [Min Grade: D]) and (CHE 341 [Min Grade: D] or CHE 302 [Min Grade: D])

CHE 350 Statistics and Design of Experiments 3.0 Credits

Provides statistical treatment of engineering data including application of statistical techniques to process model formulation, statistical designs of engineering experiments, and analysis of probabilistic systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 210 [Min Grade: D] or ENGR 232 [Min Grade: D] or MATH 262 [Min Grade: D]

CHE 351 Chemical Engineering Laboratory I 2.5 Credits

Offers laboratory experience in chemical engineering processes, requiring both experimental design and analysis. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 341 [Min Grade: D] and CHE 330 [Min Grade: D]

CHE 352 Chemical Engineering Laboratory II 2.5 Credits

Offers laboratory experience in chemical engineering processes, requiring both experimental design and analysis. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 343 [Min Grade: D] and CHE 331 [Min Grade: D]

CHE 360 BioProcess Principles 3.0 Credits

This course is concerned with manufacturing processes involving biological substances. Students gain detailed knowledge in the design and operation of bioreactors and learn about biomolecules produced therein. Specific topics covered include: Cells (type, organization, function and growth); Protein and Enzymes; Bioreactor Process Principles (active vs. passive immobilization, fermentation and scale-up, recovery and purification); Special consideration for animal and plant cell cultures.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 250 [Min Grade: D] and BIO 214 [Min Grade: D] and BIO 215 [Min Grade: D]

CHE 362 Chemical Kinetics and Reactor Design 4.0 Credits

Covers isothermal and non-isothermal reactor design, series and parallel reactions, and heterogeneous catalysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 330 [Min Grade: D] and CHE 342 [Min Grade: D] and CHE 343 [Min Grade: D]

CHE 364 Bioprocess Unit Operations 3.0 Credits

Covers separation processes applicable to bio-systems, including liquid-liquid extractions, membrane separations, chromatographic separations, filtration, and centrifugation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 305 [Min Grade: D] or CHE 331 [Min Grade: D]

CHE 371 Engineering Economics and Professional Practice 3.0 Credits

Provides techniques for making engineering project decisions. Topics include the time value of money, key decision criteria, risk analysis, and ethical considerations and consequences of business decisions.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 211 [Min Grade: D] and CHE 220 [Min Grade: D]

CHE 372 Integrated Case Studies in Chemical Engineering 3.0 Credits

This course reviews selected cases (market, processes, equipment sets and incidents) from chemical engineering practice whose analysis requires integration of concepts from previous Chemical Engineering courses such as mass and energy transport, thermodynamics, separations and reaction engineering.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 342 [Min Grade: D] and CHE 343 [Min Grade: D]

CHE 399 Special Problems in Chemical Engineering 1.0-12.0 Credit

Covers individual research problems of a non-routine nature. Requires report.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

CHE 420 Process Systems Engineering 3.0 Credits

Covers the application of automatic control theory to chemical processes within the context of processes previously introduced.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 201 [Min Grade: D] and CHE 202 [Min Grade: D] and CHE 303 [Min Grade: D]

CHE 424 Chemical Kinetics and Reactor Design 4.0 Credits

Covers isothermal and non-isothermal reactor design, series and parallel reactions, and heterogeneous catalysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 304 [Min Grade: D] and CHE 201 [Min Grade: D] and CHE 202 [Min Grade: D]

CHE 430 Introduction to Sustainable Engineering 3.0 Credits

This course introduces students to sustainability in an engineering context. Sustainable engineering encompasses the relationships between technology, society, the environment, and economic prosperity. A variety of systematic approaches will be used for multivariable design and analysis of the sustainability of engineering systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

CHE 431 Fundamentals of Solar Cells 3.0 Credits

This course focuses on the fundamentals of solar cells. It will cover semiconductor materials, basic semiconductor physics, optical and electronic phenomena, and case studies of crystalline silicon, thin film, and nanostructured photovoltaics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D] and CHEM 102 [Min Grade: D] and PHYS 201 [Min Grade: D]

CHE 450 Chemical Process Industries 3.0 Credits

Chemical engineering juniors and seniors. Combines process heuristics and design strategies with case studies of the industrial manufacture of a variety of materials, including petrochemicals, polymers, and ammonia. Discusses operational and design problems as well as the interactions of process principles.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

CHE 451 Safety Engineering 3.0 Credits

Covers selected topics such as safeguarding systems, fault trees, risk analysis, explosions, fires, and building safety.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CHE 482 [Min Grade: D]

CHE 452 Polymer Process Technology 3.0 Credits

Covers chemistry of chain and stepwise polymerization, industrial reactor systems, polymer melt rheology, processing of thermoplastic resins, and plastics properties.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

CHE 453 Chemical Engineering Laboratory III 2.5 Credits

Offers laboratory experience in chemical engineering processes, requiring both experimental design and analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 362 [Min Grade: D], CHE 464 [Min Grade: D] (Can be taken Concurrently)

CHE 460 Biochemical Engineering 3.0 Credits

Introduces underlying biological and engineering principles in an integrate fashion for biopharmaceutical production systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BME or major is CHE and classification is Junior or Senior.

CHE 461 Principles of Colloid Science 3.0 Credits

This course focuses on fundamental principles of colloid science from a biological perspective. It will cover surface active agents, thermodynamics of self-assembly of surfactants, surface chemistry and physics of monolayers and bilayers, microstructures and phase behavior, specific biological colloids (micelles, liposomes, and lipoproteins), and colloidal stability.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: BIO 141 [Min Grade: C] or BIO 122 [Min Grade: C]

CHE 464 Process Dynamics and Control 3.0 Credits

Covers the application of automatic control theory to chemical processes within the context of processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 210 [Min Grade: D] and CHE 212 [Min Grade: D]

CHE 466 Chemical Process Safety 3.0 Credits

Covers selected topics such as safeguarding systems, fault trees, risk analysis, explosions, fires, and process safety.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 472 [Min Grade: D]

CHE 471 Process Design I 4.0 Credits

Within the context of previously introduced processes, covers economic feasibility of projects and optimization of equipment and production in the design of process plants.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 331 [Min Grade: D], CHE 362 [Min Grade: D] (Can be taken Concurrently) CHE 371 [Min Grade: D] and CHE 372 [Min Grade: D]

CHE 472 Process Design II 3.0 Credits

Within the context of previously introduced processes, covers execution of feasibility study and preliminary design of process plants. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 471 [Min Grade: D]

CHE 473 Process Design III 3.0 Credits

Within the context of previously introduced processes, covers completion of feasibility study and preliminary design of process plants. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 472 [Min Grade: D]

CHE 481 Process Design I 3.0 Credits

Within the context of previously introduced processes, covers economic feasibility of projects and optimization of equipment and production in the design of process plants.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHE and classification is Senior.

Prerequisites: CHE 304 [Min Grade: D] and CHE 308 [Min Grade: D]

Corequisite: CHE 424

CHE 482 [WI] Process Design II 3.0 Credits

Within the context of previously introduced processes, covers execution of feasibility study and preliminary design of process plants. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CHE 481 [Min Grade: D]

CHE 483 [WI] Process Design III 3.0 Credits

Within the context of previously introduced processes, covers completion of feasibility study and preliminary design of process plants. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CHE 482 [Min Grade: D]

CHE I199 Independent Study in CHE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHE I299 Independent Study in CHE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHE I399 Independent Study in CHE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHE I499 Independent Study in CHE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHE T180 Special Topics in CHE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHE T280 Special Topics in CHE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHE T380 Special Topics in CHE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHE T480 Special Topics in CHE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Chemical Engineering Chemistry

Courses

CHEC 352 Physical Chemistry and Applications II 4.0 Credits

Equilibrium electrochemistry and transport; Covers electrochemical cells, Nernst equation, fuel cells, batteries, electrolytic solutions, transfer processes, Fick's laws, diffusion, ion transport, introduction to simple quantum mechanical systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 201 [Min Grade: D] and (CHE 206 [Min Grade: D] or ENGR 210 [Min Grade: D] or CHEM 253 [Min Grade: D])

CHEC 353 Physical Chemistry and Applications III 4.0 Credits

Kinetics and spectroscopy; Covers reaction kinetics, steady state approximation, chain reactions and unimolecular reactions, optical spectroscopy; Beer's Law, atomic spectra/simple atomic models, rotational and vibrational spectra, Raman spectra, term symbols and selection rules, lasers, molecular statistics, partition functions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 201 [Min Grade: D] and (CHE 206 [Min Grade: D] or ENGR 210 [Min Grade: D])

CHEC I199 Independent Study in CHEC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEC I299 Independent Study in CHEC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEC I399 Independent Study in CHEC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEC I499 Independent Study in CHEC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEC T180 Special Topics in Chemical Engineering Chemistry 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHEC T280 Special Topics in Chemical Engineering Chemistry 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEC T380 Special Topics in Chemical Engineering Chemistry 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEC T480 Special Topics in Chemical Engineering Chemistry 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Chemistry

Courses

CHEM 050 Preparatory Chemistry 0.0 Credits

This online course covered general chemical principles, such as stoichiometry, atomic and molecular structure, and characterization of chemical reactions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 100 Chemistry 2.0 Credits

Chemistry and its significance to industry and life, with discussions revolving around synthesis and use of polymers and biologically significant molecules.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 101 General Chemistry I 3.5 Credits

Covers fundamental principles of chemistry, stoichiometry, atomic and molecular structure, chemical bonding, states of matter, thermochemistry, and periodicity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: APCH 12 or CHEM 111 [Min Grade: D] or CHEM 050 [Min Grade: D]

Corequisite: EXAM 080

CHEM 102 General Chemistry II 4.5 Credits

Covers chemical equilibrium, including acid-base equilibria in solution; electrochemistry; organic chemistry; polymers; and petroleum.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 101 [Min Grade: D] or CHEM 121 [Min Grade: D] or CHEM 161 [Min Grade: D]

Corequisite: EXAM 080

CHEM 103 General Chemistry III 5.0 Credits

Covers organic functional groups, biochemistry, inorganic and coordination compounds, chemical kinetics, thermodynamics, and nuclear chemistry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D] or CHEM 122 [Min Grade: D] or (CHEM 162 [Min Grade: D] and CHEM 164 [Min Grade: D])

Corequisite: EXAM 080

CHEM 108 Health Chemistry I 3.0 Credits

Covers physical and chemical properties of substances used in medical areas and related principles: atomic structure, bonding, gases, solutions, acids and bases, oxidation-reduction and the chemistry of hydrocarbon compounds and polymers. Examples are taken from pharmacology, nutrition and other allied health fields.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

CHEM 110 Environmental Chemistry 2.0 Credits

Chemistry of the environment; the ecological aspects. Discussion of problems related to the pollution of the atmosphere, natural waters, and soil from a chemist's point of view.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 111 General Chemistry I 4.0 Credits

Not open to engineering or science majors. Introduces the principles of general chemistry. Covers SI units, unit factor calculations, states of matter, elements and compounds, energy, atoms, electronic configurations, ionic and covalent bonds, Lewis dot structures, shapes of molecules, chemical equations, stoichiometry, molarity, gas laws, nuclear chemistry, equilibrium between different states of matter, and some colligative properties of solutions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

CHEM 112 General Chemistry II 4.0 Credits

Introduces organic chemistry. Covers some classes of organic compounds from alkanes to amines, basic reactions of important functional groups, uses of some compounds, stereochemistry, synthetic and natural polymers (carbohydrates, protein, DNA), and briefly acids and bases.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 111 [Min Grade: D]

CHEM 113 General Chemistry I Laboratory 1.5 Credit

Covers chemical and physical properties and techniques for inorganic, organic, and polymeric compounds, including distillation, crystallization, chromatography, separation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 111 [Min Grade: D] (Can be taken Concurrently)

CHEM 114 General Chemistry II Laboratory 1.5 Credit

Continuation of CHEM 113.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 112 [Min Grade: D] (Can be taken Concurrently)

CHEM 121 Majors Chemistry I 5.0 Credits

Part I in an introductory sequence for chemistry majors. Covers fundamental principles of atomic and molecular nature of matter, electronic structure, physic-chemical properties, periodicity, chemical reactions, stoichiometry, thermochemistry, chemical bonding, properties of gases, and nuclear chemistry. Course includes weekly lab experiments.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHEM.

Prerequisites: APCH 12 or CHEM 111 [Min Grade: D] or CHEM 050 [Min Grade: D]

CHEM 122 Majors Chemistry II 5.0 Credits

Part II in an introductory sequence for chemistry majors. Covers physical properties of liquids and solids, kinetics, equilibrium, solutions, acids and bases, thermodynamics, and electrochemistry. Course includes weekly lab experiments.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHEM.

Prerequisites: CHEM 101 [Min Grade: C-] or CHEM 121 [Min Grade: C-]

CHEM 123 Majors Chemistry III 5.5 Credits

Part III in an introductory sequence for chemistry majors. Course covers physical and chemical properties of substances used in consumer products through an introduction to fundamental structures, nomenclature and properties of hydrocarbons, organize functional groups, polymers and biomolecules. Course includes weekly lab experiments.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHEM.

Prerequisites: CHEM 102 [Min Grade: C-] or CHEM 122 [Min Grade: C-]

CHEM 151 Applied Chemistry 3.0 Credits

For business majors. Covers physical and chemical properties of substances used in consumer products. Provides qualitative introduction to required principles, including atomic structure and the elements, bonding and compounds, and the chemistry of carbon compounds and polymers. Uses examples from the areas of food and nutrition, pharmacology, and the petrochemical industry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

CHEM 161 General Chemistry I 3.0 Credits

Covers atomic structure, stoichiometry, gases, valence theory, and thermochemistry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 003 [Min Grade: D] or (MATH 001 [Min Grade: D] and MATH 002 [Min Grade: D])

CHEM 162 General Chemistry II 3.0 Credits

Covers solutions, colligative properties, chemical equilibrium, and electrochemistry. Introduces organic chemistry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 161 [Min Grade: D] or CHEM 101 [Min Grade: D]

CHEM 163 General Chemistry III 3.0 Credits

Continues organic chemistry. Introduces thermodynamics, molecular biology, inorganic chemistry, chemical kinetics, and nuclear chemistry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 164 [Min Grade: D] and CHEM 162 [Min Grade: D]

CHEM 164 General Chemistry Laboratory I 2.0 Credits

Involves experiments demonstrating the principles of gas behavior, thermochemistry, colligative properties, chemical equilibrium, and electrochemistry. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 162 [Min Grade: D] (Can be taken Concurrently)

CHEM 165 General Chemistry Laboratory II 2.5 Credits

Involves experiments illustrating the principles of organic separations, transition metal chemistry, complex ions, chemical kinetics, and qualitative analysis. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 163 [Min Grade: D] (Can be taken Concurrently)

CHEM 201 Why Things Work: Everyday Chemistry 3.0 Credits

Course will cover chemical explanations of everyday materials and phenomena. The focus will be conceptual understanding, as opposed to a detailed quantitative treatment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 230 Quantitative Analysis 4.0 Credits

Covers chemical analysis and data treatment, including chemical equilibrium, acid-base and redox reactions, and applications to gravimetric and titrimetric methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D] or CHEM 122 [Min Grade: D] or (CHEM 162 [Min Grade: D] and CHEM 164 [Min Grade: D])

CHEM 231 [WI] Quantitative Analysis Laboratory 2.0 Credits

Provides laboratory studies in quantitative analysis. This is a writing intensive course. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 230 [Min Grade: D] (Can be taken Concurrently)

CHEM 241 Organic Chemistry I 4.0 Credits

Covers structure, reactions, and stereochemistry of organic compounds, especially alkanes, cycloalkanes, haloalkanes, and alkenes. Also covers SN1, SN2, E1, and E2 compound.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D] or CHEM 122 [Min Grade: D] or (CHEM 162 [Min Grade: D] and CHEM 164 [Min Grade: D])

CHEM 242 Organic Chemistry II 4.0 Credits

Covers structure, reactivity, and stereochemistry of organic compounds, especially alkanes, alkynes, alcohols, ethers, dienes, and aromatic compounds. IR, MS, and NMR spectral techniques are introduced and applied to the identification of organic compounds.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 241 [Min Grade: D]

CHEM 243 Organic Chemistry III 3.0 Credits

Covers structure, preparation, reactivity, and stereochemistry of organic compounds, especially substituted aromatics, aldehydes, ketones, carboxylic acids, carboxylic acid halides, anhydrides, amides, polypeptides, esters, amines, phenols, and carbohydrates.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 242 [Min Grade: D]

CHEM 244 Organic Chemistry Laboratory I 3.0 Credits

Introduces simple recrystallization, distillation, extraction, and chromatography techniques and applies them to several organic reactions illustrative of topics covered in CHEM 241. Provides opportunity to take and interpret IR and GC spectra.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 241 [Min Grade: D]

CHEM 245 Organic Chemistry Laboratory II 3.0 Credits

Provides experiments illustrating a number of organic reactions covered in CHEM 242 as well as more advanced organic techniques. Provides opportunity to take and interpret IR and GC scans. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 242 [Min Grade: D] (Can be taken Concurrently)CHEM 244 [Min Grade: D]

CHEM 246 Organic Chemistry for Majors I 6.5 Credits

This course offers a basic foundation for modern organic chemistry. Lecture topics include: the chemistry of alkanes, cycloalkanes, alkyl halides, alkenes, cycloalkenes, and alkynes, free radical substitution, nucleophilic substitution, elimination, ionic addition, and free radical addition reactions. Lab topics include recrystallization, distillation, chromatography, liquid-liquid extraction, and simple chemical reactions, including an elimination reaction to prepare an alkene and several substitution reactions to prepare alkyl halides. Introduction to the use of IR and ¹H NMR as structure identification tools.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHEM.

Prerequisites: CHEM 103 [Min Grade: D] or CHEM 123 [Min Grade: D]

CHEM 248 Organic Chemistry for Majors II 6.5 Credits

This course continues developing the basic foundation of modern organic chemistry started in CHEM 246. Lecture topics include the chemistry of alcohols, ethers, conjugated systems, aromatic compounds and thiols. The principles of IR, MS, ¹H and ¹³C NMR will be taught in lecture and put to use in identifying products in the lab. Other lab topics include the preparation of alcohols, a Grignard synthesis, an alkene addition reaction, an aromatic nitration, a Friedel-Crafts reaction, the preparation of ferrocene, and how to safely handle water-sensitive chemicals.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHEM.

Prerequisites: CHEM 246 [Min Grade: D] or (CHEM 241 [Min Grade: D] and CHEM 244 [Min Grade: D])

CHEM 249 Organic Chemistry for Majors III 7.0 Credits

This course completes development of the basic foundation of modern organic chemistry started in CHEM 246. Lecture topics include the chemistry of aldehydes, ketones, amines, carboxylic acids & their derivatives, carbohydrates, organometallic compounds, and multi-step organic synthesis. Asymmetric synthesis and C-C bond forming reactions will also be covered. Lab topics include the multi-step syntheses of benzocaine and DEET, stereochemical inversion, diazonium coupling, Aldol condensation, sequential Diels-Alder and lactonization reactions, and the principles of functional group protection.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHEM.

Prerequisites: CHEM 248 [Min Grade: D] or (CHEM 242 [Min Grade: D] and CHEM 245 [Min Grade: D])

CHEM 251 Physical Chemistry I 3.0 Credits

Introduces physical chemistry. Topics include quantum chemistry, operators, the uncertainty principle, deBroglie wavelength, particle in a box, hydrogen-like atoms, aufbau principle, commutators, normalization, LCAO-MO, variation principle, diatomic molecules, Hecke approximation, harmonic oscillator, conjugated systems, electronic and vibrational spectroscopy, and selection rules.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (CHEM 102 [Min Grade: D] and MATH 200 [Min Grade: D]) or TDEC 121 [Min Grade: D] or (CHEM 162 [Min Grade: D] and CHEM 164 [Min Grade: D])

CHEM 253 Thermodynamics and Kinetics 4.0 Credits

Covers gas properties, gas laws, state functions, first, second, and third laws of thermodynamics, phase transformations, phase diagrams, chemical equilibrium, spontaneous reactions, Gibbs free energy, molecular motion, diffusion, rates of chemical reactions, rate laws, molecular reaction dynamics, transition states, electron transfer.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D] or CHEM 122 [Min Grade: D] or (CHEM 162 [Min Grade: D] and CHEM 164 [Min Grade: D]) and MATH 200 [Min Grade: D]

CHEM 256 Physical Chemistry for Biological Sciences 4.5 Credits

Covers elementary chemical thermodynamics and homogeneous reaction kinetics as bases for experiment and phenomenology in biology and biochemistry, including properties of molecules in solution.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D] or CHEM 122 [Min Grade: D] or (CHEM 162 [Min Grade: D] and CHEM 164 [Min Grade: D])

CHEM 270 Software Skills for Chemists 3.0 Credits

Course covers mathematical, computational, and professional skills useful to chemists. Representation of chemical problems in mathematical language; use of software to: solve mathematical problems that arise in chemistry; process, analyze and present data; visualize and analyze molecular structures. Also covers the American Chemical Society guidelines for professionalism in chemistry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D] or CHEM 122 [Min Grade: D] and (PHYS 201 [Min Grade: D] or PHYS 211 [Min Grade: D])

CHEM 346 Qualitative Organic Chemistry 5.5 Credits

Covers identification of pure organic compounds, physical constants, solubilities by semi-micro techniques, infrared and nuclear magnetic resonance spectroscopy, and separation and identification of mixtures.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 243 [Min Grade: D] and CHEM 245 [Min Grade: D]

CHEM 355 Physical Chemistry IV 3.0 Credits

Computational methods of modeling molecules; Covers potential energy functions and surfaces, molecular conformations, failures of classical physics, the quantum hypothesis, the classical wave equation and the origins of the Schrodinger equation, particle-in-a-box, linear variation functions, molecular orbitals from linear combinations of atomic orbitals, Pauli principle, molecular calculations and their interpretation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (CHEM 252 [Min Grade: D] or CHEM 253 [Min Grade: D]) and (CHEM 270 [Min Grade: D] or PHYS 160 [Min Grade: D]) and (MATH 201 [Min Grade: D] or MATH 210 [Min Grade: D]) and CHEM 352 [Min Grade: D]

CHEM 356 Physical Chemistry Laboratory 2.0 Credits

Provides experiments in physical chemistry for engineering students. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 241 [Min Grade: D] (Can be taken Concurrently)

CHEM 357 [WI] Physical Chemistry Laboratory I 2.5 Credits

Provides experiments illustrative of topics included in CHEM 251 and CHEC 352. This is a writing intensive course. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (CHEM 252 [Min Grade: D] or CHEM 253 [Min Grade: D]) and (PHYS 211 [Min Grade: D] or PHYS 201 [Min Grade: D]) or CHEC 352 [Min Grade: D]

CHEM 358 Physical Chemistry Laboratory II 2.5 Credits

Continues CHEM 357.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 357 [Min Grade: D] and (CHEM 252 [Min Grade: D] or CHEM 253 [Min Grade: D] or CHEC 352 [Min Grade: D])

CHEM 359 Atomic and Molecular Spectroscopy 3.0 Credits

Emission and absorption of light, laser principles, optical spectrometers, atomic spectroscopy. LS-coupling, Zeeman effect, magnetic resonance spectroscopy, EPR, NMR, ENDOR, molecular spectroscopy of diatomic and polyatomic molecules, rotational, vibrational and electronic, fluorescence spectroscopy, two-photon spectroscopy, time resolved spectroscopy, photo-electron spectroscopy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 355 [Min Grade: D]

CHEM 361 Advanced Organic Chemistry Laboratory 2.5 Credits

Emphasizes experimental design, data collection, and interpretation in such areas as reaction mechanism and molecular structure determination. Not offered every year.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 243 [Min Grade: D] and CHEM 245 [Min Grade: D]

CHEM 364 Spectroscopic Analysis 3.0 Credits

Covers interpretation of spectra for the determination of structure of organic molecules. Stresses use of infrared, nuclear magnetic resonance, and mass spectrometry. Fall. Not offered every year.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 243 [Min Grade: D]

CHEM 367 Chemical Information Retrieval 3.0 Credits

This course examines methods for retrieving literature information, via standard tabulations, journals, and abstracts, using both hard-copy and electronic sources. Includes techniques for online searching of databases such as Chemical Abstracts, Beilstein, and crystallographic depositories.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 371 Chemistry of Biomolecules 3.0 Credits

This course is a chemistry-based approach to understanding the basic structure, chemical reactivity, and biological function of biomolecules – including amino acids, peptides, proteins, carbohydrates, nucleic acids, and lipids. A special emphasis will be given to topics in the frontiers of biomolecular research at the interface between chemistry and biology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 243 [Min Grade: D]

CHEM 420 Molecular Symmetry and Group Theory Applied Chemistry 3.0 Credits

Applies the principles of simple group theory to molecular structure and to electronic and motional properties of molecules, including crystal field and molecular orbital methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 421 [Min Grade: D]

CHEM 421 Inorganic Chemistry I 3.0 Credits

Covers crystal, atomic, and molecular structure; modern chemical bonding; and magnetic properties of inorganic systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 253 [Min Grade: D] (Can be taken Concurrently) CHEM 252 [Min Grade: D] or ENGR 210 [Min Grade: D]

CHEM 422 Inorganic Chemistry II 3.0 Credits

Covers organometallic and coordination compounds, substitution mechanisms, and bio-inorganic chemistry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 420 [Min Grade: D]

CHEM 424 Special Chemistry Problems 0.5-12.0 Credits

Allows theoretical and laboratory investigations of a particular problem of interest to the individual student. A written report may be required.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

CHEM 425 Inorganic Chemistry Laboratory 4.0 Credits

Covers synthesis of properties of inorganic compounds, magnetic measurements, spectroscopic properties, and interpretations of complex ion structure. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 422 [Min Grade: D] (Can be taken Concurrently)

CHEM 430 Analytical Chemistry I 3.0 Credits

Provides an introduction to statistics (particularly the development and use of analytic calibration curves), basic electronics, and the principles of spectroscopic methods of analysis, including the interaction of light with matter and basic instrument design.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 253 [Min Grade: D] (Can be taken Concurrently) (CHEM 230 [Min Grade: D] and CHEM 242 [Min Grade: D]) or CHEC 352 [Min Grade: D])

CHEM 431 [WI] Analytical Chemistry II 4.0 Credits

Continues CHEM 430. Covers principles of chromatographic methods of analysis. Lab includes experiments on atomic absorption, fluorescence, infrared absorption, UV/visible absorption, gas chromatography, high performance liquid chromatography, basic electronics, and potentiometry/coulometry. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 430 [Min Grade: D] or ENGR 210 [Min Grade: D]

CHEM 465 Synthetic Polymer Chemistry 3.0 Credits

Explores scope of polymer science; structure-property relations; step, free radical, cationic, group-transfer, metathesis, coordination, and ring-opening polymerizations; and stereochemistry of polymerizations and reactions of polymers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 242 [Min Grade: D]

CHEM 466 Physical Chemistry of Polymers 3.0 Credits

Covers kinetics and thermodynamics of polymerizations; control of polymerization processes; gelation theory; copolymerization; and determination of polymer molecular weight and distribution by membrane osmometry, light-scattering, solution viscosity, and other techniques.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 242 [Min Grade: D] and (CHEM 252 [Min Grade: D] or CHEM 253 [Min Grade: D])

CHEM 467 Polymer Chemistry III 3.0 Credits

Covers spectroscopy of polymers; rubber elasticity; morphology; viscoelasticity; thermal analysis; computational methods; testing, fabrication, and processing; and magnetic and mechanical properties of polymers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 252 [Min Grade: D] or CHEM 253 [Min Grade: D] or CHEC 352 [Min Grade: D] or ENGR 210 [Min Grade: D]

CHEM 493 Senior Research Project 0.5-12.0 Credits

Provides individualized research with a faculty member in any number of chemical disciplines. Requires written report. May be repeated three times for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 12 credits

Restrictions: Can enroll if major is CHEM and classification is Junior or Senior.

CHEM 497 Research 0.5-12.0 Credits

Covers research problems in several areas of chemistry. Requires written report.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CHEM.

CHEM I199 Independent Study in CHEM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM I299 Independent Study in CHEM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM I399 Independent Study in CHEM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM I499 Independent Study in CHEM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM T180 Special Topics in Chemistry 5.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 15 credits

CHEM T280 Special Topics in Chemistry 5.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 15 credits

CHEM T380 Special Topics in Chemistry 5.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 15 credits

CHEM T480 Special Topics in Chemistry 5.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 15 credits

Chinese

Courses

CHIN 101 Chinese I 4.0 Credits

Introductory Mandarin Chinese. Includes listening, speaking, and reading, with individual audiolingual practice. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHIN 102 Chinese II 4.0 Credits

Continues CHIN 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 101 [Min Grade: C]

CHIN 103 Chinese III 4.0 Credits

Continues CHIN 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 102 [Min Grade: C]

CHIN 104 Chinese Speaking, Level II (Pinyin Only Track Option) 4.0 Credits

Chinese Speaking, Level II (Pinyin Only Track Option) includes listening, speaking, reading, and some writing solely using the Chinese phonetic system: pinyin. This course will continue to introduce standard (Mandarin) Chinese to students who have had little or no previous knowledge of the language. The course is designed to help students to continue acquiring the rudimentary knowledge of Chinese and develop basic skills in listening and speaking in the language. In this class, more emphasis will be given to the training of standard pronunciation and listening comprehension as well as some basic grammar and vocabulary usage. Students will be expected to work solely in recognizing and writing pinyin, placing a much heavier emphasis on learning Chinese as a spoken language.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 101 [Min Grade: C]

CHIN 105 Chinese Speaking, Level III (Pinyin Only Track Option) 4.0 Credits

Chinese Speaking, Level III (Pinyin Only Track Option) includes listening, speaking, reading, and some writing solely using the Chinese phonetic system: pinyin. This course will continue to introduce standard (Mandarin) Chinese to students who have had little or no previous knowledge of the language. The course is designed to help students to continue acquiring the rudimentary knowledge of Chinese and develop basic skills in listening and speaking in the language. Students will be expected to work solely in recognizing and writing pinyin, placing a much heavier emphasis on learning Chinese as a spoken language. This course is specifically designed for spoken language acquisition. Students who take Chinese Speaking, Level III will not be able to continue on to Chinese 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 104 [Min Grade: C]

CHIN 201 Chinese IV 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on CHIN 103.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 103 [Min Grade: C]

CHIN 202 Chinese V 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on CHIN 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 201 [Min Grade: C]

CHIN 203 Chinese VI 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on CHIN 202.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 202 [Min Grade: C]

CHIN 301 Chinese VII 3.0 Credits

Advanced Chinese. Includes reading, writing, and extensive conversational practice. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 203 [Min Grade: C]

CHIN 302 Chinese VIII 3.0 Credits

Continues CHIN 301. Covers techniques of translation and communication. Provides advanced practice in translation, comprehension, and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 301 [Min Grade: C]

CHIN 303 Chinese IX 3.0 Credits

Continues CHIN 302. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHIN 302 [Min Grade: C]

CHIN 411 Introduction to Chinese Stylistics 3.0 Credits

Fourth year of Chinese. Provides advanced practice in translation, comprehension, and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: CHIN 303 [Min Grade: C]

CHIN 431 Introduction to Chinese Literature 3.0 Credits

Provides intensive reading, writing, and conversational practice in Chinese, based on selected texts in Chinese literature. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: CHIN 303 [Min Grade: C]

CHIN 451 Introduction to Business and Professional Chinese 3.0 Credits

Fourth year of Chinese. Provides intensive oral practice and written work in business, professional, and commercial Chinese. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: CHIN 303 [Min Grade: C]

CHIN 480 Chinese Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHIN I199 Independent Study in CHIN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN I299 Independent Study in CHIN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN I399 Independent Study in CHIN 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN I499 Independent Study in CHIN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN T180 Special Topics in Chinese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN T280 Special Topics in Chinese 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN T380 Special Topics in Chinese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHIN T480 Special Topics in Chinese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Civic Engagement

Courses

CIVC 100 Foundations of Civic Engagement 3.0 Credits

This course is designed to help students develop skills as active participants in a pluralistic democratic society through direct service, education, and reflection opportunities. It will cover key concepts and frameworks for understanding civic engagement, including: models of civic life through American history; critiques of philanthropy, volunteerism, community service, public service, and political activism; and university-community relations.

College/Department: Center for Civic Engagement

Repeat Status: Not repeatable for credit

CIVC 101 Introduction to Civic Engagement 1.0 Credit

This course is designed to help students develop skills as active participants in a pluralistic, democratic society through direct service, education and reflection opportunities.

College/Department: Center for Civic Engagement

Repeat Status: Not repeatable for credit

CIVC 200 Active Citizenship and Community-Based Learning 3.0 Credits

By exploring the conceptions of active citizenship and taking part in civic engagement activities, this course will examine issues regarding community-based learning experiences for today's university students.

College/Department: Center for Civic Engagement

Repeat Status: Not repeatable for credit

Prerequisites: CIVC 100 [Min Grade: D]

CIVC 201 Civic Engagement Leadership 3.0 Credits

This course provides experiential learning in community settings as students observe, define, analyze, and practice leadership skills.

College/Department: Center for Civic Engagement

Repeat Status: Not repeatable for credit

Prerequisites: CIVC 100 [Min Grade: D]

CIVC 202 University-Community Partnerships 3.0 Credits

This course will examine the university as a social institution and community actor.

College/Department: Center for Civic Engagement

Repeat Status: Not repeatable for credit

Prerequisites: CIVC 100 [Min Grade: D]

CIVC 490 Capstone Project in Civic Engagement 3.0 Credits

Under faculty supervision, students plan and execute a term project that integrates the academic and community-based knowledge acquired in their curriculum. Students define an issue and set learning objectives relevant to the project, develop a plan for implementation, and complete the term project.

College/Department: Center for Civic Engagement

Repeat Status: Not repeatable for credit

CIVC I199 Independent Study in CIVC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Civic Engagement

Repeat Status: Can be repeated multiple times for credit

CIVC I299 Independent Study in CIVC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Civic Engagement

Repeat Status: Can be repeated multiple times for credit

CIVC I399 Independent Study in CIVC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Civic Engagement

Repeat Status: Can be repeated multiple times for credit

CIVC I499 Independent Study in CIVC 1.0-3.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Civic Engagement

Repeat Status: Not repeatable for credit

CIVC T180 Special Topics in CIVC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Civic Engagement

Repeat Status: Can be repeated multiple times for credit

CIVC T280 Special Topics in CIVC 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Civic Engagement

Repeat Status: Can be repeated 2 times for 6 credits

CIVC T380 Special Topics in CIVC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Civic Engagement

Repeat Status: Can be repeated multiple times for credit

CIVC T480 Special Topics in CIVC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Civic Engagement

Repeat Status: Can be repeated multiple times for credit

Civil & Arch Engineering

Courses

CAE 491 [WI] Senior Design Project I 3.0 Credits

Introduces the design process, including information retrieval, problem definition, proposal writing, patents, and design notebooks. Includes presentations on problem areas by experts from industry, government, and education. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CIVE 330 [Min Grade: D] and (CIVE 301 [Min Grade: D] or CIVE 371 [Min Grade: D]) and (AE 391 [Min Grade: D] or CIVE 310 [Min Grade: D])

CAE 492 [WI] Senior Design Project II 3.0 Credits

Continues CAE 491. Requires written and oral progress reports. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CAE 491 [Min Grade: D]

CAE 493 [WI] Senior Design Project III 3.0 Credits

Continues CAE 492. Requires written and oral final reports, including oral presentations by each design team at a formal Design Conference open to the public and conducted in the style of a professional conference. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CAE 492 [Min Grade: D]

Civil Engineering

Courses

CIVE 240 [WI] Engineering Economic Analysis 3.0 Credits

Techniques for project decisions: benefit cost and present worth analysis, rate of return, capital budgeting, risk analysis, environmental impact, and depreciation. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CIVE 250 Construction Materials 4.0 Credits

Construction Materials.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 202 [Min Grade: D]

CIVE 251 Engineering Surveying 3.0 Credits

Covers the theory and use of surveying instruments and principles of plane and topographic surveying. Introduces computer programs for surveying computations and plotting.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CIVE 261 Materials and Structural Behavior I 3.0 Credits

Introduces the basic materials of construction (timber, masonry, steel, and concrete). Covers their behavior as ingredients of the structural system. Required for architecture and construction management students. Fall.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is AE or major is CIVE or classification is Freshman

Prerequisites: PHYS 182 [Min Grade: D]

CIVE 262 Materials and Structural Behavior II 3.0 Credits

Continues CIVE 261. Required for architecture and construction management students. Winter.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is AE or major is CIVE or classification is Freshman

Prerequisites: CIVE 261 [Min Grade: D]

CIVE 263 Materials and Structural Behavior III 3.0 Credits

Continues CIVE 262. Required for architecture and construction management students. Spring.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is AE or major is CIVE or classification is Freshman

Prerequisites: CIVE 262 [Min Grade: D]

CIVE 300 Structural Analysis I 4.0 Credits

Covers analysis of statically determinate structures: equilibrium, compatibility, boundary conditions, complimentary and virtual work, energy theorems, reactions, member forces and deflection of trusses, beams and frames, and influence lines. The laboratory portion will make use of structural analysis computer programs to construct analytical models of various structural systems. Calculate reactions and deflections of statically determinate and indeterminate structures and check reliability of results.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 250 [Min Grade: D] and MEM 230 [Min Grade: D]

CIVE 301 Structural Design I 3.0 Credits

This course will provide a general overview of engineering design (20%) and then a specific treatment of the structural design process (80%).

The key topics to be covered include the determination of system-level loads/demands, the estimation of element-level demands and demand envelopes, and the sizing of beams and columns constructed of both reinforced concrete and structural steel.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 300 [Min Grade: D]

CIVE 302 Structural Analysis I 4.0 Credits

Covers analysis of statically determinate structures: equilibrium, compatibility, boundary conditions, complimentary and virtual work, energy theorems, reactions, member forces and deflection of trusses, beams and frames, and influence lines. The laboratory portion will make use of structural analysis computer programs to construct analytical models of various structural systems. Calculate reactions and deflections of statically determinate and indeterminate structures and check reliability of results.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 250 [Min Grade: D] and MEM 230 [Min Grade: D]

CIVE 303 Structural Design I 3.0 Credits

This course will provide a general overview of engineering design (20%) and then a specific treatment of the structural design process (80%).

The key topics to be covered include the determination of system-level loads/demands, the estimation of element-level demands and demand envelopes, and the sizing of beams and columns constructed of both reinforced concrete and structural steel.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 302 [Min Grade: D]

CIVE 310 Soil Mechanics I 4.0 Credits

Gives an overview of types of problems encountered in geotechnical engineering: index, mechanical, hydraulic and environmental properties of soils; earth mass stability, deformation, and groundwater seepage; laboratory measurements.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (EGEO 220 [Min Grade: D] or CAEE 211 [Min Grade: D]) and CIVE 250 [Min Grade: D]

CIVE 320 Introduction to Fluid Flow 3.0 Credits

Covers fundamentals of fluid flow, fluid properties, hydrostatic forces, kinematics of flow, the Bernoulli equation, linear momentum, dimensional analysis, Froude and Reynolds similarity and hydraulic models and an introduction to pipe flows and friction.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: TDEC 202 [Min Grade: D] or ENGR 210 [Min Grade: D]

CIVE 330 Hydraulics 4.0 Credits

Covers pipe flow, friction losses, multiple pipe systems, water demand and distribution network design, pumps and pumping systems, air flow in ducts and fans, open channel flows, hydraulic jumps and energy dissipation, gravity pipe networks and the design of storm and sanitary sewer systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 320 [Min Grade: D]

CIVE 370 Introduction to Structural Analysis 3.0 Credits

Covers equilibrium, virtual work, reactions, and member forces in trusses, beams, and frames. Introduces analysis of statically indeterminate structures and the stiffness matrix method of analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 230 [Min Grade: D] and CIVE 250 [Min Grade: D]

CIVE 371 Introduction to Structural Design 3.0 Credits

Covers the design process, with topics including structural systems, loads and load path, structural safety, and design methods. Offers introduction to steel, reinforced concrete, wood, and masonry design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 370 [Min Grade: D]

CIVE 372 Structural Laboratory 1.0 Credit

Course use of structural analysis computer programs to construct analytical models of various structural systems. Calculate reactions and deflections of statically determinate and indeterminate structures and check reliability of results.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Corequisite: CIVE 371

CIVE 375 Structural Material Behavior 3.0 Credits

Study of deformation, fracture and fatigue of structural materials used in infrastructure. Includes basic failure modes, yielding and plasticity, and fracture mechanics. Emphasis on analytical and predictive methods that designers use to avoid failure. Metals, ceramic and composites are considered, as is time-dependent behavior.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 230 [Min Grade: D] and CIVE 250 [Min Grade: D] and (MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D])

CIVE 400 First Principles of Structural Design 3.0 Credits

Covers analysis of statically indeterminate structures: force methods for trusses, beams and frames, slope-deflection and equilibrium methods, moment distribution, stiffness matrices of truss and beam elements, and stiffness matrix method of analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CIVE 303 [Min Grade: C]

CIVE 401 Structural Design II 3.0 Credits

Covers principles of design of reinforced concrete structural systems, including beams, slabs, columns, and footings.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 400 [Min Grade: D]

CIVE 402 Structural Design III 3.0 Credits

Covers elastic and plastic design of structural steel members, including beams, columns, tension members, beam columns, and plate girders; design of welded and high-strength bolted connections; and design of steel trusses, bridges, and buildings.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 401 [Min Grade: D]

CIVE 410 Foundation Engineering 3.0 Credits

Covers shear strength, bearing capacity, and lateral earth pressure; design of shallow foundations (footings, mats) and deep foundations (piles, drilled shafts); and excavation and slope stability.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 310 [Min Grade: D]

CIVE 420 Water and Waste Treatment I 3.0 Credits

Covers water supply chemistry, including corrosion in water distribution systems, microbiology of water and wastes, biodegradation of toxic materials, and growth and metabolism in wastewater treatment processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CIVE 330 [Min Grade: D] and CIVE 340 [Min Grade: D]

CIVE 430 Hydrology 3.0 Credits

Covers the relationship between precipitation and runoff, unit hydrographs, flood routing, and water supply principles and applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CAEE 211 [Min Grade: D]

CIVE 431 Hydrology-Ground Water 3.0 Credits

Covers geologic and hydrologic occurrence of groundwater, underground flow, and groundwater supply. Winter.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 330 [Min Grade: D]

CIVE 432 Water Resources Design 3.0 Credits

Covers planning and design of basin and developments for requirements of various water use purposes. Spring.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 430 [Min Grade: D]

CIVE 477 [WI] Seminar 2.0 Credits

Covers professional development and ethics. Requires preparation of a technical paper. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

CIVE 478 [WI] Seminar 1.0 Credit

Requires preparation and presentation of a technical paper. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

CIVE I199 Independent Study in CIVE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CIVE I299 Independent Study in CIVE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CIVE I399 Independent Study in CIVE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CIVE I499 Independent Study in CIVE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CIVE T180 Special Topics in CIVE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CIVE T280 Special Topics in CIVE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CIVE T380 Special Topics in CIVE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

CIVE T480 Special Topics in CIVE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Civil, Arch & Envr Engr

Courses

CAEE 202 Introduction to Civil, Architectural & Environmental Engineering 3.0 Credits

This course introduces the planning, design, construction, operation, maintenance and documentation of engineering projects that are in unique social, topographic, environmental and geologic settings. The scope and principles of Civil, Architectural and Environmental engineering practice are each presented as well as the relationships between the three disciplines. The concepts are illustrated through laboratory projects, case studies, field trips and field measurement exercises. The course also addresses professional ethics, practice and licensure.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CAEE 203 System Balances and Design in CAEE 3.0 Credits

Based on fundamental science and mathematics preparation, this course for students in Civil, Architectural and Environmental Engineering covers delineation of system boundaries, analysis of mass, energy and force balances that support system integration; life cycle and uncertainty analysis; and formulation of problem solutions using these balances.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CAEE 202 [Min Grade: D] and ENGR 220 [Min Grade: D] and (ENGR 231 [Min Grade: D] or MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D])

CAEE 212 Geologic Principles for Infrastructure & Environmental Engineering 4.0 Credits

This course focuses on geological principles and their relationships to engineering properties and behavior of soil and rock materials. Topics include formation of minerals, igneous, sedimentary, and metamorphic rocks, plate tectonics, structural geology, rock mechanics, landforms and geological hazards. Labs focus on mineral and rock identification, map skills, and rock mechanics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 220 [Min Grade: D] and CAEE 202 [Min Grade: D]

CAEE 361 Statistical Analysis of Engineering Systems 3.0 Credits

This class covers probability and statistics with applications to civil, architectural, and environmental engineering. Students will learn probability theory, distributions of random variables, and statistical hypothesis testing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CAEE I199 Independent Study in CAEE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CAEE I299 Independent Study in CAEE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CAEE I399 Independent Study in CAEE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CAEE I499 Independent Study in CAEE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CAEE T180 Special Topics in CAEE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CAEE T280 Special Topics in CAEE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CAEE T380 Special Topics in CAEE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CAEE T480 Special Topics in CAEE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Common Exams

Courses

EXAM 080 Common Exam Period - I 0.0 Credits

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

EXAM 081 Common Exam Period - II 0.0 Credits

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

EXAM 082 Common Exam Period - III 0.0 Credits

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

Communication

Courses

COM 101 Human Communication 3.0 Credits

This course explores the elements of basic human communication - what does it mean to communicate? What makes communication good or bad? What is the nature of verbal and non-verbal messages? What does it mean to communicate in a group? How does culture affect communication?.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 111 Principles of Communication 3.0 Credits

Explores the importance of communication in organizational settings. Includes assessment of appropriate modes of communication, including written, spoken, and electronic.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 150 Mass Media and Society 3.0 Credits

Provides an overview of the history, economic structure, regulation, and impact of the mass media in the United States.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 160 Introduction to Journalism 3.0 Credits

This course is designed to acquaint students with various forms of basic newswriting and interview techniques. Students will learn how to write leads and short articles under deadline pressure. This is a writing-intensive course. Although writing is the main emphasis of this class, students also will learn newsroom organization, ethics and press law.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 181 Public Relations Principles and Theory 3.0 Credits

This course focuses on the principles of public relations. It introduces students to the theory and practice of PR taught in the context of real life material and situations. The course also covers main public relations techniques, tools, and types of publics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 102 [Min Grade: D] or ENGL 105 [Min Grade: D]

COM 200 Current Events in Media and Communication 3.0 Credits

Media are not only the channels through which we learn about current events—they are also, often, event makers themselves. This course will explore the collaborative relationships between media and current events, while exploring the topics of contemporary interest from the last 2-3 months.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 210 Theory and Models of Communication 3.0 Credits

Surveys historical and contemporary attempts to understand the process of human communication, using examples from the literature of interpersonal, group, organizational, and mass communication.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 211 Children and Media 3.0 Credits

This course examines the effects of media on the well-being and development of children and adolescents from a number of perspectives, including: emotional, intellectual, and physical. Through research, discussion and writing, students consider the effects of not only the "legacy" media (television, radio, music and print), but also those of "new" media, including social media.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 220 Qualitative Research Methods 3.0 Credits

This course provides a detailed investigation of the nature, application, analysis and write up of qualitative research in communication and the social sciences, including such topics as ethnography, in-depth interviews, focus groups, participant observation, and narrative analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 221 Quantitative Research Methods in Communication 3.0 Credits

This course introduces students to quantitative methods used in the study of communication. The course will help student develop techniques to understand research problems in communication settings. Students will consider applications, including survey research, content analysis, usability testing, and experimental design, and will discuss procedures for developing, operationalizing, and testing questions within communication environments.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 230 Techniques of Speaking 3.0 Credits

A workshop course in improving public speaking skills. Provides experience in speeches of explanation, persuasion, and argument.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: HUM 102 [Min Grade: D] or HUM 105 [Min Grade: D] or HUM 107 [Min Grade: D] or ENGL 102 [Min Grade: D] or ENGL 105 [Min Grade: D]

COM 240 New Technologies In Communication 3.0 Credits

Provides an overview and survey of the changes taking place in the technologies of information production, distribution, storage, and display, including the interaction of these changes with legal, social, cultural, and communications systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 246 Media and Identity 3.0 Credits

This course focuses on the central role that identity plays in popular culture, exploring how media reflect diverse identities and how, in turn, we use media to construct our own identities.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 261 Advanced Journalism 3.0 Credits

This course is designed for students interested in advancing their knowledge of news reporting and writing. Students will learn how to cover meetings, speeches, public affairs, such as courts, and to write for digital media. In addition, students will learn how to write human-interest stories, called features.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 160 [Min Grade: D]

COM 265 Audio Journalism 3.0 Credits

This course will familiarize students with the creation of audio news and editorial content that is used not only in traditional radio broadcasting, but also in web-delivered programming such as podcasts and streamed audio. Students will learn the unique characteristics of audio journalism, practice "writing for the ear" and will record and edit digital audio.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 160 [Min Grade: D] or COM 260 [Min Grade: D]

COM 266 Copy Editing for the Media 3.0 Credits

This course is designed to acquaint students with the necessary skills to prepare written materials for the media. It will cover traditional print media, magazines and online media, such as websites and blogs. The importance of accuracy, consistency, and credibility in handling written copy will be emphasized. Skills to write captivating headlines, captions and other accompaniments to visuals will be a large focus of this class.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 160 [Min Grade: D]

COM 270 [WI] Business Communication 3.0 Credits

Covers the writing of business letters, resumes, memos, proposals, and reports. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 108 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

COM 282 [WI] Public Relations Writing 3.0 Credits

In this writing-intensive course, students will develop the professional-level writing skills expected of public relations practitioners. The objectives include building an understanding of PR writing styles and genres as a persuasive influence and learning how to use basic information in different PR media kits, memos, letter, and other external and internal communications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 181 [Min Grade: D] or COM 280 [Min Grade: D]

COM 284 Public Relations Research, Measurement and Evaluation 3.0 Credits

Public Relations research is the first essential element in the process of Public Relations. The purpose of this course is to introduce students to the methods of quantitative and qualitative research most widely used to assess an organization's public relations efforts.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 181 [Min Grade: D] or COM 280 [Min Grade: D]

COM 286 Public Relations Strategies and Tactics 3.0 Credits

This course helps students better understand the advanced concepts, strategies, and tactics practiced in public relations today. It combines real-life case studies with core theoretical ideas to help students relate theory to the actual practice of the profession. This intermediate-level course connects scholarship with time-honored real-life PR strategies and tactics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 282 [Min Grade: D]

COM 290 Sports and the Mass Media 3.0 Credits

To explore the interrelationships between professional and college sports and the mass media. Students will look at how news media coverage has changes sports, the conventions found in sports journalism, promotion and marketing of sports teams and leagues, and how sponsorship of sporting events changes the nature of these events.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 107 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

COM 305 Sports Journalism 3.0 Credits

To gain a deeper appreciation for and understanding of the meaning-making power of sports journalism. We will explore the history of sports journalism, review and critique examples of historically significant sports writing and write game stories and columns based on actual coverage of local and on-campus sporting events.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 260 [Min Grade: D] or COM 160 [Min Grade: D]

COM 310 [WI] Technical Communication 3.0 Credits

Develops skills in communicating technical information. Focuses on writing letters, resumes, proposals, reports, and instructions. Offers extensive writing practice along with exercises and presentations. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 108 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

COM 311 Dynamics of Interpersonal Communication 3.0 Credits

This course provides the student with a more thorough understanding of the communication dynamics between individuals. By reviewing scholarly writing on the subject and performing direct observations and analyses, students will acquire an appreciation of the complexities of interpersonal communication and enhanced communication skills.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 210 [Min Grade: D]

COM 315 Investigative Journalism 3.0 Credits

Mastery of investigative reporting tactics and strategies enables student to explore and write about issues of great importance to the community.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 260 [Min Grade: D] or COM 261 [Min Grade: D]

COM 316 Campaigns for Health & Environment 3.0 Credits

This seminar-style course explores theories and practical aspects of environmental and health campaigns and community-based social marketing campaigns. This course has a strong applied component.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 317 [WI] Environmental Communication 3.0 Credits

This reading and writing intensive course will explore communication about environmental issues. Topics can include advocacy campaigns, social marketing, environmental journalism, media coverage of environmental issues, green marketing, the environment in popular culture, risk communication, and public participation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

COM 318 Film, Celebrity and the Environmental Movement 3.0 Credits

Using the framework of mass media and behavioral change theories, we will look at the environmental movement through the lens of "eco celebrities" and mainstream environmental films and will discuss how Hollywood shapes our perceptions of the environment and whether this has helped or hurt the environmental movement.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 320 [WI] Science Writing 3.0 Credits

A workshop course in writing on scientific subjects. Includes analysis of the current market for science writing; examination of exemplary pieces of science writing; instruction in finding article ideas, interviewing, and working with editors; and production of feature-length articles. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 108 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

COM 325 The Cultural Significance of Fame 3.0 Credits

We will explore why fame is so important to us. Why do so many of us want it so badly? Why do we envy those who have it? What does the pursuit of fame say about us and about society? You will explore your own perception of fame, dissect your fame-related experiences, and analyze how the mass media keep us thinking and talking about fame.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 150 [Min Grade: D]

COM 330 Professional Presentations 3.0 Credits

A workshop course in the theory and practice of making effective professional presentations for the technical and business professional. Provides a systems approach to the planning, production, and presentation of visual/aural programs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: COM 230 [Min Grade: D]

COM 335 Electronic Publishing 3.0 Credits

Electronic Publishing gives students applied and theoretical knowledge of professional electronic publishing. Students will focus on issues relating to writing and integrating text and graphics to create websites and on-line publications. Students will also consider how issues in document design and usability can be used to evaluate websites.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 103 [Min Grade: D] or HUM 105 [Min Grade: D] or HUM 108 [Min Grade: D]

COM 340 Desktop Publishing 3.0 Credits

Covers production of publications using desktop publishing software, including planning, writing, designing, and budgeting of institutional magazines, newsletters, manuals, and brochures. Requires students to design several pieces (letterheads and flyers).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 108 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

COM 342 English Worldwide 3.0 Credits

This course provides an overview of the spread of English globally, by examining English as a language of trade, diplomacy, and education, as well as its status as an aesthetic and market force. For a final project, students research how English is utilized for social, economic, and political purposes in a single area of the world.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 108 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

COM 345 Intercultural Communication 3.0 Credits

This course introduces students to the theory and practice of intercultural communication. Drawing from traditions in anthropology and communication, intercultural communication is the study of the effect of differing cultural norms and beliefs upon communication between speakers. Through a wide range of readings, journal writing assignments, and participative and experiential activities, students will develop both their understanding of and skills in inter-cultural communication. A final project and presentation draws together participative experiences and the readings and class discussions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

COM 350 [WI] Document Design and Evaluation 3.0 Credits

Introduces the principles and practice of designing documents and measuring their effectiveness with audiences. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

COM 351 Computer Mediated Communication 3.0 Credits

We focus on practices and affordances of Computer Mediated Communication (CMC). We consider how computer technology is used in social interaction and its practical consequences. We focus on social practices and uses of technology. We use qualitative methods of analysis to understand the practices of CMC.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: COM 220 [Min Grade: D]

COM 352 Social Media and Communication 3.0 Credits

Social Media provide a communication system for connecting, collaborating and building community. We will examine how these functions may be applied in personal, professional and political contexts. Activities will include readings, case studies and discussions. Students will create a strategic plan for using social media for personal, organizational or political purposes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 355 Ethnography of Communication 3.0 Credits

Examines theories and methods of qualitative language and communication studies. Topics include story telling, greetings, gossip, self-presentation in talk, language of ritual and religion, men and women's roles in communication, and communicative events and competence. Case student in literature will be analyzed and will form a basis for the students' own ethnographic fieldwork.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 108 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

COM 360 International Communication 3.0 Credits

Examines the political, cultural, technological, and economic processes and effects of international communication flow.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

COM 361 International Public Relations 3.0 Credits

The course is designed give students a comprehensive overview of international issues in PR including such areas as: history and evolution of the field of international PR; image-formation and image-changes process; PR in war and conflict; as well as effect of different political and legal systems on the field of public relations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 108 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

COM 362 International Negotiations 3.0 Credits

This course is designed to give students a comprehensive overview of the field including different theoretical points of view on the process of international negotiations; the role of perceptions in this process; the role of internal politics and cultural variables in the process of international negotiations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

COM 363 Event Planning 3.0 Credits

This course will provide the student with the theoretical and practical fundamentals in understanding the complexities of producing Special Events across all major industries. Special Events addresses all elements of the communication process.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 365 Journalists, the Courts, and the Law 3.0 Credits

Students explore and apply techniques for covering the court system, and explore case law and recent key legal developments that have reshaped how journalists do their jobs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 260 [Min Grade: D] or COM 160 [Min Grade: D]

COM 375 [WI] Grant Writing 3.0 Credits

Students explore the grant writing process, from the development of an idea and researching appropriate contributors, to writing a fully realized grant proposal, complete with budget. Course topics also include surveying the political and social climate before developing an idea, assessing an organization's capabilities to handle a project, and performing through literature reviews. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: COM 270 [Min Grade: D] or COM 310 [Min Grade: D] or SOC 260 [Min Grade: D]

COM 376 Nonprofit Communication 3.0 Credits

All nonprofit organizations must develop and maintain effective communication strategies in order to survive in a competitive economy. Nonprofits have unique needs and limitations in their longterm goals and short-term operations that relate to communication. This course introduces students to the ways nonprofits communicate with both their constituents and their benefactors and the ways researchers have examined these practices. Students will explore these two perspectives on nonprofit communication through a combination of scholarly readings, dialogues with local representatives in the nonprofit sector, and direct contact and work for a local nonprofit organization (as coordinated by the Drexel Center for the Support of Nonprofit Communication).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 377 Communication for Civic Engagement 3.0 Credits

Extremist rhetoric and divisive politics seem to go hand-in-hand in today's public deliberations. The media so often pair the word rhetoric itself with the pejorative adjectives mere, empty, and deceptive, that anything rhetorical becomes vilified. This course draws from the ancient accounts of rhetoric and the contemporary studies on rhetoric to rehabilitate it as a way to inform our efforts towards a more civil public discourse. This course also will host guest speakers from local civic and political organizations who engage in rhetorical practices in the service of civic engagement, which includes the discourse both of people who exercise political power and of citizens who debate over public policies and cultural identity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 378 Public Service Campaigns 3.0 Credits

Public communication campaigns are a familiar and essential part of American civic culture. Campaign topics range from personal issues, such as health, to social issues, such as equal opportunity, energy conservation, and environmental protection. Campaigns are regarded as public service programs if their goals are widely supported by the public and policymakers. If their goals are controversial, however, then they are regarded as advocacy strategies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

COM 380 Special Topics in Communication Theory 1.0-5.0 Credit

Provides advanced communication studies covering various subjects in interpersonal, group, organizational, and mass communication. May be taken for credit twice.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

COM 384 Free Speech & Censorship 3.0 Credits

In this course, students will explore the various forms --some obvious, some not-- that censorship takes. Also explored will be what those who hold dissenting views endure as they try to contribute to the national dialogue. Historical and legal perspective on censorship will also be considered.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

COM 385 Media Effects 3.0 Credits

Some people believe that the mass media rule our lives, making us fat, violent, sexist, etc. Some think that media are irrelevant. Of course these arguments are extreme and simplifications. In this course, we ask: What are the facts regarding media effects research?.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 386 Public Relations Campaign Planning 3.0 Credits

This capstone course will focus on the advanced aspects of public relations: how to analyze, plan, conduct, and implement successful public relations campaigns systematically and scientifically. Students will create full-scale PR campaigns, including budget, media materials, and social media tools, for their real-world "clients," and implement key activities.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 284 and COM 286

COM 390 [WI] Global Journalism 3.0 Credits

Explores the issues facing journalists covering foreign affairs. Students will research and write news stories on issues of global import and will examine the work of foreign correspondents from historical and critical perspectives. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: COM 260 [Min Grade: D] or COM 261 [Min Grade: D]

COM 391 Critiques of Journalism and News Media 3.0 Credits

This course examines the role of journalism and news media in the social construction of our world. Focusing on key topics like framing and agenda setting in media research, we will critically consider how stories are routinely emphasized, excluded, organized, made sense of, and accumulate, plus more. We will discuss such topics in regard to various media (from newspapers to new media), various methods (qualitative and quantitative), and various public issues (including politics, music, sports, and representation of race/gender/sexuality/etc.).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: COM 150 [Min Grade: D]

COM 400 Seminar in Communication 3.0 Credits

This is an upper-level seminar in various topics in Communication, including but not limited to Rhetoric. Students will undertake an in-depth examination of critical texts or themes in Communication. The course is intended for upper-level majors in Communication and can be repeated for credit with a different topic.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 4 times for 12 credits

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: COM 210 [Min Grade: D]

COM 410 [WI] Advanced Technical Writing 3.0 Credits

Continues COM 310. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: COM 310 [Min Grade: D]

COM 420 Technical and Science Editing 3.0 Credits

Introduces the theory and practice of technical editing, including project and copy editing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: COM 270 [Min Grade: D] or COM 310 [Min Grade: D] or COM 375 [Min Grade: D] or COM 410 [Min Grade: D]

COM 491 Senior Project in Communication I 3.0 Credits

Covers planning and execution of a professional project that integrates the academic and practical knowledge the student has acquired in his or her major.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is COMM and classification is Senior.

Prerequisites: COM 210 [Min Grade: D] and (COM 220 [Min Grade: D] or SOC 250 [Min Grade: D])

COM 492 Senior Project in Communication II 3.0 Credits

Requires completion and evaluation of the project begun in COM 491.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is COMM and classification is Senior.

Prerequisites: COM 491 [Min Grade: D]

COM I199 Independent Study in COM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

COM I299 Independent Study in COM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

COM I399 Independent Study in COM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

COM I499 Independent Study in COM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

COM T180 Special Topics in Communication Theory 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

COM T280 Special Topics in Communication Theory 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

COM T380 Special Topics in Communication Theory 1.0-5.0 Credit

Provides advanced communication studies covering various subjects in interpersonal, group, organizational, and mass communication. May be taken for credit twice.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

COM T480 Special Topics in Communication Theory 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Communications & Applied Tech

Courses

CAT 200 Strategies for Lifelong Learning 3.0 Credits

Strategies for Lifelong Learning. This course introduces students to the skills necessary for successful lifelong learning. Theoretical and practical aspects of learning are explored. Emphasis is placed on critical thinking, study skills, analytical reading, effective writing, reasoning, problem-solving, time management and strategies for management necessary to support learning in a college environment.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

CAT 201 [WI] Interpersonal Communication 3.0 Credits

Interpersonal Communication. Interpersonal communication will be studied from the perspective of emotional intelligence. Particular emphasis will be placed on emotional intelligence in the workplace and in leadership. The main objective is to make students aware that intelligence and technological expertise are not enough to be successful in the workplace. This is a writing intensive course.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

CAT 215 Emerging Trends of Video Games 3.0 Credits

Course examines the importance of the video game industry in today's world including an overview of current video game industry, the motivation for playing video games and the associated consequences. The role of video games from an international perspective also is examined.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

CAT 302 Customer Service Theory and Practice 3.0 Credits

Customer Service Theory and Practice. This course focuses on the theory of customer service and the practices that "best in class" companies apply to differentiate themselves from the competition. The course includes practical information and activities designed to teach students how to respond to customers, resolve problems, and provide quality customer service.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CAT 303 Client Relations Management 3.0 Credits

Client Relations Management. This course introduces the skills that facilitate and enhance client relations management. Topics covered include building a trusting relationship, evaluating and managing expectations and needs, managing conflict, understanding the client's perspective, customer life cycle, consulting, serving public sector versus private sector clients, managing client relations managers, and ethical issues.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CAT 315 Expressive Power of Video Games 3.0 Credits

Course focuses on the effects of video games from a multidisciplinary perspective including how video games have transformed social interactions. Emphasis placed on the importance of video games as a persuasive communication medium.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CAT 360 Applied Organizational Research 3.0 Credits

Applied Organizational Research. This course presents a systematic approach to managerial methods of conducting organizational research and analysis. Students will undergo the managerial research process of specifying the problem; translating the problem into specific research questions; designing the data collection and methodology; collecting, analyzing, and interpreting data; and reporting research results and recommendations.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

CAT 491 Senior Project in Communications and Applied Technology I 3.0 Credits

Senior Project CAT I. Covers planning and execution of a professional project that integrates the academic and practical knowledge the student has acquired in his or her major. Requires a formal written report and a formal oral presentation. This is part one of a two-course sequence.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: (CAT 301 [Min Grade: D] or PROJ 301 [Min Grade: D]) and CAT 360 [Min Grade: D] and COM 230 [Min Grade: D] and COM 270 [Min Grade: D] and ORGB 300 [Min Grade: D]

CAT 492 Senior Project in Communications and Applied Technology 3.0 Credits

Senior Project CAT II. Covers planning and execution of a professional project that integrates the academic and practical knowledge the student has acquired in his or her major. Requires a formal written report and a formal oral presentation. This is part two of a two-course sequence.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CAT 491 [Min Grade: C]

CAT I199 Independent Study in CAT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CAT I299 Independent Study in CAT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CAT I399 Independent Study in CAT 0.5-6.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated 3 times for 18 credits

CAT I499 Independent Study in CAT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CAT T180 Special Topics in CAT 1.0-4.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CAT T280 Special Topics in CAT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CAT T380 Special Topics in CAT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CAT T480 Special Topics in CAT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

Complementary and Integrative Therapies

Courses

CIT 336 Introduction to Complementary & Integrative Therapies 3.0 Credits

This course provides the underpinning philosophy and practice of complementary and integrative therapies (CIT). It presents an overview of the major categories including herbal medicine, clinical aromatherapy, mind-body interventions and the role of spirituality in health and healing. In addition, students explore effective relaxation techniques that help to integrate the mind-body-spirit connection, which support health and well-being.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 345 Holistic Self-Care 3.0 Credits

Holistic Self-Care provides students with an A-Z approach to "living" a holistic, balanced life, complete with step-by-step guidelines necessary to incorporate dietary and lifestyle changes and effective stress reduction and stress management techniques to assist in navigating through the common challenges associated with student life and beyond. Students will be required to purchase a "Holistic Student Stress Reduction Kit", complete with specific essential oils, Meditation DVD, and guided stress reduction techniques.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 480 Special Topics in Complementary and Integrative Therapies 3.0 Credits

This course consists of content that faculty or students have requested to meet undergraduate special needs or interests. Content is variable and is offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the course director. May be repeated for credit if the topics vary.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

Computer Science

Courses

CS 140 Introduction to Multimedia Programming 3.0 Credits

Introduction to structured computer programming in a language designed for working with media (images, sound, video), e.g. Python/Jython.

Topics include: variables, input and output, expressions, assignment statements, conditionals and branching, files, repetition, functions and parameter passing, one-dimensional and two-dimensional arrays, and media manipulation. Stresses good programming style, documentation, debugging, and testing.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CS 143 Computer Programming Fundamentals 3.0 Credits

Introduction to structured computer programming in language of instruction (e.g. C++). Topics include: variables, input and output, expressions, assignment statements, conditionals and branching, files, repetition, functions and parameter passing, arrays, and string manipulation. Stresses good programming style, documentation, debugging and testing.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CS 161 Introduction to Computing 3.0 Credits

Introduction to the computer as a tool for productivity and communications. Provides fluency in the use of industry-standard software for professional communications and presentations, data analysis, and telecommunication. Introduce automation and programming to enhance the effective use of computers and computer applications.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

CS 164 Introduction to Computer Science 3.0 Credits

An introduction to the field of computer science. Exposure to core areas (selected from algorithms, artificial intelligence, computer architecture, databases, graphics, human-computer interaction, programming languages, scientific computation, software engineering) while introducing and reinforcing the importance of programming.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CS or major is MATH or major is SE.

Corequisite: EXAM 080

CS 171 Computer Programming I 3.0 Credits

Introduces fundamental concepts of computing including memory, instructions, function calls, and activation records. Covers fundamentals of structured computer programming in the language of instruction: variables, input and output, expressions, assignment statements, conditionals and branching, subprograms, parameter passing, repetition, arrays, top-down design, testing, and debugging.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

CS 172 Computer Programming II 3.0 Credits

Covers object-oriented design, inheritance hierarchies, information hiding principles, string processing, recursion, good programming style, documentation, debugging, and testing.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 171 [Min Grade: C] or CS 132 [Min Grade: C] or CS 175 [Min Grade: C]

Corequisite: EXAM 080

CS 175 Advanced Computer Programming I 3.0 Credits

Advanced programming in language of instruction at an accelerated pace: introduces fundamental concepts of computing including memory, instructions, function calls, and activation records. Covers fundamentals of structured computer programming in the language of instruction: conditionals and branching, subprograms, parameter passing, repetition, arrays, top-down design, testing, and debugging. Supplements basic topics with deeper presentation of advanced techniques for those with some incoming programming experience.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CS 176 Advanced Computer Programming II 3.0 Credits

Enhanced presentation of object-oriented design, inheritance hierarchies, information hiding principles, string processing, recursion, good programming style, documentation, debugging and testing. Includes special focus on language facilities and use of libraries.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 171 [Min Grade: C] or CS 175 [Min Grade: C]

CS 190 Selected Computer Language 3.0 Credits

Focuses on programming in a selected language of interest. Course content, language, and prerequisites may vary according to instructor, with emphasis on applications for which the language is designed. May be repeated for credit.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS 260 Data Structures 3.0 Credits

Covers stacks, queues, linked allocation, binary trees, internal searching and sorting, hashing, and applications.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 265 [Min Grade: D]

CS 265 Advanced Programming Tools and Techniques 3.0 Credits

Introduction to the basic principles of programming practice: testing, debugging, portability, performance, design alternatives, and style. Application in a variety of programming languages, programming environments, and operating systems. Introduction to tools used in the software development process for improving program functionality, performance, and robustness.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 172 [Min Grade: D] or CS 176 [Min Grade: D] or CS 133 [Min Grade: D] or SE 103 [Min Grade: D] or ECEC 301 [Min Grade: D]

CS 270 Mathematical Foundations of Computer Science 3.0 Credits

Introduces formal logic and its connections to Computer Science. Students learn to translate statements about the behavior of computer programs into logical claims and to prove such assertions using both traditional techniques and automated tools. Considers approaches to proving termination, correctness, and safety for programs. Discusses propositional and predicate logic, logical inference, recursion and recursively defined sets, mathematical induction, and structural induction.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 172 [Min Grade: D] or CS 176 [Min Grade: D] or CS 265 [Min Grade: D] or SE 103 [Min Grade: D] or ECEC 301 [Min Grade: D]

CS 275 Web and Mobile App Development 3.0 Credits

This course introduces students to web-based and mobile development technologies and practices, including tiered application development, Service-Oriented Architectures and associated exchange protocols, and web-database programming. This course explores development and integration of web services from well-known providers as well as services created by the student, using a mobile platform as a vehicle for interactions with the services.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 265 [Min Grade: D]

CS 281 Systems Architecture 4.0 Credits

Covers internal function and organization of digital computers, including instruction sets, addressing methods, input-output architectures, central processor organization, machine language, and assembly language.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: (CS 270 [Min Grade: D] or ECE 200 [Min Grade: D]) and (CS 172 [Min Grade: D] or CS 176 [Min Grade: D] or SE 103 [Min Grade: D])

CS 283 Systems Programming 3.0 Credits

This course introduces computer systems, including interaction of hardware and software through the operating system, from the programmer's perspective. Three fundamental abstractions are emphasized: processes, virtual memory, and files. These abstractions provide programmers a common interface to a wide variety of hardware devices. Topics covered include linking, system level I/O, concurrent programming, and network programming.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 265 [Min Grade: D]

CS 300 Applied Symbolic Computation 3.0 Credits

This course covers the fundamentals of symbolic mathematical methods as embodied in symbolic mathematics software systems, including: fundamental techniques, simplification of expressions, solution of applications problems, intermediate expressions swell, basic economics of symbolic manipulation, efficient solution methods for large problems, hybrid symbolic/numeric techniques.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and CS 270 [Min Grade: D] and MATH 200 [Min Grade: D] and MATH 201 [Min Grade: D]

CS 303 Algorithmic Number Theory and Cryptography 3.0 Credits

Covers fundamental algorithms for integer arithmetic, greatest common divisor calculation, modular arithmetic, and other number theoretic computations. Algorithms are derived, implemented and analyzed for primality testing and integer factorization. Applications to cryptography are explored including symmetric and public-key cryptosystems. A cryptosystem will be implemented and methods of attack investigated.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and MATH 221 [Min Grade: D] and (MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D])

CS 338 Graphical User Interfaces 3.0 Credits

This course covers the design and implementation of graphical user interfaces. Topics include: event-driven programming, application programmer interfaces, widgets, callback functions, windowing systems and desktops, rapid prototyping languages, multithreaded GUI's. A term project involving implementation of a complex application will be undertaken.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 350 [Min Grade: D] or SE 310 [Min Grade: D]

CS 345 Computer Game Design and Development 3.0 Credits

This course introduces students to the computer game design process. Students also learn how the individual skills of modeling, animation, scripting, interface design and story telling are coordinated to produce interactive media experiences for various markets, devices and purposes.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: (DIGM 260 [Min Grade: D] or GMAP 260 [Min Grade: D]) and (CS 265 [Min Grade: D] or DIGM 141 [Min Grade: D])

CS 347 Experimental Game Development 3.0 Credits

The goal of this course is to develop new ideas and innovations in games through the design, development, and implementation of games using short development cycles and creative thematic constraints.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 345 [Min Grade: D], GMAP 345 [Min Grade: D] (Can be taken Concurrently)

CS 348 Serious Game Development 3.0 Credits

The goal of this course is to learn more about serious games, that is games used in a non-entertainment context, such as games for health, education, and persuasion, through readings and through the design, development, and implementation of serious games.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 345 [Min Grade: D], GMAP 345 [Min Grade: D] (Can be taken Concurrently)

CS 350 [WI] Software Design 3.0 Credits

Covers software design methods and implementation. Good design and implementation approaches will be motivated through software examples and reinforced through programming projects. Topics include architectural styles, code reuse, modularity and information hiding principles, object-oriented design patterns, design specification and formal methods, good coding and documentation practices. This is a writing intensive course.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: CS 260 [Min Grade: D] and CS 265 [Min Grade: D]

CS 352 Processor Architecture & Analysis 3.0 Credits

This course covers performance evaluation and benchmarking, pipelining, superscalar processors, multiprocessors, and interfacing processors and peripherals. The memory hierarchy, including cache and virtual memory, are also explored from a programmer's perspective with high-performance computing techniques in mind.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 281 [Min Grade: D] or ECEC 355 [Min Grade: D]

CS 360 Programming Language Concepts 3.0 Credits

Introduces the design and implementation of modern programming languages: formal theory underlying language implementation; concerns in naming, binding, storage allocation and typing; semantics of expressions and operators, control flow, and subprograms; procedural and data abstraction; functional, logic, and object-oriented languages. Students will construct an interpreter for a nontrivial language.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and CS 265 [Min Grade: D] and CS 270 [Min Grade: D]

CS 361 Concurrent Programming 3.0 Credits

Covers programming of concurrent, cooperating sequential processes. Studies race conditions, critical sections, mutual exclusion, process synchronization, semaphores, monitors, message passing, the rendezvous, deadlock, and starvation.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 260 [Min Grade: D] and CS 281 [Min Grade: D]

CS 365 System Administration 3.0 Credits

Fundamentals of system administration featuring hands-on practice with an industry standard operating system. Focus on installation, maintenance and management of several systems for multi-user environments.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and CS 265 [Min Grade: D]

CS 370 Operating Systems 3.0 Credits

Explores the internal algorithms and structures of operating systems: CPU scheduling, memory management, file systems, and device management. Considers the operating system as a collection of cooperating sequential processes (servers) providing an extended or virtual machine that is easier to program than the underlying hardware. Topics include virtual memory, input/output devices, disk request scheduling, deadlocks, file allocation, and security and protection.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 283 [Min Grade: D]

CS 377 Software Security 3.0 Credits

Examines ways to avoid and correct programming flaws that lead to software security vulnerabilities in web applications, code implementation, user interfaces, use of cryptography, concurrency and exception handling. It also exposes students to testing processes that are specifically targeted to uncovering security flaws.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 283 [Min Grade: D]

CS 380 Artificial Intelligence 3.0 Credits

Explores the foundations of artificial intelligence: production systems, heuristic programming, knowledge representation, and search algorithms. Also covers programming in an AI language. Additional topics chosen from game theory, decision support systems, pattern matching and recognition, image understanding, natural language, fuzzy and non-monotonic logic, machine learning, theorem proving, and common sense reasoning.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 260 [Min Grade: D] and CS 270 [Min Grade: D]

CS 383 Machine Learning 3.0 Credits

This course covers the fundamentals of modern statistical machine learning. Lectures will cover the theoretical foundation and algorithmic details of representative topics including probabilities and decision theory, regression, classification, graphical models, mixture models, clustering, expectation maximization, hidden Markov models, and weak learning.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and CS 380 [Min Grade: D]

CS 385 Evolutionary Computing 3.0 Credits

This course covers computational intelligence approaches to problem solving for classification, adaptation, optimization, and automated control. Methods covered will include evolutionary programming/genetic algorithms, genetic programming, neural networks, swarm optimization, and fuzzy logic.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and CS 380 [Min Grade: D]

CS 387 Game AI Development 3.0 Credits

This course focuses on artificial intelligence (AI) techniques for computer games. Students will learn both basic and advanced AI techniques that are used in a variety of game genres including first-person shooters, driving games, strategy games, platformers, etc. The course will emphasize the difference between traditional AI and game AI, the latter having a strong design component, focusing on creating games that are "fun to play." Topics include path-finding, decision-making, strategy and machine learning in games.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and CS 380 [Min Grade: D]

CS 430 Computer Graphics 3.0 Credits

The course presents the fundamental geometric representations and drawing algorithms of computer graphics through lectures and programming assignments. The representations include lines, curves, splines, polygons, meshes, parametric surfaces and solids. The algorithms include line drawing, curve and surface evaluation, polygon filling, clipping, 3D-to-2D projection and hidden surface removal.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and (MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D])

CS 431 Advanced Rendering Techniques 3.0 Credits

The creation of realistic images from 3D models is central to the development of computer graphics. The ray tracing algorithm has become one of the most popular and powerful techniques for creating photo-realistic images. This class explores the algorithmic components of ray tracing. Students implement many of these components in their class programming projects.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 430 [Min Grade: D] or CS 432 [Min Grade: D]

CS 432 Interactive Computer Graphics 3.0 Credits

This is a project-oriented class that covers the concepts and programming details of interactive computer graphics. These include graphics primitives, display lists, picking, shading, rendering buffers and transformations. Students will learn an industry-standard graphics system by implementing weekly programming assignments. The course culminates with a student-defined project.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and (MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D])

CS 435 Computational Photography 3.0 Credits

Fundamentals of computational photography, an interdisciplinary field at the intersection of computer vision, graphics, and photography. Covered topics include fundamentals of cameras, novel camera designs, image manipulation, single-view modeling, and image-based rendering with an emphasis on learning the computational methods and their underlying mathematical concepts through hands-on assignments.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and (MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D])

CS 440 Theory of Computation 3.0 Credits

Finite automata, regular sets, and regular expressions; pushdown automata, context-free languages, and normal forms for grammars; Turing machines and recursively enumerable sets; Chomsky hierarchy; computability theory.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: CS 270 [Min Grade: D] and MATH 221 [Min Grade: D]

CS 441 Compiler Workshop I 3.0 Credits

Design and implementation of compiler for specified language. Practical application and in-depth study of parsing, scanning, run-time storage management, type analysis, code generation, and error recovery.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: CS 270 [Min Grade: D] and CS 283 [Min Grade: D] and CS 360 [Min Grade: D] and CS 440 [Min Grade: D]

CS 442 Compiler Workshop II 3.0 Credits

Continuation of CS 441. Advanced topics in compilation, code generation, and optimization for various programming languages and paradigms.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: CS 441 [Min Grade: D]

CS 445 Topics in Computer Gaming 3.0 Credits

Contemporary topics in the design and implementation of computer games. Topics may include game genres, psychological and sociological aspects of games, software tools and game development engines, character and behavior modeling, physical models and realism, virtual reality, graphics and animation, network-based games, performance analysis and efficiency.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 3 times for 9 credits

Prerequisites: CS 345 [Min Grade: D] or DIGM 345 [Min Grade: D]

CS 451 Software Engineering 3.0 Credits

Covers requirements specification, system modeling, formal methods, architectural design, object-oriented design, programming for reliability, user interface design, functional and structural testing, software reuse, and configuration management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 270 [Min Grade: D] and MATH 221 [Min Grade: D] and (CS 350 [Min Grade: D] or SE 310 [Min Grade: D])

CS 457 Data Structures and Algorithms I 3.0 Credits

This course covers techniques for analyzing algorithms, including: elementary combinatorics, recurrence relations, and asymptotic analysis; data structures such as hash tables, red-black trees, B-trees, binomial and Fibonacci heaps, union-find trees; sorting algorithms and elementary graph algorithms.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D] and CS 270 [Min Grade: D] and MATH 221 [Min Grade: D]

CS 458 Data Structures and Algorithms II 3.0 Credits

This course presents algorithm design techniques such as dynamic programming, greedy methods, divide and conquer, amortized algorithms; more graph algorithms for minimum spanning trees, shortest paths, and network flows; string matching algorithms; algorithms for finding the convex hull of a discrete set of points; NP-Completeness and approximation algorithms.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 457 [Min Grade: D]

CS 461 Database Systems 3.0 Credits

Covers topics including structure and function of database systems, normal form theory, data models (relational, network, and hierarchical), query processing (ISBL), relational algebra and calculus, and file structures. Includes programming project using DBMS.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 260 [Min Grade: D]

CS 465 Privacy and Trust 3.0 Credits

This course will motivate the need for privacy protection and introduce basic privacy properties such as anonymity, unlinkability or unobservability. We will then discuss how these properties can be formalized, modeled and measured. The course will provide a broad overview of the state-of-the-art in privacy technologies, explain the main issues that these technologies address, what the current solutions are able to achieve, and the remaining open problems.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 303 [Min Grade: D]

CS 467 Security and Human Behavior 3.0 Credits

Humans are usually the weakest link in information security. Technical measures are easily thwarted by end-user decisions. How are end user decisions made? This course examines security decisions online from the distinct perspective of economics, psychology, anthropology, evolutionary biology, and criminology. We will address topics such as System I vs. System II, mental models, risk perceptions, safety engineering, groups behaviors in primates.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: (INFO 110 [Min Grade: D] or INFO 310 [Min Grade: D]) and PSY 101 [Min Grade: D] and ECON 201 [Min Grade: D]

CS 470 Operating Systems Workshop 3.0 Credits

Studies a modern multitasking operating system in detail, including device drivers, CPU scheduling, memory management, and file systems. Includes programming assignments that modify or enhance the operating system.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 370 [Min Grade: D]

CS 472 Computer Networks: Theory, Applications and Programming 3.0 Credits

Introduction to computer networking theory, applications and programming, focusing on large heterogeneous networks. Broad topdown introductions to computer networking concepts including distributed applications, socket programming, operation system and router support, router algorithms, and sending bits over congested, noisy and unreliable communication links.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 361 [Min Grade: D] or CS 283 [Min Grade: D]

CS 475 Computer and Network Security 3.0 Credits

The key objective of this course is to provide a thorough understanding of technologies and methodologies with which computer networks can be protected. Topics that are covered include: key management and credentials, steganography and watermarking, networking security (VPNs, firewalls, intrusion detection) and system security policies.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 472 [Min Grade: D] or CS 283 [Min Grade: D]

CS 476 High Performance Computing 3.0 Credits

This course is an introduction to high performance computing, including concepts and applications. Course contents will include discussions of different types of high performance computer architectures (multi-core/multi-threaded processors, parallel computers, etc), the design, implementation, optimization and analysis of efficient algorithms for uni-processors, multi-threaded processors, parallel computers, and high performance programming.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: (CS 281 [Min Grade: D] and CS 283 [Min Grade: D]) or (ECEC 353 [Min Grade: D] and ECEC 355 [Min Grade: D])

CS 479 Advanced Network Security 3.0 Credits

A study of what it takes to make a network secure, starting with an analysis of the sometimes conflicting goals (e.g. anonymity vs. traceability) through the mechanisms that can be used to achieve these goals. Covers in depth both the design options available and the design decisions made in various deployed systems, including Kerberos, IPsec, SSL, and X.509.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 475 [Min Grade: D]

CS 481 Advanced Artificial Intelligence 3.0 Credits

This course covers topics in representation, reasoning, and decision-making under uncertainty; learning; solving problems with time-varying properties. Assignments applying AI techniques toward building intelligent machines that interact with dynamic, uncertain worlds will be given.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 380 [Min Grade: D] and (MATH 311 [Min Grade: D] or MATH 410 [Min Grade: D])

CS I199 Independent Study in CS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS I299 Independent Study in CS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS I399 Independent Study in CS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS I499 Independent Study in Computer Science 12.0 Credits

Provides supervised study of selected topics in computer science.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS T180 Special Topics in Computer Science 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS T280 Special Topics in Computer Science 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS T380 Special Topics in Computer Science 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS T480 Special Topics in Computer Science 12.0 Credits

Covers topics in computer science of interest to students or faculty.

Different topics may be considered during different quarters.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

Computing Technology

Courses

CT 100 Microcomputer Hardware 3.0 Credits

This course imparts to the student knowledge of microcomputer hardware by providing instruction on system configuration, installation, upgrades, diagnosis, repair, preventive maintenance, and safety.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 120 Microcomputer Operating System 3.0 Credits

Prepares students for DOS/Windows with a brief introduction to networking. Students learn installation procedures and how to deal with current and legacy systems, create and use emergency boot systems, and manage printers and other devices. Students install Windows operating systems, manage window devices and configuration utilities, use the FDISK utility, perform backups, manage system files, configure network and internet access, and troubleshoot operating system errors.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 100 [Min Grade: D]

CT 140 Network Administration I 3.0 Credits

Students gain an understanding of terminology, technology, and issues involved in implementing networks. Topic include: understanding the OSI 7 layer model; concepts of servers and clients; network hardware/software functions; basics of TCP/IP protocol, main types of network topologies (bus, ring, star and mesh); and share and access network resources (files, printers, etc.).

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 100 [Min Grade: D] or INFO 101 [Min Grade: D]

CT 200 Server I 3.0 Credits

Topics include advanced PC hardware and server issues, including RAID, SCSI, troubleshooting and problem determination, upgrading, configuration, and disaster recovery. The second part of this course is an introduction to Apache Server concepts. Topics include: installations, configuration and administration in environments such as Windows and Linux.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 100 [Min Grade: D] or INFO 101 [Min Grade: D]

CT 210 Open Server I 3.0 Credits

Introduces students to the principles and practices of administering a Linux server. Students will: install, verify, and modify software packages, access resources on other servers, configure NFS, integrate Linux servers with other platforms, setup DNS, configure network interfaces, examine system scripts, examine boot options and Graphical User Interfaces.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 212 Computer Forensics I: Fundamentals 3.0 Credits

This course presents the theory, methodology and hands-on labs necessary for students to become competent in the basics of computer forensics. Topics covered include: understanding computer investigations, the investigators, laboratory, current forensics tools, digital evidence controls and processing crime.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 214 Computer Forensics II: Forensics and Investigations 3.0 Credits

Students will learn what computer forensics and investigation is as a profession and gain an understanding of the overall investigative process. Disk structures and operating system architectures are analyzed. Topics include the importance of the digital evidence control process and how to process crime and corporate scenes, data acquisition of single and RAID systems, computer forensics analysis, e-mail investigations, investigative report writing and expert witness requirements.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 212 [Min Grade: D]

CT 215 Computer Forensics III: Advanced Computer Forensics 3.0 Credits

This course provides a solid foundation and advanced topics for students who will soon be in the field conducting computer forensic investigations, public or private. This course will introduce computer forensics to non-traditional devices such as smart phones and other non-traditional devices. Advanced topics include live memory analysis, anti-forensic techniques and portable media analysis including iPhones, Blackberrys and other smart phones. This course will use current open source and commercial tools.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 214 [Min Grade: D]

CT 220 Database I 3.0 Credits

Extensive introduction to data server technology, concepts of relational databases and SQL. Best engineering practices utilizing DFD, ERD, CRUD, TIC charts. Data-dictionary utilization, use of primary keys, and the first three forms of normalization. Students are expected to create and maintain database objects and to store, retrieve, and manipulate data.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 222 Security and Information Warfare 3.0 Credits

This course presents the theory and methodology of Information Warfare and Security. Topics covered include: intellectual property crimes; computer fraud; harassment; embezzlement; eavesdropping; sabotage; surveillance; identity theft; incident handling; terrorism; and the protection of critical infrastructure. The course requires critical thinking and analysis of topics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 225 Data Mining Technology for Security 3.0 Credits

The course focuses on data mining technology used to combat crime. Students learn the theory of various searching techniques and criminal detection tactics and acquire fundamental knowledge of investigative data mining techniques.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 230 Web Development I 3.0 Credits

This course begins with an overview of the history of the internet. We examine how the Internet has changed modern society. Using XHTML, students acquire the skills needed to develop, design and create web pages. This course develops functional knowledge of microcomputer use beyond computer literacy, and examines fundamental networking concepts like TCP/IP, HTTP, FTP, SMTP, IMAP, etc.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 240 Web Development II 3.0 Credits

This course will focus on building an understanding of JavaScript and Cascading Style Sheets. Students will learn the basics of each language and apply them to the development of interactive and versatile page designs. The class culminates in a web site that integrates the use of both technologies that offers two different layouts, one *standard* and one *accessible* with JavaScript used to control which is displayed in the browser window. The course also has an overview of the foundations and theory of XML and XLST.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 230 [Min Grade: D]

CT 290 Client Side Programming 3.0 Credits

This course emphasizes becoming productive quickly as an Object-Oriented client-side programmer. Students learn how to create real-world Object-Oriented GUI applications using Java or Visual BASIC.Net. Topics include: Programming Environment; Fundamental Programming Structures; Objects and Classes; Inheritance; Interface Components; Event Handling; Applets; Debugging; and Graphics Programming.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 295 Public Key Infrastructure Technology 3.0 Credits

Practical knowledge of public key infrastructure. Topics include: symmetric & asymmetric cryptography, hashes, digital signatures and certificates, PKI basics & services, key and certificate life cycles, PKIX, protocols and formatting standards, trust models, authentication methods and deployment.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CT 320 [Min Grade: D]

CT 300 Security Technology Models and Architecture I 3.0 Credits

Presents theory and techniques utilized by IT Security professionals to secure a wide range of diversified platforms. Focuses on solutions for securing web servers, code, communications, applications, and databases.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CT 380 [Min Grade: D]

CT 310 Open Server II 3.0 Credits

Presents an in depth study of server administration utilizing the Linux Operating System. Topics covered include: shell environments, shell program structures, executions, variables, positional parameters, special shell variables, and shell programming statements. In addition the course will examine shell conditional statements, looping constructs, interrupt handling, and debugging tools.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 210 [Min Grade: D]

CT 312 Access Control and Intrusion Detection Technology 3.0 Credits

Fundamental theory and methodology of intrusion detection systems. Using intrusion detection systems to secure corporate and personal networks against attacks. Hands-on laboratory experience using an in-depth, open-source network intrusion detection system.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 420 [Min Grade: D]

CT 315 Security Management Practice 3.0 Credits

Managerial issues involved in the daily operations of an IT Security department. Topics include staffing, budgets, job descriptions, long term planning, resource allocation, training of security personnel, motivational techniques, interaction with other departments including upper management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

CT 320 Server II 3.0 Credits

This course is designed to introduce the Microsoft Windows Server Operating System. Upon successful completion of the course, the student will be able to implement, administer and troubleshoot in a network environment. The course will cover installation, administration of resources, monitoring and optimizing system performance, implementing, managing and troubleshooting hardware device drivers, managing data storage, setting up and configuring users, groups, policies and resources.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 200 [Min Grade: D]

CT 325 Operating System Security Architecture I 3.0 Credits

This course provides requisite knowledge to perform network security within a Windows based computing environment. Topics include: how Assets are Attacked and Secured, Trusted Computing Bases, Cryptography, Protecting Web Servers, Security for Web Browsers, Database Security, Protecting DNS, Security Policies and Procedures.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

CT 326 Operating System Security Architecture II 3.0 Credits

Provides students with the knowledge necessary to design a security framework for small, medium and enterprise networks utilizing Windows based computing technologies. Design and implementation of an effective network security plan based on an organization's business needs. Topics include: GPO's, AD, and Auditing.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CT 320 [Min Grade: D] and CT 325 [Min Grade: D]

CT 330 Network Administration II 3.0 Credits

Course covers both theoretical knowledge and hands-on exercises for networking using CISCO hardware. Topics include: Extending Switched Networks with VLANs; Determining IP Traffic with Access Lists; Establishing Point-to-Point Connections; and Establishing Frame Relay Connections.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 140 [Min Grade: D]

CT 335 Mobile Applications 3.0 Credits

Provides students with an understanding of mobile technologies and the components for building and testing mobile applications. Topics covered include: mobile frameworks, plugins, mobile device storage, visual design and user interfaces for mobile applications, device sensors, and compression.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 230 [Min Grade: D] or INFO 152 [Min Grade: D] or CS 265 [Min Grade: D]

CT 336 Internet Protocol Security and Virtual Private Network Technology 3.0 Credits

Technological components of IP Security and underlying architecture.

Theory of symmetric-key cryptographic algorithms, including AES, CAST, Blowfish, IDEA, RC2, RC5, and Skipjack. Understanding of PKI infrastructure and the managed certificate protocol. Implementing VPN solutions in a variety of scenarios.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 140 [Min Grade: D] and CT 420 [Min Grade: D]

CT 339 Computing and Security Technology Practicum 3.0 Credits

This course provides an opportunity to gain professional experience in the CST field.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CT.

CT 340 Operating Systems Architecture I 3.0 Credits

Students learn to set up and support MS Windows Operating System. Students gain experience in installing, administering, implementing and troubleshooting this TCP/IP Protocol. Explain data system security through group policy and encryption of files system.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 350 Network Administration III 3.0 Credits

This class gives successful student important knowledge and skills necessary to select, connect, configure, and troubleshoot the various CISCO networking devices. Topics include: Extending Switched Networks with VLANs; Determining IP Routes; Managing IP Traffic with Access Lists; Establishing Point-to-Point Connections; and Establishing Frame Relay Connections.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 330 [Min Grade: D]

CT 355 Wireless Network Security Technology 3.0 Credits

Theory, methodology and hands-on labs relating to the unique security issues of Wireless Networks. Limitations and risks of Wireless Networks. Use of audit and exploit tools to discover security flaws. Protocol and signal vulnerabilities. Methods to secure such vulnerabilities.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 420 [Min Grade: D]

CT 360 Operating Systems Architecture II 3.0 Credits

The knowledge base and skill sets presented in this course are foundations for support professional who are new to the Microsoft Windows O/S architecture and/or who will be responsible for installing, configuring, managing, and supporting a network infrastructure that uses the Microsoft Windows Server products.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 320 [Min Grade: D] and CT 340 [Min Grade: D]

CT 362 Network Auditing Tools 3.0 Credits

Theory, methodology and hands-on labs relating to Network Auditing. The course relies on advanced multi-functional network auditing tools to uncover Network Security problems, with the purpose of eliminating these vulnerabilities.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 420 [Min Grade: D]

CT 370 Object Oriented Systems Analysis 3.0 Credits

This course is designed to increase knowledge of the software development process with a focus on requirements gathering and documentation. UML notation is used. In addition to object-oriented analysis, techniques include the use of conceptual object models, use cases, and business process modeling.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 375 Database II 3.0 Credits

This course examines inserting, updating and deleting data. Subqueries are explored in detail along with the use of many Oracle intrinsic single row and group functions. Joins, merge, views, foreign keys, and compound primary keys are all studied in depth.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 220 [Min Grade: D]

CT 380 Operating Systems Architecture III 3.0 Credits

Students learn network administration skills including: how to configure and troubleshoot client computers; network printing; Active Directory; file sharing; Internet connection and services; remote access; and network security.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 360 [Min Grade: D]

CT 382 Applied Cryptography 3.0 Credits

This course presents the theory, methods, strengths, weaknesses, and effective strategies necessary for students to acquire a fundamental knowledge of Cryptography and Stenography. This is a hands-on course utilizing several tools and software programs. Emphasis is placed on formulating effective strategies, such as when and how to protect computer data.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 385 Web Development III 3.0 Credits

Students will acquire skills to develop, design and produce Web pages using Dreamweaver and Flash. Using software, students will construct a multimedia website, incorporating Flash movie elements, interactivity, and sounds.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 240 [Min Grade: D]

CT 388 Topics in Computing Technology I 3.0 Credits

This course will cover special topics of interest to students in the Computing Technology Major. May be repeated for credit.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 4 times for 12 credits

CT 389 Topics in Computing Technology II 3.0 Credits

This course will cover special topics of interest to students in the Computing Technology Major. May be repeated for credit.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 4 times for 12 credits

CT 390 Server Side Programming 3.0 Credits

This class is designed to provide students with intensive hands-on experience in using server-side technology to develop Web applications. Server-side programming, sometimes called servlets, is a powerful hybrid of the Common Gateway Interface (CGI) and lower-level server APU programming such as NSAPI from Netscape and ISAPI from Microsoft.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 290 [Min Grade: D]

CT 392 Web Development IV 3.0 Credits

Students will acquire skills to develop, design, and produce a functional dynamic Web site on ASP. An e-commerce web site is developed in the classroom to apply dynamic theory and practice. In addition, exploration of intellectual property, copyright, trademark, and privacy issues as they relate to web development are included.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: CT 385 [Min Grade: D]

CT 393 Information Technology Security Risk Assessment 3.0 Credits

This course addresses risk management methodology, the specific procedures for determining assets valuation, vulnerabilities, and threats. Risk migration methods that security professional use to protect valuable IT assets will also be studied. Issues, designed to foster critical thinking, are explored, as well as the standardized approaches to risk management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 395 Information Technology Security I 3.0 Credits

This class is a hands-on introduction of key security concepts such as authentication, malware and attacks, security in transmissions (including wireless). Cryptography, PKI and security analysis and planning (including risk management). Security policy, law on computer security violations.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 400 Network Security 3.0 Credits

This class focuses on the security aspects of networks. Topics covered: intrusion detection, VPN, and Firewalls. This course is designed to provide students with the necessary skills and information aligned with Securing Networks.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 330 [Min Grade: D]

CT 402 Network Security II 3.0 Credits

Theory, methodology of Security firewalls, Topics include: firewall models, user interfaces, feature sets, interfaces, routing, IP addressing services, IP multicast support, monitoring with SNMP, authentication, authorization, and accounting, address translation, traffic content filtering, application inspection, traffic shunning, and firewall failover.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: CT 400 [Min Grade: D]

CT 405 Enterprise Programming 3.0 Credits

This course covers the main aspects of Enterprise Component Architecture to build reliable, scalable and portable enterprise-wide distributed application. All architecture discussions, examples and exercises are described according to Object-oriented Analysis & Design (OOAD) principles and using the Unified Modeling Language (UML) notation. OOAD and UML are briefly introduced, too.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 390 [Min Grade: D]

CT 407 Network Security III 3.0 Credits

In-depth coverage of VPN technology, using different encryption schemes, certificates (PKI Theory, certificate creation and implementation), integration with routers, router management, advanced techniques in encryption and virtual private networking, user defined tracking, load balancing and firewall synchronization.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 402 [Min Grade: D]

CT 410 Linux III 3.0 Credits

All the key core elements of the Linux operating system: network configurations, recovery planning. TCP/IP, DHCP, DNS, Apache, Security, and email. These are the typical day-to-day administrative and maintenance issues and tasks commonly faced by Linux system administrators.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 310 [Min Grade: D]

CT 412 Information Technology Security Policies 3.0 Credits

This course presents the theory and legal issues necessary for students to acquire fundamental knowledge of Computer Policies for information Security. Topics covered include: E-mail, Employee Privacy, Labor Organization Activities (Fair Use), Avoiding Discrimination and Harassment, Copyright, Defamation, Spamming, Trade Secrets & Confidential Information, Attorney-Client communication via E-mail, Computer Security, Preventing Waste of a Computer Resources, Essentials for Good Policy, and Ensuring Compliance.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 415 Disaster Recovery and Continuity Planning 3.0 Credits

Disaster Recovery & Continuity Planning specific to Emergency Recovery Procedures. Techniques for development of disaster recovery plans, procedures and testing methods. Strategies used by businesses to assure that sensitive data will not be lost in the event of a disaster. Techniques used to manage potential risk within multiple environments.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 420 Information Technology Security II 3.0 Credits

This course focuses on network security. Students will gain hands-on experience in the areas of Internet vulnerabilities, analyzing intrusion signatures, risk analysis, designing and configuring firewall systems, router security, Attack and Defense Techniques, IP and Packet structure and analysis, creating a security policy, operating system security for Windows and Linux.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 395 [Min Grade: D]

CT 422 Incident Response Best Practices 3.0 Credits

Theory and legal issues necessary for students to acquire fundamental knowledge of how to design an effective Incident Response Policy. Topics include forming and Incident Response Team, types of responses, legal issues, training employees, selecting tools, honey pots, computer attacks, and the cost of an incident.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CT 425 Database III 3.0 Credits

This course is an introduction to Oracle's PL/SQL programming language. Anonymous blocks, PL/SQL constructs, stored procedures and functions are examined in depth.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 375 [Min Grade: D]

CT 427 E-Commerce and Web Security Technology 3.0 Credits

In-depth understanding of security problems and risks specific to e-Commerce on web servers. Implementation of advanced security technologies specific to e-Commerce. Design of secure Web Sites, mobile commerce applications, electronic payment systems, address communication security. Web- and Java-related security issues.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 420 [Min Grade: D]

CT 430 Database IV 3.0 Credits

This course introduces packages along with program unit dependencies. Triggers and Oracle-supplied packages are examined in detail. Time is also allocated for performance tuning specifically utilizing the Oracle tables.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 425 [Min Grade: D]

CT 431 Project Management 3.0 Credits

This course teaches how to develop project management plans; develop an understanding of the risks inherent in project development; and be able to evolve coping strategies to deal effectively with projects that go off track. Areas covered include: Project Definition, Project Risk, Project Planning, Risk Assessment, Critical Path, and Cost Management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

CT 432 Information Technology Security Systems Audits 3.0 Credits

This course presents the theory, methodology, procedures and hands-on labs necessary for students to acquire a fundamental working knowledge of IT System Audits. Students learn how to discover system vulnerabilities with proper audit procedures, and how to document their findings properly for upper management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 420 [Min Grade: D]

CT 435 Database V 3.0 Credits

Students with a foundation in the Oracle database continue their student of the application and how to insure its functionality. Topics in this course include: backup and recovery analysis and options, recovery structures and processes, backup configuration, manual backup, automated backup, archiving, utilities, Recovery Manager catalog design and maintenance, RMAN, standby databases, Alert and Trace files, dynamic performance, cache, logs, I/O, shared pool, blocks, rollbacks, optimizing sort operations and multithreaded server tuning.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 430 [Min Grade: D]

CT 438 Database VI 3.0 Credits

This course provides instruction in the operations of the Oracle database. It presents the day-to-day duties of the database administration, from initialization parameters and table space storage, to data integrity, constraints, and user profiles.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 435 [Min Grade: C]

CT 472 Security Defense Countermeasures 3.0 Credits

Theory, methodology and hands-on labs relating to Defense Countermeasures. Understanding the reasons that lead to system vulnerabilities and how criminals exploit those vulnerabilities. Labs that utilize security software to conduct penetration testing, audits, and system vulnerability tests will be taught.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CT 420 [Min Grade: D]

CT 491 Senior Project I 3.0 Credits

This course is an independent project which small student teams determines and scopes an appropriate computing technology project that can be completed within the constraints of time and resources under faculty guidance. The objective of the course is to provide specifications and requirements for the team project.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

CT 496 Senior Project II 3.0 Credits

This course is a continuation of Senior Project I. In this course, student-teams are required to implement their project specifications and requirements developed in the previous course.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CT 491 [Min Grade: D]

CT I199 Independent Study in CST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CT I299 Independent Study in CST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CT I399 Independent Study in CST 0.5-9.0 Credits

Provides individual study or research in computing and security technology with faculty supervision. This course may be repeated for credit.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 2 times for 6 credits

CT I499 Independent Study in CST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

Computing and Informatics

Courses

CI 101 Computing and Informatics Design I 2.0 Credits

Introduces computing and informatics through a combination of lectures and hands-on laboratory exercises. Lectures emphasize an integrated view of topic areas and systems, spanning low-level software and implementation issues to high-level use and acceptance by individuals and communities. Lab exercises allow students to explore familiar systems in unique and novel ways to better understand how these systems are designed and used.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CI 102 Computing and Informatics Design II 2.0 Credits

Introduces computing and informatics through a combination of lectures and hands on laboratory exercises. Lectures emphasize an integrated view of topic areas and systems, spanning low level software and implementation issues to high level use and acceptance by individuals and communities. Lab exercises allow students to explore familiar systems in unique and novel ways to better understand how these systems are designed and used.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CI 103 Computing and Informatics Design III 2.0 Credits

Follows CI 102 in the Computing & Informatics design sequence. Introduces computing and informatics through a combination of lectures and hands-on laboratory exercises. Lectures emphasize an integrated view of topic areas and systems, spanning low-level software and implementation issues to high-level use and acceptance by individuals and communities. Lab exercises allow students to explore familiar systems in unique and novel ways to better understand how these systems are designed and used.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CI 102 [Min Grade: D]

CI 106 Computing & Informatics Design Project 4.0 Credits

Introduces computing and informatics through a term-long design project. Lectures emphasize an integrated view of topic areas and systems, spanning low-level software and implementation issues to high-level use and acceptance by individuals and communities. Lab exercises allow students to explore familiar systems in unique and novel ways to better understand how these systems are designed and used.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CI 120 CCI Transfer Student Seminar 2.0 Credits

Introduces students to the academic and co-curricular aspects of university life. Includes academic functions such as reflection papers, reading, and study skills, as well as co-curricular functions such as campus resources, activities, and social programs. Aids in the transition to student life at Drexel and is designed to help each student achieve academic and personal success through academic and career exploration.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CI 491 [WI] Senior Project I 3.0 Credits

Part of a multi-term capstone experience involving in-depth study and application of computing and informatics. Students work in teams to develop a significant product. Requires use of a development process that includes planning, specification, design, implementation, evaluation, and documentation. This course is writing intensive.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 451 [Min Grade: D] or INFO 324 [Min Grade: D] or INFO 420 [Min Grade: D]

CI 492 [WI] Senior Project II 3.0 Credits

Part of a multi-term capstone experience involving in-depth study and application of computing and informatics. Students work in teams to develop a significant product. Requires use of a development process that includes planning, specification, design, implementation, evaluation, and documentation. This course is writing intensive.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CI 491 [Min Grade: D]

CI 493 [WI] Senior Project III 3.0 Credits

Part of a multi-term capstone experience involving in-depth study and application of computing and informatics. Students work in teams to develop a significant product. Requires use of a development process that includes planning, specification, design, implementation, evaluation, and documentation. This course is writing intensive.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CI 492 [Min Grade: D]

Construction Management

Courses

CMGT 101 Introduction to Construction Management 3.0 Credits

This course will introduce the basic history and management concepts of the construction industry to students with the expectation that upon completion students will have an overview of the industry. Career choices, industry firms, and key players in the Construction Management process will be explored.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Junior or Senior

CMGT 161 Building Materials and Construction Methods I 3.0 Credits

This course is designed to explore the range of building materials in use today and their interrelationships in a construction project. Topics will include a study of the major components of construction materials, the selection process, specification, alternatives, procurement, placement and quality management for the building systems covered. Foundations, excavations, wood framing and steel construction and the role these materials play in the success of a project once chosen will be considered and evaluated.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is AE or major is CIVE

CMGT 162 Building Materials and Construction Methods II 3.0 Credits

Continues CMGT 161. Covers concrete, reinforced concrete, site cast and pre-cast concrete, brick and concrete masonry, reinforced masonry, and properties of these materials and construction methods associated with them.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is AE or major is CIVE

Prerequisites: CMGT 161 [Min Grade: D]

CMGT 163 Building Materials and Construction Methods III 3.0 Credits

Continues CMGT 162. Covers roofing systems, glass, glazing, windows, doors, cladding systems, interior finishes, the properties of these materials and construction methods associated with each of them.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is AE or major is CIVE

Prerequisites: CMGT 162 [Min Grade: D]

CMGT 240 [WI] Economic Planning for Construction 3.0 Credits

Covers techniques for economic decision making for building and infrastructure construction topics. Topics include cash flow, present worth analysis, equivalent annual worth, rate of return, risk analysis, and benefit/cost analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is AE

Prerequisites: MATH 121 [Min Grade: D]

CMGT 251 Construction Surveying 3.0 Credits

Covers the theory and use of surveying instruments and principles of plane and topographic surveying. Introduces satellite positioning, geomatics, and other modern surveying techniques related to construction.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is AE

Prerequisites: MATH 121 [Min Grade: D]

CMGT 261 Construction Safety 3.0 Credits

Covers OSHA liability, general safety, hazard communication, fire, material handling, tools, welding, electricity, scaffolding, fall protection, cranes, heavy equipment, excavation, concrete, ladders and stairways, confined space entry, personal protective equipment, and health hazards. Course approved by the osha Training Institute.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is ARCH or major is CIVE or major is CMGT or major is EE.

Cannot enroll if classification is Freshman

CMGT 262 Building Codes 3.0 Credits

Familiarizes students with the content of the boca International Building Code (emphasizing the non-structural provisions), the purpose and intent of code requirements, and how to apply the code to structures and occupancies. Examines how the code is used as a tool in design and construction and prepares students for the advent of a single model building code planned for the nation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is ARCH or major is CIVE or major is CMGT or major is EE.

Cannot enroll if classification is Freshman

CMGT 263 Understanding Construction Drawings 3.0 Credits

This course examines a variety of construction documents, including drawings, details, graphic standards, sections, and quantities for competitive bidding and execution of projects. Both residential and commercial construction documents will be examined.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CMGT 161 [Min Grade: D] and CMGT 162 [Min Grade: D]

CMGT 265 Information Technologies in Construction 3.0 Credits

The objective of this course is to expose students to a large variety of information technologies in construction and will discuss the impact of these technologies on work environments, processes, and work quality. Students will investigate a variety of issues surrounding IT in construction including implementation, standards, integration, knowledge management and the underlying technology.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CMGT 266 Building Systems I 3.0 Credits

This course covers construction management and design concepts relating to heating, ventilation, and air conditioning systems and the integration of these systems into the building design and construction process.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 182 [Min Grade: D]

CMGT 267 Building Systems II 3.0 Credits

Continues CMGT 266. This course covers construction management concepts relating to electrical systems, wiring, lighting, signal and data systems, and transportation systems and the integration of these into the building design and construction process.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CMGT 266 [Min Grade: D]

CMGT 355 Introduction to Sustainability in Construction 3.0 Credits

An overview of the design and construction of high performance buildings. Students will gain topical familiarity with the wide range of issues related to sustainable design and construction. The USGBC's green building certification program will be covered in detail. Both historical and contemporary case studies will be utilized.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 361 Contracts And Specifications I 3.0 Credits

Analyzes construction contracts, specifications, and practices with regard to business law and liability. Required for construction management students. Elective for others. Fall.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CMGT 362 Contracts and Specifications II 3.0 Credits

Continues CMGT 361. Examines contractor, architect, and engineer responsibilities through case studies and class discussions. Winter.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CMGT 361 [Min Grade: D]

CMGT 363 Estimating I 3.0 Credits

Covers discussion of the estimating function and review and applications of material quantity survey techniques used in estimating costs of construction projects. Includes types of approximate and precise methods of estimating and their uses, and computer applications. Required for construction management students.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 110 [Min Grade: D] and CMGT 263 [Min Grade: D]

CMGT 364 Estimating II 3.0 Credits

Covers pricing and bidding of construction work including cost factors, labor and equipment, productivity factors, prices databases, job direct and indirect costs, methods of estimating time, materials, equipment, subcontractors' work, general expenses, and profit, bid preparations and submission, and computer applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CMGT 363 [Min Grade: D]

CMGT 365 Soil Mechanics in Construction 4.0 Credits

Gives an overview of the types of problems encountered in geotechnical construction. Subjects covered will be composition, groundwater fundamentals, settlement and consolidation, stability of earth slopes, types of foundations and behavior of difficult soils.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: CMGT 161 [Min Grade: D] and MATH 121 [Min Grade: D] and PHYS 182 [Min Grade: D]

CMGT 366 Construction Accounting and Financial Management 3.0 Credits

This course brings together all of the key principles from general business accounting, financial management, and engineering economics needed by construction managers vis-a-vis the unique characteristics of the construction industry, and addresses how these principles are specifically applied in the construction industry, and how they should interact effectively to ensure the efficient and profitable management of construction projects and companies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 116 [Min Grade: D] and CMGT 364 [Min Grade: D] and CIVE 240 [Min Grade: D]

CMGT 371 Structural Aspects in Construction I 3.0 Credits

The first of two course series designed specifically for construction management majors. The sequence addresses the interactions of different kinds of loads with common structural elements and design considerations for typical construction materials. This course places emphasis on the design of wood framed construction.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: CMGT 161 [Min Grade: D] and MATH 121 [Min Grade: D] and PHYS 182 [Min Grade: D]

CMGT 372 Structural Aspects in Construction II 3.0 Credits

The second part in a two-course sequence for Construction Management majors. The course places emphasis on the design and analysis of concrete and steel frame construction.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CMGT 371 [Min Grade: D]

CMGT 375 Building Information Modeling in Construction 3.0 Credits

This course is intended to provide students with a hands-on introduction to Building Information Modeling (BIM) in Construction. Emphasis will be placed on the use of BIM to support current construction activities such as design review, coordination, scheduling, logistics, estimating, and project close-out. Topics will include an introduction to 3D BIM modeling, 3D coordination and clash detection, 4D visual scheduling and logistics, 5D estimating, and BIM for Facility Management. Students will learn the fundamentals of the most widely used software applications in the construction industry: SketchUp, Revit and Navisworks.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 450 Construction Management of Field Operations 3.0 Credits

This course is intended to equip students with knowledge and skills required to successfully manage and support construction field operations. Knowledge areas include contract administration, project engineering, site superintendence, and other topics critical to field operations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: CMGT 101 [Min Grade: D] and CMGT 163 [Min Grade: D] and CMGT 263 [Min Grade: D]

CMGT 451 Heavy Construction Principles & Practices 3.0 Credits

This course is intended to provide students an introduction to the principles and practices employed in heavy construction. The course content is presented from a practical perspective focusing on actual field applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is ARCH or major is CHE or major is CIVE or major is CMGT or major is EE or major is IAD or major is INTR.

Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

CMGT 461 Construction Management 3.0 Credits

Covers construction management concepts and practices, the management system, construction planning and programming, project control, environmental management, total quality management, and ethics in construction management. Winter.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is ARCH or major is CIVE or major is CMGT or major is INTR and classification is Junior or Pre-Junior or Senior.

CMGT 463 Value Engineering 3.0 Credits

Covers the value concept, value engineering job plan, and techniques of project selection.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is ARCH or major is CHE or major is CIVE or major is CMGT or major is EE or major is INTR or major is PRMT.

Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

CMGT 465 Marketing Construction Services 3.0 Credits

Applies marketing principles to the construction industry. Includes understanding the roles of market research, business development planning, and networking techniques. Students will acquire the skills and techniques to prepare a winning presentation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

CMGT 467 Techniques of Project Control 4.0 Credits

This course covers construction planning, scheduling, network systems, and communications required for project control, diagram logic, and Earned Value Analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is ARCH or major is CIVE or major is CMGT or major is CPM or major is EE or major is ENGR or major is IAD or major is MECH or major is MSE or major is PRMT or major is PROJ.

Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

CMGT 468 Real Estate 3.0 Credits

Overview of the development process including site selection, residential densities, market analysis and cash flow analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CMGT 469 Construction Seminar: Contemporary Issues 3.0 Credits

This course is intended to prepare students for professional practice through a survey of the current and future state of the industry.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

CMGT 470 Productivity in Construction 3.0 Credits

Explores the evaluation of construction management's effectiveness. Overview of techniques required for improvement of construction field efficiency including quality management, productivity measurements, method improvement, human factors, and communications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT I199 Independent Study in CMGT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CMGT I299 Independent Study in CMGT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CMGT I399 Independent Study in CMGT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CMGT I499 Independent Study in CMGT 4.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Senior.

CMGT T180 Special Topics in CMGT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CMGT T280 Special Topics in CMGT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CMGT T380 Special Topics in CMGT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

CMGT T480 Special Topics in CMGT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Cooperative Education

Courses

COOP 001 Co-op Essentials 0.0 Credits

Co-op Essentials is an accelerated version of the required course for co-op students, COOP 101. It is designed for non-traditional students with significant work history. The course covers all of the essential job development topics including, introduction to the SCDC and SCDCOnline, resumes, interviewing, and workplace issues. The emphasis of Co-op Essentials is on integrating and adapting the student's previous experience to a co-op environment.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if concentration is 4COP or concentration is 4TOP or concentration is 5COP or concentration is 5TOP.

COOP 101 Career Management and Professional Development 0.0 Credits

Prepares new students to achieve success, personally and academically, in their first co-operative education experience. Topics covered include career exploration, resume skills, interview techniques, professional conduct in the job search, contemporary workplace issues, and job searching and the Internet.

College/Department: University Courses

Repeat Status: Not repeatable for credit

COOP 201 Co-op Experience 16.0 Credits

College/Department: University Courses

Repeat Status: Can be repeated 6 times for 96 credits

COOP 250 Professional Skills Enrichment 0.0 Credits

Professional Skills Enrichment is designed to enable the student to hone their job search skills. Taught as a series of workshops, each class focuses on a different career-related topic including Networking, Utilizing Social Networking Sites, and Mastering the Interview. Students are required to attend a mock interview and participate in a mock networking event.

College/Department: University Courses

Repeat Status: Not repeatable for credit

COOP 301 Co-op/Internship Experience 16.0 Credits

College/Department: University Courses

Repeat Status: Can be repeated 2 times for 34 credits

Creativity Studies

Courses

CRTV 301 Foundations in Creativity 3.0 Credits

This course provides a foundation in creativity including leading creativity theorists and their ideas, and introduction to creativity in many fields.

Students will explore basic creative characteristics including originality, fluency, flexibility, elaboration, resistance to premature closure, and tolerance of ambiguity. Sets the foundation for acquiring tools and applying creativity.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CRTV 302 Tools and Techniques in Creativity 3.0 Credits

This hands-on course provides tools for enhancing creative strengths including role-play, simulation, brainstorming together with synectics, and creative problem solving. A second focus is the role of inspiration in how creativity, personal maturity, and spirituality inter-relate and how this interaction expands our repertoire of tools and techniques in creativity.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CRTV 303 Creativity in the Workplace 3.0 Credits

This course focuses on how creative ideas happen and how they become innovations to reveal a set of principles for infusing creativity into every aspect of an organization. Examples from a wide range of settings demonstrate how to build systemic creativity at the individual, team, and leadership levels.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CRTV T180 Special topics in CRTV 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

CRTV T280 Special topics in CRTV 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

CRTV T380 Special topics in CRTV 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

CRTV T480 Special topics in CRTV 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

Criminal Justice

Courses

CJ 290 Crime and Public Policy 3.0 Credits

This course focuses on criminal justice and non-criminal justice policies used to combat crime. Students will use the most recent crime data and explanatory theories on crime to evaluate current policy. A multi-disciplinary approach will be used to develop new policies designed to have a long-lasting impact on crime.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJ 400 [WI] Critical Issues in Criminal Justice 3.0 Credits

The capstone course will be open only to Criminal Justice Seniors. It will serve as an opportunity for them to demonstrate their cumulative learning to the major by looking on the most challenging issues in the field. Students, divided into groups, will research the topics, draft a report and present and defend it before an audience of Criminal Justice students. The knowledge and skills obtained through four years as a Criminal Justice major will be reflected in their work. This course will be a writing intensive course as multiple drafts of their thesis will be reviewed and critiqued before the final report is written and accepted. (Topic will reflect contemporary issues and one subject to choose.).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CJ and classification is Senior.

CJ T180 Special Topics in Criminal Justice 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJ T280 Special Topics in Criminal Justice 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJ T380 Special Topics in Criminal Justice 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJ T480 Special Topics in Criminal Justice 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Criminology & Justice Studies

Courses

CJS 101 Introduction to Criminal Justice 3.0 Credits

This course provides a survey of the criminal justice system with the primary goal of conveying an understanding of America's formal response to crime. We confront the long-standing struggle to balance due process with crime control through the lenses of the police, courts and corrections -- the core elements of the Criminal Justice system. We also examine major crime control paradigms (historic and current), and the tenuous relationship between race and justice. The course offers a variety of educational approaches in an effort to match (as much as is reasonable) students' individual learning styles and needs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 200 Criminology 3.0 Credits

This course examines the myriad factors that explain crime and criminal behavior. The course describes prevalences of different crime types across various populations and geographic areas to help students understand how and why crime often clusters within certain settings.

The Course reviews major theories of crime developed over the past two hundred years to help explain crime and the labeling of criminal offenders. The course will draw on references from popular culture to help provide a context for crime and crime causation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 210 Race, Crime, and Justice 3.0 Credits

This course considers how race affects the behaviors of the major institutions of the justice process, as well as how the justice process affects social perceptions of race and crime. The course also describes the relationships among race, criminal offending, and victimization; and it explores how justice--related outcomes are often influenced by the quality and behaviors of local schools, access to housing, economic investment in majority--minority communities, crime control strategies, and the perceived fairness of the justice process itself.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 220 Crime and the City 3.0 Credits

This course reviews the nature of crime and disorder in cities from the urban industrial revolution through the so-called "Crime Drop" of the early 2000s. The course opens with an overview of urbanization, contrasting the "best" with the "worst" aspects of the industrial revolution on human life. It then examines urban drug markets, violence, and policing before moving into a discussion of the crime "peak" of 1992. The course then follows the ensuing crime drop, examining demographic, economic, and cultural factors that may explain the national crime decline. The course then focuses on violence as a public health issue and on how crime, incarceration, health, housing, and education are all tied to urban crime policy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 250 Research Methods & Analytics I 3.0 Credits

This is the first of three integrated methods and analysis courses for CJS students that introduces them to the fundamentals of research design, the benchmarks of scientific quality, sampling, modes of observation, and units of measurement. The course also introduces students to the most relevant analytical procedures often used at each stage in the methodological process, such as developing a data set, performing descriptive (univariate) analyses, examining bivariate relationships, and testing hypotheses using both parametric and non-parametric statistical tests. The course culminates with students writing a research proposal that includes the major components of most grant applications: Statement of the Problem, Literature Review, Research Questions, and Research Methodology/Analytical Procedures.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 260 Justice in Our Community 4.0 Credits

This course is a seminar style community-based learning course that will begin with an introduction to justice in urban communities and examine problems unique to cities. The will include class lectures and on-site work with our community partners at UConnect. The synthesis of scholarship and community classroom experience will provide a holistic lens in which to explore issues in our urban community. Topics include urban economies, access to education and health care, digital divides and crime. Students who take this course will also register for one recitation section of CJS 260.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 261 Prison, Society and You 3.0 Credits

This course utilizes the Inside-Out Prison Exchange Program to explore the relationship between individuals and the prison system. The Inside-Out Exchange Program is an evolving set of projects that creates opportunities for dialogue between those on the outside and those on the inside of the nation's correctional facilities. The program demonstrates the potential for dynamic collaborations between institutions of higher education and correctional institutions. Most importantly, through this unique exchange, Inside-Out, this course seeks to deepen the conversation and transform ways of thinking about crime and justice (Crabbe, Pompa, 2004).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 265 Criminal Investigation 3.0 Credits

This course introduces students to the broad field of criminal investigations. It examines the elements of an effective investigation, the equipment, technology and procedures used to complete successful investigations. It also covers note taking, crime scene photography and sketching, searching the crime scene, identifying and collecting physical evidence, and arresting and searching suspects.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 266 Crime Prevention Planning 3.0 Credits

The course will explore the role of places and environments on criminal opportunities. By analyzing residential and business layouts, street networks, and routine activities of individuals, the course will seek ways in which situational crime prevention methods may then be applied for preventing criminal behavior in both the public and private settings.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 267 Introduction to Security Studies 3.0 Credits

This course examines the private security industry. Substantive topics of interest include the historical development of the industry; its linkage to public forms of security (law enforcement and the regulatory state); its legal underpinnings; management issues; and the nature of internal and external threats faced by facilities and organizations. The philosophical and analytic paradigm for security -- risk analysis and prevention -- offers a framework for the study of problem solving models used in the field. This framework, along with the analytic models utilized by security professionals will be explored in depth.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 273 Surveillance, Technology, and the Law 3.0 Credits

This course will examine current surveillance technologies used by criminal justice agencies and private sector organizations and the laws that regulate government surveillance and protect privacy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 274 Sex, Violence, & Crime on the Internet 3.0 Credits

This course explores how offenders are adopting computers to commit traditional crimes in a high-tech manner. Specific attention will be paid to the following types of crime: cyberstalking, online harassment, cyberbullying, sexting, and computer-facilitated sexual exploitation of children. Related legislation and current law enforcement practices to address these crimes will be examined.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 275 Issues in Domestic Violence 3.0 Credits

Domestic Violence is a familiar phrase, but what does it really mean? How often does it occur? Is it a new phenomenon? Do other countries view domestic abuse as a problem? In our class we will examine these questions using broad conceptual frameworks. It will then explore the definitional aspects of domestic violence, common characteristics of victims and offenders, as well as the historic, current, and emerging criminal justice responses to domestic violence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 276 Introduction to Computer Crime 3.0 Credits

This course provides an overview of computer crime. Emphasis will be placed on the legislative responses and policy issues related to computer intrusions and cyberfraud. Issues encountered when informing laws in cyberspace and the public/private sector initiatives for dealing with computer crime will also be explored.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 277 Introduction to Correctional Practices 3.0 Credits

This course provides insight into the Correctional component of the Criminal Justice System. Students will learn and understand correctional theory, over view of correctional facilities management and practice and contemporary issues in the field of corrections, including re-entry and alternatives to incarceration. Emphasis will be placed on actual real world experiences based upon the Philadelphia Prison System. Course material will be presented through the required textbook, court opinions from legal cases, handouts, classroom lecture and discussion, on-site visits and tours of the various Philadelphia Prison System facilities and guest lectures and demonstrations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 278 Introduction to Law Enforcement 3.0 Credits

This course examines the implications of maintaining an armed police force in a democratic society whose mandate requires it to enforce laws under the tacit threat of coercion. The course explores different styles of policing that are commonly found in urban, rural, and suburban locations; and it examines the rise and consequences of historic crime control paradigms, such as the War on Drugs, and the War on Terrorism. It offers an overview of Supreme Court decisions that have most affected police functions and authority. And it will highlight the police use of technology for the purposes of coercion, surveillance, and communication.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 280 Communities and Crime 3.0 Credits

This course introduces students to the ecological study of crime. Crime varies in time, space, and populations as it reflects neighborhood structures and the routine social interactions that occur in daily life. Concentrations of crime can be found among locations, with antisocial activities like assaults and theft occurring at higher rates because of the demographic make-up of people (e.g., adolescents) or conflicts (e.g., competing gangs), for reasons examined by ecological criminology. We examine variations in socio-demographic structures (age, education ratios, and the concentration of poverty) and the physical environment (housing segregation, density of bars, street lighting) predicts variations between neighborhoods in the level of crime and disorder.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 289 Terrorism 3.0 Credits

This course examines the varying types and purposes of terrorism and its application. It will discuss the problems with definitions, worldviews and ideologies, and how these affect both the perceptions and responses to terrorist events.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 290 Crime and Public Policy 3.0 Credits

This course focuses on criminal justice and non-criminal justice policies used to combat crime. Students will use the most recent crime data and explanatory theories on crime to evaluate current policy. A multi-disciplinary approach will be used to develop new policies designed to have a long-lasting impact on crime.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 295 International Field Experience 1.0-3.0 Credit

This course provides students the opportunity to process and contextualize their recent Intensive Course Abroad (taken through Drexel's Study Abroad Office). By keeping an extensive travel journal, participating in all activities while abroad, and through a series of written reflection assignments, students will link their travel experiences with assigned academic materials to help them make meaning from their observations while on tour in the relevant host countries.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJS 300 Research Methods and Analytics II 3.0 Credits

This course builds on (and reviews) the fundamentals of research design introduced in Methods and Analysis I with the specific aim of teaching students how to construct, and analyze data generated from, surveys. Students will learn the "mechanics" of survey design, such as where to place demographic questions, as well as how to identify and include validated scales on the instrument, and how to avoid misleading or debilitating items (e.g., "double-barreled" questions, biased/leading questions, non-mutually exclusive or exhaustive response categories. Students will also learn the process (and importance) of pre-testing the survey prior to implementing it; and they will be trained to analyze survey results using SPSS and other software packages as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CJS 250 [Min Grade: C]

CJS 301 Methods and Analytics III 3.0 Credits

The course focuses on the development of a community needs assessment as a platform for giving students the opportunity to work as part of a research team in the field, creating a data collection instrument, collecting and analyzing data, and reporting the findings. The course integrates the community needs assessment methodology with the urban disorder literature to educate students in the modes of observation required to reliably measure crime, disorder, surveillance gaps, and other sources of community risk. Students will map community demographic features, develop an assessment tool, make field observations, and analyze the findings as part of their culminating experience.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CJS 300 [Min Grade: C]

CJS 302 Advanced Criminological Theorizing 3.0 Credits

This course offers a detailed examination of several major theories of crime. Whereas CJ204-Criminology represents a survey of many criminological theories, this advanced course focuses on three major perspectives in criminology: Life-course, genetics/bio-social, social disorganization (and specifically, subculture of violence) theories. The course also helps students understand how different criminological theories might integrate with each other to offer broad perspectives the causes of crime.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CJS 204 [Min Grade: C] or CJ 204 [Min Grade: C]

CJS 320 Comparative Justice Systems 3.0 Credits

This course offers students a transnational perspective on crime and justice institutions. As the world increasingly globalizes, it becomes increasingly important to understand how countries outside the United States undertake the processes of detecting crime, labeling people "criminal," and adjudicating criminal offenders. Is there a common threshold in other countries for determining guilt? Is there a universal standard that governs the presumption of guilt or innocence at the onset of the criminal justice process? How many other countries still use the death penalty? These are questions the course will address in addition to others related to policing, courts, and corrections.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CJS 101 [Min Grade: C] or CJ 206 [Min Grade: C]

CJS 330 Crime Mapping Using Geographic Information Systems 3.0 Credits

This is primarily a lab course that trains students in the fundamentals of crime mapping using geospatial software. The course opens with a history of crime mapping, then moves to an examination of several place-based theories of criminology that help explain why crime events often cluster in time and space. The course then uses scenario-based exercises to train students how to work with and manage geospatial data, conduct select spatial analyses, interpret the results of such analyses within the contexts of different criminological theories, and create maps that illustrate spatial patterns and relationships across different units of geography.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 335 Intelligence-Led Decision-Making 3.0 Credits

This course examines the processes of (1) identifying crime and security threats across different risk terrains, turning raw information from non-crime sources into intelligence data that can help forecast crime/security problems, and (2) developing a strategic plan to guide the deployment of crime control resources for solving a crime problem or reducing a security threat. The course also introduces students to the importance of developing multi-organizational collaborations that create data streams from key social agencies (e.g., schools, hospitals, local commercial enterprises, tourism offices, etc.) that could help predict crime problems or threats to public safety before they become apparent. Students will develop a Strategic Plan designed to reduce a crime problem or security threat in a local setting.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CJS 330 [Min Grade: C]

CJS 360 Juvenile Justice 3.0 Credits

Students will learn about the history, development and current status of the juvenile justice system. Philosophical, sociological, psychological, legal and political factors contributing to the changes in the manner in which society processes children and youth who violate social norms will be explored in research articles, legal decision, and theoretical analyses.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 362 Gender, Crime, and Justice 3.0 Credits

This term will explore the historical roots of crime and how we study crime specifically; we will critically analyze female crime trends and statistics, gender and the law, and female offending. After laying a strong foundation, we will connect gender and crime by exploring rape, pornography, and domestic violence, sex trafficking and female gangs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 364 Community Corrections 3.0 Credits

This course is a comprehensive, up-to-date, coverage of evidence-based practices and research for probation, release from prisons and other community-based alternatives in their historical, philosophical, social and legal contexts illustrated with real life examples.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 365 Computer Investigations and the Law 3.0 Credits

This course will examine the techniques used to investigate Internet crimes and extract evidence from digital storage devices. Specific attention will be paid to the procedural laws that govern digital forensic techniques and investigations involving electronic evidence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 366 Technology and the Justice System 3.0 Credits

This course will examine past and current technologies adopted in the field of criminal justice to assess their usefulness in identifying and preventing crime and advancing justice. We will also discuss technologies on the horizon that are likely to be adopted by criminal justice agencies. Additionally, methods for evaluating technology use will be examined.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 369 Forensic Science Survey Course 3.0 Credits

This survey course introduces some principles and techniques of forensic science as they pertain to crime scene investigation and crime laboratory analysis. The course is designed to be accessible to those without a science background, but at the same time will provide a well-rounded introduction to some topics for those considering further studies in the field.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 372 Death Penalty - An American Dilemma 3.0 Credits

Capital punishment is one of the most complex issues in Criminal Justice and one of the most controversial facing America. Everyone has an opinion about the death penalty but rarely is it grounded in hard evidence. This course will examine the history of the use of capital punishment in America by reviewing the relevant case law in this area and will explore in-depth the issues which rise from the use of the Death Penalty in this country. Is it ethical? Is it fairly administered? Is it effective? Should it be reformed? Can it be reformed?.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 373 Environmental Crime 3.0 Credits

The objective of this course is to provide students with an introduction to and overview of the federal criminal enforcement program concerning the criminal prosecution of certain types of violations of federal environmental laws and regulations. Although the focus of the course will be on the federal government's environmental crimes program that is administered by the United States Environmental Protection Agency, general concepts concerning criminal law and procedure will also be discussed. More specifically, topics to be covered will include, among other things: the history of the federal environmental crimes program; the role of EPA-CID Special Agents and federal prosecutors in the investigation and prosecution of environmental crimes; environmental offenses under the federal Federal Acts.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 374 Restorative Justice 3.0 Credits

Restorative justice is a paradigm shift in criminal justice in response to the failure of the traditional retributive model to meet the needs of victims, offenders and the community. This course offers an overview of Restorative Justice, including its definitions, history, theoretical and legal basis, principles and practices, controversial issues, and evaluative research as to its efficacy and reducing crime and restoring victims and communities.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 375 Criminal Procedure 3.0 Credits

A solid understanding of constitutional criminal procedure is essential to any career in the law or law enforcement. Further, as America seeks to protect itself from terrorism, every citizen should understand the constitutional protections that Americans have historically enjoyed which have been and continue to be diminished by the courts and the legislature.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 376 Sentencing 3.0 Credits

We explore the theoretical basis for sentencing, including the purposes of sentencing, and determination of the just sentence, including the consideration of the crime, as well as the offender's background and criminal history. We cover contemporary issues like prosecutorial misconduct, plea bargaining, sentencing guidelines, mandatory minimums, truth in sentencing and the impact of racial and gender disparities. We also spend time investigating special issues within the field such as the sentencing of juveniles and capital sentencing procedures.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 377 Intellectual Property Theft in the Digital Age 3.0 Credits

This seminar focuses on the changing nature of intellectual property theft, piracy, and copyright infringement in the Digital Age. Attention will be paid to legislative and technical solutions for protecting copyrighted goods (including music, movies, and software) and the challenges faced when investigating the theft of intellectual property. Additionally, theoretical explanations to account for intellectual property theft will be explored.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 378 Science of Forensic Science 3.0 Credits

Forensics is the application of science or other disciplines to the Legal System. Students will study the science of science in application of ethics and scientific method to evidence analysis and presentation of data to Court. Students will learn to recognize and deal with context, observer, expectancy, and experimenter effects. Data from actual cases will be discussed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 379 Forensic DNA Analysis 3.0 Credits

An introduction to DNA analysis methods in current forensic testing. Genetics, inheritance, DNA biochemistry are applied to a fluorescent detection technology to produce results using one or more manufactured DNA testing kits. Students will be exposed to actual casework data and as virtual analyst present results to juries and judges.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CJS 400 Capstone in Criminology and Justice Policy 3.0 Credits

The capstone course will be open only to Criminology and Justice Policy Seniors. This course serves as an opportunity for students to apply their cumulative knowledge in the Criminology and Justice Policy concentration to an identified crime, policy, and/or criminal justice deployment problem facing the field today. This may be a more global problem, such as mass incarceration across the United States, or a highly localized problem, such drug markets in an urban setting. Students will work in consultation with the professor and their class peers to identify a problem, and then develop an evidence-based solution to address the problem. The course culminates with students presenting their evidence-based solutions to the class at the end of the quarter.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CJS and classification is Senior.

CJS 401 Program Evaluation 3.0 Credits

This course will examine research designs and statistical methods often used when evaluating criminal justice programs or policies. The course will focus mostly on the conceptual, rather than the applied, giving students an opportunity to begin to synthesize the methods and techniques to which they were exposed in the previous methods and analytics courses. During the course, students will develop a proposal to conduct an evaluation of a policy and/or program, using a research design that meets the benchmarks of scientific quality; and they will incorporate several research and analytics strategies they learned in previous courses.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CJS 250 [Min Grade: C] and CJS 300 [Min Grade: C] and CJS 330 [Min Grade: C]

CJS 402 Capstone in Justice Informatics 3.0 Credits

The Capstone in Justice Informatics course calls upon students to integrate the concepts covered in the informatics, computing, analytical, and methodological courses in their major to develop a informatics-driven plan that addresses a problem pertaining to crime, criminality, or criminal justice. The course will culminate with students making a professional presentation of their plan/project to the class.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CJ and classification is Senior.

CJS I199 Independent Study in CJS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJS I299 Independent Study in CJS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJS I399 Independent Study in CJS 0.5-12.0 Credits

Provides a course of independent study in Criminology and Justice Studies. Topics for study must be approved in advance of registration by the advisor and the instructor involved.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJS I499 Independent Study in CJS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJS T180 Special Topics in Criminology & Justice Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJS T280 Special Topics in Criminology & Justice Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJS T380 Special Topics in Criminology and Justice Studies 12.0 Credits

This course will explore current issues and interests in Criminology and Justice Studies. The topic will vary each term.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CJS T480 Special Topics in Criminology & Justice Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Culinary Arts

Courses

CULA 115 Culinary Fundamentals 3.0 Credits

Introduces culinary principles and procedures used in commercial food preparation and practical application of classical culinary techniques.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

CULA 120 Techniques and Traditions I 3.0 Credits

In this foundation culinary course, students will learn the fundamentals of a professional kitchen through lecture, demonstration and production. Classical and contemporary techniques are emphasized for development of cooking methods, knife skills, and food and kitchen safety and sanitation.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

CULA 121 Techniques and Traditions II 3.0 Credits

A continuation of CULA 120. Students will further develop their kitchen skills with application to recipe and menu development and plate design. Service to the public will be executed through various preparation techniques and types of service.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 120 [Min Grade: D]

CULA 125 Foundations of Professional Baking 3.0 Credits

This course will introduce students to the foundations needed to work in a pastry kitchen. This hands-on lab class will help build students sense of timing and a delicate touch needed to produce classic bakery items such as pies, cookies, muffins, biscuits, pastry cream, and basic breads.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 115 [Min Grade: D] (Can be taken Concurrently)

CULA 216 A la Carte 3.0 Credits

This is a sophomore level course in dining operations designed around a weekly restaurant operation, which is marketed and delivered to the Drexel Community and general public.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 121 [Min Grade: D]

CULA 220 Patisserie I 3.0 Credits

Students will be introduced to a variety of techniques that are the foundations to creating restaurant quality desserts, including mousses, sorbets, custards, ice creams, and frozen desserts. Along with learning techniques, applications, and utilization of products dessert plating will be part of the students development.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 125 [Min Grade: D]

CULA 225 Patisserie II 3.0 Credits

This course will further develop students sense of creativity, flavor, texture, color, and presentation skills. Building on knowledge and techniques already learned in previous courses, this course will provide students with knowledge and touch to produce professional quality desserts of all sizes from amuse bouche, petit fours, and sophisticated desserts.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 220 [Min Grade: D]

CULA 226 Patisserie III 2.0 Credits

This advanced pastry course is the third in a series of related topics. Culinary students will have the opportunity to work with techniques in cake decorating, sugar and chocolate work, and candy making. Attention to detail in pastry arts will be emphasized in this course.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 225 [Min Grade: D]

CULA 227 Wheat and Grains: Artisan Breads 3.0 Credits

This course will introduce students to proper techniques in producing a variety of artisan breads. The course will allow students to create professional style breads and allow for fully developed yeast fermentation. Students will learn the skills, terminology, and calculations to produce artisan breads in volume.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 125 [Min Grade: D]

CULA 228 Design, Presentation, and Decorating in Pastry 3.0 Credits

This course will give students the foundation to create a variety of cakes for many special occasions. Students will learn to produce and utilize different types of icings, fondant, and cake styles to build numerous flavor and texture combinations. Along with the skills learned in garnishing student will create a variety of professional quality cakes.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 125 [Min Grade: D]

CULA 229 Confectionery 3.0 Credits

This course will give students an excellent foundation in understanding, taste, and usage of chocolate and its many forms. Students will learn to properly temper chocolate and then utilize it for creating garnishes and artisan candies. In addition the proper technique for sugar cookery will be learned and then applied for a variety of confections.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 125 [Min Grade: D]

CULA 235 Professional Dining Room Management 3.0 Credits

Students will manage front-of-the house operations in a professional dining room setting with fine dining service to the public. Table side preparations and cookery will be strongly emphasized with weekly executions.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 121 [Min Grade: D]

CULA 240 Fundamentals of Chinese Cuisine 3.0 Credits

Students will explore traditional regional preparations with Chinese ingredients, such as beef, fowl, lamb, vegetables and various fish and seafood.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 115 [Min Grade: D] or CULA 120 [Min Grade: D]

CULA 290 Culinary Arts Practicum I 3.0 Credits

Students will gain work experience in culinary production while under faculty supervision. Students obtain industry jobs, work a minimum of 60 hours, log their experiences, and write a final analysis. The networking opportunities often lead to rewarding co-op, part time, or full time employment opportunities. Students take CULA 290 or CULA 291.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CLSC or major is CULA.

Prerequisites: CULA 120 [Min Grade: D]

CULA 291 Culinary Arts Practicum II 6.0 Credits

Students will gain work experience in culinary production while under faculty supervision. Students obtain industry jobs, work a minimum of 120 hours, log their experiences, and write a final analysis. The networking opportunities often lead to rewarding co-op, part time, or full time employment opportunities. Students take either CULA 290 or CULA 291.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CLSC or major is CULA.

Prerequisites: CULA 120 [Min Grade: D]

CULA 300 Fundamentals of Vegetarian Cuisine 3.0 Credits

Vegetarian cooking is explored by examining ethnic specific global cuisines. Vegetable based diets are a result of geography, economics, politics, culture, religion and choice. By understanding and appreciating diverse peoples and their foods, the student will expand not only his or her culinary repertoire, but also achieve a greater global and cultural awareness.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 120 [Min Grade: D] or CULA 115 [Min Grade: D]

CULA 303 Global Cuisine Studio 3.0 Credits

This course will serve as the foundation for a variety of ethnic cuisine options including French, Italian, Chinese, Korean, Indian, Caribbean and Island Cuisine.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated 4 times for 15 credits

CULA 305 Fundamentals of Italian Cuisine 3.0 Credits

Students will be presented with the philosophy of traditional Italian cooking as it is articulated in the culture of Italy. There will be a strong emphasis on regional ingredients and recipes. Topics include: basic menu language, terminology, preparation of various antipasti, pasta, and risotto.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 120 [Min Grade: D] or CULA 115 [Min Grade: D]

CULA 306 Advanced Italian Cuisine 3.0 Credits

A continuation of CULA 305. Utilizing regional Italian products, students will produce classical and traditional recipes with opportunity to further develop personal style and creativity. Proper seasoning, handling of product, and family style and plated presentations will be emphasized.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 305 [Min Grade: D]

CULA 310 Fundamentals of French Cuisine 3.0 Credits

The course explores the history, culture and persistent influence of the French 'methode' and its relevancy to the contemporary kitchen. The major French regional classic dishes and techniques will be studied and produced; each week visiting a different geographic locality from Provence to Alsace.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 120 [Min Grade: D] or CULA 115 [Min Grade: D]

CULA 311 Advanced French Technique 3.0 Credits

A continuation of CULA 310. This course more deeply explores the history persistent influence of the French 'methode' and its relevancy to the contemporary kitchen. Each week will examine on a single food category; Potages, Poisson, veau, volaille, Gibier. Patisserie, etc., as well as a significant figures in gastronomic history from Taillevent to Paul Bocuse and beyond — from the earliest origins of Haute Cuisine to Modernist and applications to evolving contemporary cuisine. Related topics of French art, culture and music will be included.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 310 [Min Grade: D]

CULA 315 Fundamentals of American Cuisine 3.0 Credits

The course provides a foundation in American regional cuisine by examining the history, diverse cultures and culinary traditions of the evolving United States from native Americans and first settlers to the present day. Students follow a culinary cultural journey through time and geography, preparing a variety of dishes from influential cuisines, in search of a definition for American Cuisine.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 120 [Min Grade: D] or CULA 115 [Min Grade: D]

CULA 316 Butchery Laboratory 2.0 Credits

In this culinary lab course students will execute the fabrication of meat, fish and poultry products, skills necessary in any professional kitchen operation. Students will perform yield tests and calculate portion cost of fabricated items.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 115 [Min Grade: D] or CULA 120 [Min Grade: D]

CULA 320 Advanced Culinary Studio 3.0 Credits

Under the direction of culinary industry leaders and program faculty students will prepare and produce finished plates using a variety of previously learned skills. Finished products will reflect the style of a chosen culinary industry leader executed with the judgment and professionalism of the student.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 115 [Min Grade: D] or CULA 120 [Min Grade: D]

CULA 325 Garde Manger Laboratory 3.0 Credits

Introduces techniques used in the fabrication, selection and preparation of cold buffet production. Items include cold appetizers, canapes, garnishes, hors d'oeuvres, salads, and sandwiches. Additional focus on decoration, form, and presentation of cold food items.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 120 [Min Grade: D] or CULA 115 [Min Grade: D]

CULA 328 Brasserie Applied Baking 3.0 Credits

This course will develop students ability to cross utilize the mediums of culinary arts and pastry arts. In almost every food service operation the techniques and products made by both the savory and sweet kitchen are seamlessly combined to create the menu. Students will focus on combining both of these disciplines to create contemporary and classic dishes.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 125 [Min Grade: D] and CULA 320 [Min Grade: D] and CULA 325 [Min Grade: D] and CULA 227 [Min Grade: D]

CULA 330 Charcuterie 3.0 Credits

Students learn about the chemistry and techniques of curing, brining, and smoking. Items covered include classic and modern, forcemeats, pates, galantines, terrines, and sausages (fresh and dry).

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 115 [Min Grade: D] or CULA 120 [Min Grade: D]

CULA 335 Fundamentals of Indian Cuisine 3.0 Credits

This course introduces students to the diverse cooking and cultures of India. Explores India's unique cooking methods and the varied use of herbs, spices, and condiments.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 120 [Min Grade: D] or CULA 115 [Min Grade: D]

CULA 400 Directed Studies with a Master Chef 3.0 Credits

Structured program that allows students the opportunity to practice the skills and competencies learned in coursework with an acknowledged culinarian in a qualified foodservice operation. Students are monitored by their direct supervisor, by Culinary Arts faculty, and by evaluation of written reports, workbooks, journals, and portfolios prepared during the course.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 115 [Min Grade: D] or CULA 120 [Min Grade: D]

CULA 405 [WI] Culture and Gastronomy I 3.0 Credits

The first of two courses devoted to the study of food as a determinant, how culture, beliefs, methods of acquisition, preparation and social interaction impact on a global scale. Reading, research, and course study focuses on food sources, discoveries and the evolution of sustainables and their effects on the formation of tribes and communities, population growth and expansion. Dishes, history and commonalities from three global cuisines will be compared, prepared and discussed. This is a writing intensive course. Classes are divided between lecture and cooking labs.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

CULA 410 Culture and Gastronomy II 3.0 Credits

The second of two courses devoted to the study of food and culture. The course comprises a survey of contemporary food studies topics and an examination of food choices in contemporary society. Reading, research and course study focuses on food sources, individual and gender identity, the global food chain, sustainability, inherent "costs" of contemporary consumables, and the future of food in an ever expanding global economy. Classes are divided between lecture and cooking labs. This is a reading and writing intensive course.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 405 [Min Grade: D]

CULA 412 Food Writing 3.0 Credits

A practical introduction to food journalism. Explores through regular writing and reading assignments the broad range of topics typically encountered in a newspaper or magazine environment, from ingredient features and trend stories, to profiles, first person essays, restaurant criticism, "live" deadline assignments, and long-form magazine projects.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

CULA 415 Food Styling and Photography 3.0 Credits

The course deals with the basics of composition, color theory, basic digital photography, food styling techniques, and what constitutes a professional photographic image. An art historical approach is used to facilitate the development of aesthetic judgment. Students prepare a variety of dishes, utilizing and amplifying cooking skills, prop, style, and photograph a variety of themed food and drink employing new skills in a new and exciting manner.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 115 [Min Grade: D] or CULA 120 [Min Grade: D]

CULA 420 Senior Design Project 3.0 Credits

Students will undertake individual creative research which will enable them to prepare for the Culinary Arts Program annual show. Emphasis will be on the incorporation of skills, technologies and techniques learned from prior coursework and experience.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CULA 310 [Min Grade: D] and CULA 315 [Min Grade: D]

CULA 421 Senior Design Project I 2.0 Credits

Students will undertake individual creative research which will enable them to prepare for the Culinary Arts Program annual show. Emphasis will be on the incorporation of skills, technologies and techniques learned from prior coursework and experience.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

CULA 422 Senior Design Project II 2.0 Credits

Students will undertake individual creative research which will enable them to prepare for the Culinary Arts Program annual show. Emphasis will be on the incorporation of skills, technologies and techniques learned from prior coursework and experience.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 421 [Min Grade: D]

CULA 423 Senior Design Project III 2.0 Credits

Students will undertake individual creative research which will enable them to prepare for the Culinary Arts Program annual show. Emphasis will be on the incorporation of skills, technologies and techniques learned from prior coursework and experience.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: CULA 421 [Min Grade: D] and CULA 422 [Min Grade: D]

CULA 425 The Kitchen Garden 3.0 Credits

This course familiarizes students with the preparation and planting of a raised-bed culinary garden using organic techniques. Students will practice indoor and outdoor seed sowing; learn to promote soil health and study the relationships between the kitchen and the garden. The harvested spring produce is used for various culinary applications.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

CULA 426 The Kitchen Garden: Summer 3.0 Credits

This course familiarizes students with the dynamics of the contemporary kitchen garden as a food source, and a platform for environmental stewardship. Students will study the importance of plant nutrition; and take part in community garden outreach activities. The harvested summer produce is used in summer term Culinary Arts classes.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

CULA 427 The Kitchen Garden: Fall 3.0 Credits

This course familiarizes students with the complex relationships between food sources, conventional vs. sustainable farming practices; and the ethics of food access and waste analysis. Preservation of the harvest is explored; and the fall produce is used in various culinary applications.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

CULA 440 Food in the Arts 3.0 Credits

Provides an overview of food in artistic settings. Course offerings will be rotated to include food in literature, food in painting, and food in film.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated 2 times for 9 credits

Prerequisites: CULA 121 [Min Grade: D]

CULA I199 Independent Study in CULA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

CULA I299 Independent Study in CULA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

CULA I399 Independent Study in CULA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CULA.

CULA I499 Independent Study in CULA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

CULA T180 Special topics in CULA 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

CULA T280 Special topics in CULA 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

CULA T380 Special topics in CULA 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

CULA T480 Special topics in CULA 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CULA.

Custom-Designed Major

Courses

CSDN 101 [WI] Introduction to Multi-Disciplinary Methods 1.0 Credit

Teaches Custom-Designed Major students about the many different methods of scholarly analysis practiced across the university. Students will be introduced to the methods practiced in the social sciences and humanities, creative arts, science and engineering, and business.

College/Department: Pennoni Honors College

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CSDN.

Prerequisites: HNRS 200 [Min Grade: D]

CSDN 102 Knowledge by Design Seminar 1.0 Credit

Develops skills in designing curriculum paths at the University, designing research topic bibliographies, and developing original research questions and methodologies. The course culminates in the preparation of a formal proposal for the student's course of study in the Custom-Designed Major Program.

College/Department: Pennoni Honors College

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CSDN.

Prerequisites: CSDN 101 [Min Grade: D]

CSDN 203 Custom-Designed Major Seminar 1.0 Credit

Brings Custom-Designed Major students at the sophomore, pre-junior, and junior years together to present and critique original work with their peers related to their individualized courses of study.

College/Department: Pennoni Honors College

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CSDN and classification is Sophomore.

Prerequisites: CSDN 102 [Min Grade: D]

CSDN 304 Custom-Designed Major Proj I 3.0 Credits

Research project sequence for the Custom-Designed Major program.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Can enroll if classification is Senior.

CSDN 305 Custom-Designed Major Project II 3.0 Credits

Research project sequence for the Custom-Designed Major program.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Can enroll if classification is Senior.

CSDN 306 Custom-Designed Major Project III 3.0 Credits

Research project sequence for the Custom-Designed Major program.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Can enroll if classification is Senior.

CSDN I199 Independent Study in CSDN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

CSDN I299 Independent Study in CSDN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

CSDN I399 Independent Study in CSDN 1.0-3.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated 2 times for 6 credits

CSDN I499 Independent Study in CSDN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

CSDN T180 Special Topics in CSDN 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

CSDN T280 Special Topics in CSDN 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

CSDN T380 Special Topics in CSDN 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

CSDN T480 Special Topics in CSDN 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Customer Operations

Courses

CUST 401 Customer Service Practicum I 4.0 Credits

First of a three-course series. Combines classroom theory with practical application at the student's worksite, completing the learning experience. Requires students to demonstrate the ability to apply classroom learning to situations benefitting a corporation. Includes proposals, reports on work in progress, contributions to team efforts and methods of measurement identified by the faculty or mentor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CUST 402 Customer Service Practicum II 4.0 Credits

Second of a three-course series. Combines classroom theory with practical application at the student's worksite, completing the learning experience. Requires students to demonstrate the ability to apply classroom learning to situations benefitting a corporation. Includes proposals, reports on work in progress, contributions to team effort and methods of measurement identified by the faculty or mentor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CUST 403 Customer Service Practicum III 4.0 Credits

Third of a three-course series. Combines classroom theory with practical application at the student's worksite, completing the learning experience. Requires students to demonstrate the ability to apply classroom learning to situations benefitting a corporation. Includes proposals, reports on work in progress, contributions to team efforts and methods of measurement identified by the faculty, or mentor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CUST I199 Independent Study in CUST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CUST I299 Independent Study in CUST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CUST I399 Independent Study in CUST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CUST I499 Independent Study in CUST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor. Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CUST T180 Special Topics in CUST 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CUST T280 Special Topics in CUST 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

CUST T380 Special Topics in CUST 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

CUST T480 Special Topics in CUST 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

Dance

Courses

DANC 100 Survey of Dance Studies 3.0 Credits

This course will include lecture, reading assignments, writing assignments and self-reflection activities to introduce students to academic dance coursework in higher education.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 101 Introduction to Dance Studies 3.0 Credits

This course will include lecture, reading assignments, writing assignments and self-reflection activities to introduce potential part-time professional dance program participants to coursework in higher education.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 110 Movement for Actors 3.0 Credits

Employs specific exercises designed to increase the actor's ability to move freely and with expression and to appreciate the role of movement in the making of theater.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 120 Yoga 3.0 Credits

The physical and intellectual study of the ancient practice of yoga. Includes both physical practice and readings related to the discipline, as well as a survey of a variety of forms of the practice.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 12 credits

DANC 131 Dance Practicum in Performance 1.0 Credit

Provides practical experience as a dancer in a Department of Performing Arts dance production. Includes helping with preperformance production, attending all rehearsals, and performing in the concerts. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DANC 132 Dance Practicum in Production 1.0 Credit

Provides practical experience in dance production, including participation in publicity, costume construction, lighting design, box office, and program production for a Drexel University Dance Ensemble concert. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DANC 133 Dance Practicum in Choreography 1.0 Credit

Covers the process of developing an idea into a finished dance through close work with the artistic director, including selecting dancers and music; teaching the movement; planning costumes, lighting, and sets; polishing the work; and presenting it to an audience during a Drexel University Dance Ensemble concert. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DANC 140 Ballet Technique I 2.0 Credits

Introduces ballet dance vocabulary including alignment, stretching and strengthening, line, flexibility and movement phrases.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 14 credits

DANC 141 Ballet Technique II 2.0 Credits

Studio course in intermediate level ballet technique. Further develops students' alignment, line, muscular stamina, flexibility and movement vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 14 credits

Prerequisites: DANC 140 [Min Grade: D]

DANC 142 Ballet Dance Technique III 2.0 Credits

Studio course in advanced level ballet technique. Further develops students' alignment, line, muscular stamina, flexibility and movement vocabulary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 16 credits

Prerequisites: DANC 141 [Min Grade: D]

DANC 150 Modern Dance Technique I 2.0 Credits

Introduces modern dance vocabulary, including stretching and strengthening exercises, alignment, movement phrases, and basic locomotor skills. Includes performances and discussion.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 14 credits

DANC 151 Modern Dance Technique II 2.0 Credits

Covers advanced modern dance vocabulary, including stretching and strengthening exercises, alignment, movement phrases and basic locomotor skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 14 credits

Prerequisites: DANC 150 [Min Grade: D]

DANC 152 Modern Dance Technique III 2.0 Credits

This course covers advanced modern dance vocabulary, including stretching and strengthening exercises, alignment principles, movement phrases and increasingly complex locomotor skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 16 credits

Prerequisites: DANC 151 [Min Grade: D]

DANC 160 Jazz Dance Technique I 2.0 Credits

Introduces jazz dance style, concentrating on body isolations, movement vocabulary and the development of movement phrases.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 6 credits

DANC 161 Jazz Dance Technique II 2.0 Credits

Covers advanced jazz dance style, concentrating on body isolations, movement vocabulary, and the development of movement phrases, syncopation and flexibility.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 6 credits

Prerequisites: DANC 160 [Min Grade: D]

DANC 162 Jazz Dance Technique III 2.0 Credits

This course covers advanced jazz dance styles for highly experienced students, concentrating on body isolations, movement vocabulary and the development of movement phrases, syncopation and flexibility.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 16 credits

Prerequisites: DANC 161 [Min Grade: D]

DANC 170 Hip-Hop Dance Technique I 2.0 Credits

Introduces hip-hop dance technique, vocabulary, movement principles, muscle control, and body alignment. Includes appreciation for funk and hip-hop with historical and cultural contexts.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 6 credits

DANC 171 Hip-Hop Dance Technique II 2.0 Credits

Advanced hip-hop dance technique, vocabulary, movement principles, muscle control, and body alignment. Includes appreciation for funk and hip-hop with historical and cultural contexts.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 8 credits

Prerequisites: DANC 170 [Min Grade: D]

DANC 180 Dance Improvisation 2.0 Credits

A studio course in creative movement. Uses contact and structured improvisational problems, interaction between dances and the elements of time, space and force.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 6 credits

DANC 181 Dance Improvisation II 2.0 Credits

A studio course in advanced creative movement. Uses improvisational problems and improvisational dance making to study momentum, speed, alignment, contact, sound, group work, and dramatic intention.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DANC 180 [Min Grade: D]

DANC 190 African Dance Technique I 2.0 Credits

This studio course is designed to explore the aesthetic, movement, music and rituals found in African Dance forms.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 6 credits

DANC 191 African Dance Technique II 2.0 Credits

This studio course is an advanced exploration of the aesthetic, movement, music and rituals found in African Dance forms. It builds on principles of African I and introduces more complex and physically demanding repertory.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 8 credits

Prerequisites: DANC 190 [Min Grade: D]

DANC 201 [WI] Dance Appreciation 3.0 Credits

Teaches students to look at dance as an art form, emphasizing the ability to analyze and understand various dance styles. Includes films, readings, performances, and discussion. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 210 Introduction to Dance 3.0 Credits

A studio and classroom course. Examines the elements of dance through study and participation in classical, theatrical, and social forms. Includes readings, films, and discussion.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 220 History of Dance 3.0 Credits

Broadly surveys dance from ancient times to the present, including development of the European aesthetic. Examines the cultural significance of dance through the ages. Includes films, performances, and discussion.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 225 Dance Repertory 4.0 Credits

This course allows dancers to synthesize their technical abilities with their knowledge of dance history as they learn the works of major historical choreographers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 6 credits

DANC 230 Survey of Dance and Movement Therapy 3.0 Credits

This course investigates the use of dance as a diagnostic and therapeutic tool for psychological health and recovery.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 240 Dance Composition I 3.0 Credits

Explores the basic traditional forms of solo and group composition through improvisation, manipulation of movement phrases and critique.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 241 Dance Composition II 3.0 Credits

This course explores the advanced forms of solo or group choreography including narrative, abstract and musical interactions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 6 credits

Prerequisites: DANC 240 [Min Grade: D]

DANC 260 Injury Prevention for Dance 3.0 Credits

This course uses physical and intellectual exploration to create individual flexibility and injury prevention plans that meet the student's goals. It is particularly targeted to dancers who use their bodies intensively.

Techniques for injury prevention and recovery are emphasized.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 261 Foundations of Somatic Theory and Practice 3.0 Credits

This course, for beginner through advanced, teaches you to maximize your potential for dance, sports, yoga, martial arts or any movement practice, through readings, exercises and assignments that build core strength, flexibility and efficient action.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 262 Dance and Fitness 3.0 Credits

This course explores areas of health and fitness that impact peak physical performance for dance and related activities. Topics will be covered through a combination of kinesthetic and academic approaches.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DANC 263 Survey of Somatic Practices 3.0 Credits

This course investigates a range of integrative mind/body practices for physical well-being and optimal performance.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DANC 261 [Min Grade: D]

DANC 310 [WI] Dance Aesthetics and Criticism 3.0 Credits

This course is designed to introduce students to the concepts of aesthetics which affect the ways in which dance is created, performed and viewed. Issues of dance criticism and how this pertains to aesthetic judgment will also be addressed. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

DANC 325 [WI] Twentieth Century Dance 3.0 Credits

Covers the history of Western theatrical dance from the beginning of the century to contemporary times. Emphasizes the development of modern dance in the United States. Includes films, performances, and discussion. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

DANC 330 Introduction to Laban Movement Analysis 3.0 Credits

This course introduces the principles of movement analysis by Rudolph Von Laban including an exploration of effort - shape, space and body as introduced by physical therapist Irmgard Bartenieff.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

DANC 340 Dance Pedagogy 3.0 Credits

This course explores the social and physical development of children as it relates to the teaching of dance. Develops a repertoire of techniques for teaching children and adults.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

DANC 355 Rhythmic Study for Dance 3.0 Credits

Covers rhythmic structures that can accompany dance, including sight reading and eurhythmics.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

DANC 360 Dance Kinesiology 3.0 Credits

This course will provide an introduction to the musculoskeletal system and basic health information. Students will gain an understanding of anatomy and kinesiology and will explore how these topics are related to dance, normal daily activities, injury prevention, and healthy lifestyle choices. The kinesiological concepts presented in this course will be applied using the context of dance movement.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

DANC 380 Special Topics in Dance 0.5-3.0 Credits

Covers selected topics in dance. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

DANC 495 Directed Studies in Dance 0.5-12.0 Credits

Offers supervised individual study of special subjects in dance. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

DANC I199 Independent Study in DANC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

DANC I299 Independent Study in DANC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

DANC I399 Independent Study in DANC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

DANC I499 Independent Study in DANC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

DANC T180 Special Topics in Dance 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

DANC T280 Special Topics in Dance 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

DANC T380 Special Topics in Dance 0.5-3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

DANC T480 Special Topics in Dance 0.5-3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

Design & Merchandising

Courses

DSMR 100 Computer Imaging I 3.0 Credits

The course explores the fundamentals of computer design software including Adobe Photoshop, Illustrator and InDesign. Projects include graphics creation and manipulation; image acquisition, text creation and manipulation; typography; input and output options and control; hardware/software/system fundamentals; and troubleshooting as they relate to the creative industries.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DSMR or major is EAM.

DSMR 201 Analysis of Product 3.0 Credits

This course examines the methods by which non-apparel products are conceived, designed and brought to market. Students learn to recognize the importance of design integrity in the areas of home furnishing, cosmetics, accessories, paper products, footwear, and industrial design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DSMR 205 eFashion Promotion 3.0 Credits

Utilizing current and commonly available technologies, students develop a communication plan to disseminate current trend and style information to end use customers. Students explore past, analyze and participate in the present and consider the future uses of new technologies in merchandising fashion apparel, accessories and home products.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

DSMR 210 Presentation Techniques Design and Merchandising 3.0 Credits

This course explores the various types of presentation/storyboard formats used within the industry in merchandising product. The student learns to create an array of presentations used for visual communication among all facets of the workplace as well as market research specific to the design industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]) and (VSCM 100 [Min Grade: D] or DSMR 100 [Min Grade: D])

DSMR 211 Computer Design for Design and Merchandising 3.0 Credits

This course addresses the use of computer design as a merchandising and design tool for branding and promotion of a business or organization. The student is introduced to the branding process from a visual point of view and will create brand identity materials through the use of computer software programs including Adobe Photoshop, Illustrator and InDesign.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSCM 100 [Min Grade: D] or DSMR 100 [Min Grade: D]

DSMR 212 Visualization Techniques for Design & Merchandising 3.0 Credits

Visual Presentation for Design and Merchandising explores hand drawn and 3D computer software tools to accurately express design intentions for store and window displays, branded fixture plans as well as other design related projects. This course focuses on analog and digital techniques including diagrammatic sketching, 1-point perspective, visual note-taking and mind-mapping skills, hand coloring techniques, concept boards and SketchUp.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 111 [Min Grade: D]

DSMR 230 Textiles for Design and Merchandising 3.0 Credits

Examines the textile manufacturing industry and the fundamental processes involved in producing natural and man-made fabrics as they relate to Design & Merchandising. Includes basic terminology and production processes as well as selection and evaluation of fabrics based on aesthetics, performance and care characteristics.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DSMR.

Cannot enroll if classification is Freshman

DSMR 231 Retail Principles 3.0 Credits

Examines retail philosophies within a marketing context, including understanding of how consumer behavior, present and future, determines retailers' marketing strategies; knowledge of product mix and product assortment; and understanding of operating retail ventures in the global marketplace.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

DSMR 232 Retail Merchandise Planning 4.0 Credits

Provides a working knowledge of merchandise planning, flow, and distribution in the retail setting. Covers profitable merchandise and assortment planning and control in both conceptual and technical formats. Final project incorporates six-month financial, classification, and assortment planning.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 115 [Min Grade: D] or ECON 201 [Min Grade: D] or DSMR 231 [Min Grade: D] or ACCT 110 [Min Grade: D]

DSMR 233 [WI] Retail Image Analysis 3.0 Credits

Students will perform an in-depth analysis of theoretical and applied retail product and brand research. Qualitative, quantitative and triangulation methods of research will be discussed. The course focuses on researching, writing and presenting various topics in a professional environment. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DSMR 305 eTailing 3.0 Credits

Students explore and analyze past, current and future trends in ecommerce technologies that primarily support the back end inventory, logistics and front end operations of the fashion apparel, accessory and home products industries.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

DSMR 309 Color and Trend Forecasting 3.0 Credits

This course provides an overview of the fashion forecasting function in Fashion, Design & Merchandising. Students investigate color and trend forecasting, design research and concepts, and fabric direction. Students apply their knowledge in "hands on" color cards and development of a trend book.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSMR 210 [Min Grade: D] or FASH 210 [Min Grade: D]

DSMR 310 Computer Integrated Merchandising Management 3.0 Credits

This course will focus on the Apparel Management functions that exist between the merchandising, design, production and promotion elements of the apparel supply chain. The student will be a member of a team that must bring a fully merchandised collection from item selection through production to retail in an ideal Vertical Merchandising System. Forecasting, collection development, production and revisions, allocation of inventory, coordinated visual presentation packaging and problem solving of anomalies in the supply chain are integrated into this course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSMR 211 [Min Grade: D] and DSMR 232 [Min Grade: D]

DSMR 311 Visual Merchandising 4.0 Credits

Visual Merchandising combines design skills, consumer psychology and marketing principles to create window displays, floor merchandising and plan-o-grams in a retail environment that entices consumers to buy. Students will investigate related areas of store planning and design, point-of-purchase display, fixture design, and topics on trend in the industry. Students will apply the principles and elements of design in merchandise presentation, analysis and experimentation and field research. Methods of promoting and selling merchandise, analyzing leading retail firms, employing basic methods of displaying merchandise, and developing a basic understanding of the use of special materials and lighting will be integrated into experiential projects outside of the classroom.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (VSST 103 [Min Grade: D] or VSST 106 [Min Grade: D]) and DSMR 211 [Min Grade: D]

DSMR 312 Visual Merchandising II 3.0 Credits

Visual merchandising II is an in-depth look at exhibit design, where students explore the traditions, expectations and norms of exhibit design. Technological advances in exhibit design will be introduced and utilized to produce a visual outcome/presentation for exhibition purpose.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (VSST 103 [Min Grade: D] or VSST 106 [Min Grade: D]) and DSMR 210 [Min Grade: D] and DSMR 211 [Min Grade: D]

DSMR 313 International Fashion Merchandising 3.0 Credits

Introduces students already familiar with U.S. retail merchandising to global retail merchandising. Develops a framework for the international merchandising process and discusses effects of globalization.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSMR 231 [Min Grade: D]

DSMR 314 Visual Merchandising III 4.0 Credits

Assuming the role of the Visual Merchandiser students apply Visual Merchandising principles to the area of store planning and design, analyze leading retailers and trends, develop an understanding of the use of materials and lighting "in store," and learn to use industry software. This course is inter-disciplinary with Interior Design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DSMR or major is INTR and classification is Junior or Senior.

Prerequisites: DSMR 311 [Min Grade: D]

DSMR 315 [WI] Media Merchandising I 3.0 Credits

Media Merchandising I explores the process of creating, designing and publishing the annual D & M Magazine and accompanying media. The students develop all content organized around theses of school, city, fashion, product and technology, their various intersections as it relates to design and merchandising. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: VSST 103 [Min Grade: D] and DSMR 210 [Min Grade: D] and DSMR 211 [Min Grade: D] and ENGL 103 [Min Grade: D]

DSMR 316 Media Merchandising II 3.0 Credits

Media Merchandising II is a continuation of Media Merchandising I, where critical decisions with regard to informational articles, interviews, photography, graphic design, interactive media and paid advertisement are completed. The end result is the D & M Magazine, a distributable product with actual marketing potential.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: DSMR 315 [Min Grade: D]

DSMR 317 Media Merchandising III 3.0 Credits

Students work in interdisciplinary groups to develop and produce episode based style programming for delivery on DUTV and through other media broadcast media outlets. Students will develop a promotional package for the overall program series.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DSMR or major is FMVD and classification is Junior or Senior.

DSMR 318 Music Merchandising 3.0 Credits

Students work in interdisciplinary groups with Music Industry Program artists to create a comprehensive merchandise extension program including product selection, production, distribution and promotion within the context of the artists' overall brand package.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DSMR or major is EAM or major is MUSI and classification is Junior or Senior.

DSMR 320 Merchandising and Design Directions 3.0 Credits

Merchandising and Design Directions addresses the production of prototypes for a small collection of accessories or home products. The necessary collateral promotional materials for marketing these designs to a specific target market and retail outlet will also be created.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: VSST 103 [Min Grade: D] and DSMR 210 [Min Grade: D] and DSMR 211 [Min Grade: D]

DSMR 321 [WI] Fashion Show Production I 2.0 Credits

Limited enrollment. This course is an examination of the Fashion Show as a sales and marketing tool and as a historically important event in the evolution of the fashion industry. An understanding of all behind-the-scenes aspects of a professional fashion show will be discussed. This course introduces a hands-on experience in addition to academic course work. Especially for students interested in event planning, public relations and marketing, this course provides experience that will be valuable as students enter the workplace.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

DSMR 322 Fashion Show Production II 2.0 Credits

DSMR 322, Fashion Show Production II, is a continuation of DSMR 321. Whereas DSMR 321 examined the business of the fashion show using an academic approach (lecture, projects, video), DSMR 322 is a hands-on experience, which culminates in the production of Drexel's annual fashion show each year in June. The purpose of the course is to give students experience producing one of the College and University's most important public relations events. Students are an integral part of the team that plans, manages and executes all phases of the Fashion Show.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: DSMR 321 [Min Grade: D]

DSMR 324 Retail Intersections: Social & Cultural Issues 3.0 Credits

Those who participate in the business of fashion such as retailers, merchants, designers, manufacturers and stylists must evolve in order to sell to customers. Throughout their lives, students are exposed to retailing, merchandising, buying, design, sales, branding, promotions, manufacturing and other such fields. For those interested in the study of retailing, fashion and merchandising, it is essential to understand landmark research and theoretical concepts behind the influences of this field and how social change, innovations and with the evolution of a multicultural marketplace, shifts have occurred over generations, and into the 21st century. This conceptual and theoretical course will expose students to a diverse range of clients and consumers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSMR 231 [Min Grade: D]

DSMR 325 Retail Buying and Assortment Strategies 4.0 Credits

Advanced buying strategies focuses on in-season merchant operations of the merchant organization. Students develop assortment and promotional plans and learn to react to changes in their plans as the season unfolds. Students perform "hands on" tasks in conjunction with the D & M retail outlets.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSMR 232 [Min Grade: D]

DSMR 326 Fashion Product Promotion 4.0 Credits

This course examines aspects of Fashion Product Promotion in Design & Merchandising. Students will study a "host" city which will become integral in their retail promotional strategy. Students will conduct demographic, geographic, logistics, marketing and media through a variety of research methods. This course is offered as part of London Study Abroad and online with a Hong Kong partner school.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 8 credits

DSMR 333 Fashion Product Development 3.0 Credits

Provides an overview of both knitted and woven apparel. Covers the procedures and processes involved in apparel product development, particularly as related to retail merchandising and marketing. Considers styling as a reflection and a reinterpretation of current trends in specific markets.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 201 [Min Grade: D]

DSMR 397 Retail Practicum 3.0 Credits

Students work on a variety of hands on projects surrounding our retail laboratory, supporting the d&m popup and online retail outlets. Tasks may include: Product development, buying, visual merchandising, photography, operations, data collection, analysis and promotion.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 4 times for 15 credits

DSMR 398 D&M Practicum 0.5-4.0 Credits

Students work on a variety of special projects for ongoing D&M Program administration and special project requests from Industry and Community Partners that vary each term. The Industry and Community Partners and the D&M program are seen as clients, and these special projects are integral to their business. Examples include: developing content for the D&M program Social Media, developing and implementing mannequin display throughout the D&M program space, providing event planning support for community or industry partner events.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 10 times for 44 credits

DSMR 399 Independent Study in Design and Merchandising 12.0 Credits

Provides individualized study in design and merchandising in a specialized area of study. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

DSMR 410 Career Strategies for Design and Merchandising 3.0 Credits

Course develops skills that enable the student to put into place an effective job search strategy. Specifically geared to the D&M professions, students develop comprehensive area of expertise including networking, industry research, and industry hiring trends.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

DSMR 411 Design and Merchandising Portfolio Design 3.0 Credits

Students will prepare a complete visual showcase of their marketability and skills. Accepted industry standards, targeting visual elements to specific job goals and self-promotion will be emphasized.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DSMR 434 Fashion Product Sourcing 3.0 Credits

This course explores the history and growth of sourcing. Students consider the consumer benefits in terms of lower prices and quality. Sourcing is analyzed from the retail/product development point of view and will examine challenges they face in the global arena.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSMR 333 [Min Grade: D]

DSMR 465 Special Topics in Design and Merchandising 0.5-12.0 Credits

Provides study in design and merchandising on a special topic or on an experimental basis. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

DSMR 477 [WI] Design and Merchandising Seminar 3.0 Credits

Provides reading and discussion of pertinent topics of current concern in the professional area of design and merchandising. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DSMR.

Cannot enroll if classification is Freshman

DSMR 496 [WI] Senior Problem in Design and Merchandising 3.0 Credits

Provides an opportunity for the student to research, independently or within a group, an idea within the field of design-merchandising, synthesizing material and developing a presentation of that concept. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

DSMR I199 Independent Study in Design & Merchandising 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DSMR I299 Independent Study in Design & Merchandising 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DSMR I399 Independent Study in Design & Merchandising 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DSMR I499 Independent Study in Design & Merchandising 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DSMR T180 Special Topics in Design & Marketing 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DSMR T280 Special Topics in Design & Marketing 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DSMR T380 Special Topics in Design & Marketing 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DSMR T480 Special Topics in Design & Marketing 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Digital Media

Courses

DIGM 100 Digital Design Tools 3.0 Credits

Students learn the basics of visual design within the digital realm.

Software tools such as Adobe Photoshop and Illustrator are utilized.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DIGM 105 Overview of Digital Media 3.0 Credits

Surveys the history, theory, practice, technologies, and related social issues associated with the growth of digital media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DIGM 110 Digital Spatial Visualization 3.0 Credits

Students learn to represent 3D objects and spaces in 2D media using a variety of drawing and computer graphic techniques. This course lays important foundations for subsequent courses in 3D computer modeling and animation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 100 [Min Grade: D] and VSST 110 [Min Grade: D]

DIGM 220 Digital Still Imaging I 3.0 Credits

Introduces the still image for majors in screen-based visual media. Covers the making, appreciation, and critical analysis of images produced by still cameras using both film and digital capture. Screen-based presentation is primary, but a number of print-based projects are included.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 100 [Min Grade: D] and (VSST 101 [Min Grade: D] or VSST 108 [Min Grade: D])

DIGM 221 Digital Still Imaging II 3.0 Credits

Second course on the still image for majors in screen-based visual media. Continues the investigation begun in DIGM 220 Digital Still Imaging I. Introduces color and imaging and explores in greater depth the potentials of digital imaging applications for manipulation, enhancement, creative interpretation. Includes image preparation for the Web.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 220 [Min Grade: D]

DIGM 223 Creative Concept Design 3.0 Credits

This course explores methods to develop design concepts on demand. Topics to be considered include recognizing one's imaginative potential, expanding fanciful memory, and maintaining a creative ecology of mind.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DIGM 250 Professional Practices 3.0 Credits

Provides a professional orientation to the field through an exploration of a variety of digital media projects. In addition to lecture and discussions, allows students to take active part in role plays and presentations to achieve an understanding of the importance of team building, team work, and team management in all phases of digital media production from proposals to product delivery.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: DIGM 242 [Min Grade: D]

DIGM 252 Multimedia Timeline Design 3.0 Credits

Introduces basic design concepts and tools to create time based 2D and 3D multimedia. Addresses issues from pre-production planning, through, post-production and delivery; emphasis on time-based multimedia.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 100 [Min Grade: D]

DIGM 281 Interactive TV DVD-ROM 3.0 Credits

Students work to develop strategies for meaningful retrieval of mass amounts of media (video, still images, sounds, and text) for television DVD-ROM players. This course will cover basic forms of digital information storage and retrieval to and from TV DVD-ROM media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM or major is EAM or major is FMVD.

Prerequisites: DIGM 100 [Min Grade: D]

DIGM 291 Internship in Digital Media 0.5-12.0 Credits

Provides an internship in the field of digital media, with a minimum of 100 hours for 3 credits in a ten-week term. Requires students to provide an initial informational sheet on the internship and submit a final paper on the experience. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

DIGM 350 [WI] Digital Storytelling 3.0 Credits

By surfing the internet and playing computer games, by lectures, assigned readings, class screening, and research projects, this class explores the impact of digital media on art, design and daily living. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

DIGM 399 Independent Project-Digital Media 2.0-12.0 Credits

Supervised planning and execution of a project in the area of digital media. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

DIGM 451 [WI] Explorations in New Media 3.0 Credits

Through class presentations, field trips, discussions, readings, screenings and guest speakers; this class bridges artistic and technical aspects of new media in theory and practice. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

DIGM 465 Special Topics-Digital Media 3.0 Credits

Addresses current topics in a rapidly changing field. Possible offerings include multimedia databases, virtual reality modeling language (VRML), real-time 3-D graphics, open GL programming, interactive art in virtual space, and multithreaded narrative. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

DIGM 475 [WI] Seminar: The Future of Digital Media 3.0 Credits

Focuses on current and anticipated issues in digital media. Involves reading and discussion of news, product announcements, articles, and predictions related to digital media. Provides a comprehensive and up-to-date understanding of digital media, including its likely directions in the immediate future and long-term possibilities. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 492 [Min Grade: D]

DIGM 490 Digital Media Senior Project 3.0 Credits

In this course students produce professional-level media assets for a team based senior project in a simulated real-world production environment. It requires a project that demonstrates the integration of the academic and practical knowledge the student has acquired in the overall field as well as in one or more specializations. Students will refine their understanding of the production, delivery and presentation of quality digital media production through implementation of professional best practices, and practice and perfect written, oral, and visual presentation skills through the power of collaboration, teamwork and shared missions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 9 credits

Prerequisites: (ANIM 312 [Min Grade: D] or GMAP 377 [Min Grade: D] or IDM 372 [Min Grade: D]) and DIGM 451 [Min Grade: D]

DIGM 491 Digital Media Senior Project Studio 1.0 Credit

In this course Digital Media senior project teams will meet with an appointed advisor on the technical details of their specific project requirements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 3 credits

DIGM 492 Senior Project in Digital Media I 3.0 Credits

The first of a two-course sequence. Requires a project that demonstrates the integration of the academic and practical knowledge the student has acquired in the overall field as well as in one or more specializations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

DIGM 493 Senior Project in Digital Media II 3.0 Credits

The second of a two-course sequence.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM and classification is Senior.

Prerequisites: DIGM 492 [Min Grade: D]

DIGM 494 Senior Project in Digital Media III 3.0 Credits

The third of a three-course sequence. Requires a project that demonstrates the integration of the academic and practical knowledge the student has acquired in the overall field as well as in one or more specializations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM and classification is Senior.

Prerequisites: DIGM 493 [Min Grade: D]

DIGM I199 Independent Study in Digital Media 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DIGM I299 Independent Study in Digital Media 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DIGM I399 Independent Study in Digital Media 2.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DIGM I499 Independent Study in Digital Media 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DIGM T180 Special Topics in Digital Media 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DIGM T280 Special Topics in Digital Media 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DIGM T380 Special Topics in Digital Media 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DIGM T480 Special Topics in Digital Media 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Economics

Courses

ECON 201 Principles of Microeconomics 4.0 Credits

Examines allocation of resources within an economy. Major topics include interaction of supply and demand in markets, consumer choice, cost structure of firms, and profit maximization for competitive forms as well as firms with market power.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ECON 202 Principles of Macroeconomics 4.0 Credits

Examines measurement, growth, and fluctuation of aggregate economic activity. Includes national income accounting and explains determination of output, employment, and price level. Also provides an introduction to international economics, money and banking, and economic policy. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 201 [Min Grade: D] (Can be taken Concurrently)

ECON 203 Survey of Economic Policy 4.0 Credits

This course will introduce students to the application of economic principles for a variety of policy-relevant topics covered in more advanced economics classes. Examples of applications may include the analysis of financial and economic crises, mergers, free trade agreements, social security, and unemployment.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 202 [Min Grade: D] (Can be taken Concurrently)ECON 201 [Min Grade: D]

ECON 240 Economics of Health Care Systems 4.0 Credits

Examine the health care industry from an economic perspective, including demand, cost-benefit analysis, insurance, supply constraints, and the role of the government.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ECON 250 Game Theory and Applications 4.0 Credits

Introduces the basic ideas of game theory with a minimum of mathematics; and discusses application to economics, politics, business, behavioral science, philosophy, population biology and engineering.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: STAT 201 [Min Grade: C] or STAT 205 [Min Grade: C] or MATH 107 [Min Grade: C]

ECON 260 Economics of Small Business 4.0 Credits

Discusses economic topics relevant to the role and varieties of small businesses in industrialized economies, and to government policy with respect to small business.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 201 [Min Grade: C]

ECON 301 Microeconomics 4.0 Credits

Examines theory of the firm and theory of the consumer in a rigorous fashion. Also covers risk and uncertainty, price determination, market failures, and analysis of various government policies.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C] and (MATH 102 [Min Grade: C] or MATH 121 [Min Grade: C])

ECON 321 Macroeconomics 4.0 Credits

Provides an in-depth introduction to dominant theories behind short-run economic fluctuations and long-run economic growth. Employs both mathematical and graphical tools to discuss determination of output, employment, and price level in the aggregate economy. Also covers effectiveness of monetary and fiscal policies in dealing with unemployment and inflation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C] and ECON 301 [Min Grade: C] and (MATH 102 [Min Grade: C] or MATH 121 [Min Grade: C])

ECON 322 [WI] Economics Seminar 4.0 Credits

Requires research and writing of a scholarly paper on a topic in economics approved by an appointed faculty adviser. This is a writing intensive course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 301 [Min Grade: C] and ECON 321 [Min Grade: C]

ECON 326 [WI] Economic Ideas 4.0 Credits

Covers the history of economic thought and development of different schools of thinking in economics. This is a writing intensive course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

ECON 330 Managerial Economics 4.0 Credits

Covers applied economics relevant for decision-making processes. Emphasizes profit management, demand and cost analysis, pricing, and government policy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

ECON 331 International Macroeconomics 4.0 Credits

This course covers fundamental issues in open economy macroeconomics. We will learn about how fiscal and monetary policy work when the economy is open to international trade in goods and services and to international capital flows. We will also study the effects of these policies on the current account and the exchange rate. The course treatment will be mainly theoretical. However, we will frequently refer to features of the international financial markets data, and we will use examples, case studies, readings, videos and policy applications to illustrate the findings of the theory and/or to try to bridge the gap between the predictions of theoretical models and real world developments.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

ECON 334 Public Finance 4.0 Credits

This course explores the role of government in the economy. Students will analyze the rationales for government policies as well as their implications for equity and efficiency. Much of the course will center on current policy issues related to the national debt, Social Security, education, environmental protection and taxation. Both theoretical applications and empirical findings will be discussed.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C] and (MATH 102 [Min Grade: C] or MATH 121 [Min Grade: C])

ECON 336 Labor Economics 4.0 Credits

Develops an understanding of how labor institutions operate to determine wages and employment. Examines alternative policy questions involving unemployment and inflation, collective bargaining, investment in education and training, and other labor-related questions. Requires students to apply theoretical and empirical abilities to research a labor-related issue and improve the ability to think clearly and communicate effectively.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

ECON 338 Industrial Organization 4.0 Credits

Examines observational studies of industries with respect to competitive or non-competitive structure, conduct, and performance. Considers implications of profitability, technological innovation, antitrust policy, and competitiveness in trade. Reviews problems of measurement and sources of data.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C] and (MATH 102 [Min Grade: C] or MATH 121 [Min Grade: C])

ECON 342 Economic Development 4.0 Credits

Covers topics including driving forces of economic growth, economic planning, income distribution and poverty, labor migration, capital markets and saving, international debt problems and global economic crisis. Emphasizes underlying theories and realities of economic growth and development of less developed economies and emerging economies.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

ECON 344 Comparative Economic Systems 4.0 Credits

Covers theory and contemporary practices of capitalism, socialism, fascism, and the welfare state as economic systems.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

ECON 348 Mathematical Economics 4.0 Credits

Discusses the application of mathematics in economic models, with extensive discussion of economic applications of linear algebra and calculus. Considers implications of the assumptions of maximization of profits and utility. Stresses mathematical models and techniques useful in statistical applications of economics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C] and (MATH 102 [Min Grade: C] or MATH 121 [Min Grade: C])

ECON 350 [WI] Applied Econometrics 4.0 Credits

Applies statistics to economics, with emphasis on the special problems of statistical analysis of economic data, sources of data, and examples of applications and models. Covers forecasting the impacts of changing economic policy and of developments in industrial markets using economic-statistical models. This is a writing intensive course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C] and STAT 201 [Min Grade: C]

ECON 351 Resource and Environmental Economics 4.0 Credits

Examines the microeconomic and quantitative aspects of markets for both renewable and exhaustible resources, and the interaction between the energy and resource sectors of the economy and between the productive sectors of the economy and the natural environment, with evaluation of major public policy initiatives and issues in these areas.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

ECON 360 Time Series Econometrics 4.0 Credits

Introduce time-series econometric models and provide tools for empirical analysis using time-series economic and financial data, with specific emphasis on application and forecasting.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 201 [Min Grade: D] and ECON 202 [Min Grade: D] and ECON 350 [Min Grade: D]

ECON I199 Independent Study in ECON 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ECON I299 Independent Study in ECON 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ECON I399 Independent Study in ECON 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ECON I499 Independent Study in ECON 0.5-5.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ECON T180 Special Topics in ECON 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ECON T280 Special Topics in ECON 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ECON T380 Special Topics in ECON 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ECON T480 Special Topics in ECON 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Education Human Resource Development

Courses

EHRD 205 Organizational Learning & Strategy 3.0 Credits

The purpose of this course is to help learning professionals understand how to align learning functions with strategic goals of the organization in order to support leadership functions. Students will develop an understanding of learning in, by, and across organizations, explore barriers to change, and discuss and apply specific tools and processes to facilitate and sustain change and tighten the alignment of organizational learning and strategy.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Education Learning Techniques

Courses

EDLT 101 Learning, Culture & Technology Workshop I 3.0 Credits

The Workshops (EDLT 101, 201, 301) are comprised of a set of three project-based courses that will provide innovative, rigorous, and immersive educational experiences in diverse learning environments that focus on emerging technologies, authentic and situated learning and contextual factors. Students will observe, document, analyze, and describe complex learning situations, develop different learning designs, and an e-portfolio, and explore social and cultural perspectives on learning.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 103 Foundation in Education III: Learning Sciences 3.0 Credits

This foundations course introduces students to the Learning Sciences, an interdisciplinary field that draws on multiple theoretical perspectives and research paradigms with the goal of advancing and applying knowledge about human learning and development. Its purpose is to introduce students to basic concepts and findings relevant to theory, design, and research in the Learning Sciences, with specific focus on how those concepts and findings apply to learning environments and experiences. Students will learn the rich history about learning and acquire a deep understanding of how the notion of learning has evolved over time. Students will collaborate to design learning environments from different theoretical perspectives on learning.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 201 Learning, Culture and Technology Workshop II 3.0 Credits

The Workshops (EDLT 101, 201, 301) are comprised of a set of three project-based courses that will provide innovative, rigorous, and immersive educational experiences in diverse learning environments that focus on emerging technologies, authentic and situated learning and contextual factors. Students will observe, document, analyze, and describe complex learning situations, develop different learning designs, and an e-portfolio, and explore social and cultural perspectives on learning.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 238 New Media Literacies 3.0 Credits

This course provides an in-depth exploration of new media literacies including the practices and concepts of fan fiction writing, online social networking, video gaming, appropriation and remixing, tinkering and making, transmedia navigation, multitasking, performance, distributed cognition, and collective intelligence. It examines literacy as a sophisticated set of meaning-making activities situated in specific social spaces. Students will learn how new media are changing the dimensions of school literacies and challenge traditional ways of learning and communicating.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 250 Sociocultural Perspectives on Learning 3.0 Credits

This course will focus on knowing and learning from sociocultural perspectives and will include emphasis on both recent research and seminal literature. The course will begin with an introduction to sociocultural research and then explore how these theories can be used to understand how learning occurs in various disciplines.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 301 Learning, Culture & Technology Workshop III 3.0 Credits

The Workshops (EDLT 101, 201, 301) are comprised of a set of three project-based courses that will provide innovative, rigorous, and immersive educational experiences in diverse learning environments that focus on emerging technologies, authentic and situated learning and contextual factors. Students will observe, document, analyze, and describe complex learning situations, develop different learning designs, and an e-portfolio, and explore social and cultural perspectives on learning.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 339 Future Pedagogies 3.0 Credits

This course introduces learners to learning and designing experiences for complex domains. Students explore current pedagogies and how to assess the progress of learning. Students learn how to think about and design learning environments to facilitate different types of knowledge to support novice to expert learners.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 353 Play and Learning in Participatory Cultures 3.0 Credits

In this course, students examine the role of play along the developmental continuum and in immersive and interactive learning spaces. Students also examine how play impacts learning in the context of participatory cultures. Students focus on play, its role in learning in social spaces, and the current research around these practices. Students study the issues relating to how schools, organizations, and society are responding to the challenges of emerging technologies through the design of participatory spaces.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 354 Learning In and Out of Schools 3.0 Credits

The term "informal learning environments" (ILEs) is often used to describe places and activities where learning occurs outside of more formal settings such as schools, universities, etc. Examples of ILEs include after school activities, museums, zoos, and so on. This course is an introduction to ILEs and theories related to understanding how learning occurs within them. The course will also consider similarities and differences between learning in and out of schools.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 491 Senior Project I 3.0 Credits

The Senior Project courses (EDLT 491, 492, 4933) are a set of three courses intended to immerse student teams in the design, implementation, and evaluation of a substantial project. Most educational design research involves teams in their creation, so it is essential to develop those skills. Students collaborate on an extended project to better understand project and time management issues related to large design projects. The courses also facilitate students' integrating materials from other courses in service of better learning environments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 492 Senior Project II 3.0 Credits

The Senior Project courses (EDLT 491, 492, 4933) are a set of three courses intended to immerse student teams in the design, implementation, and evaluation of a substantial project. Most educational design research involves teams in their creation, so it is essential to develop those skills. Students collaborate on an extended project to better understand project and time management issues related to large design projects. The courses also facilitate students' integrating materials from other courses in service of better learning environments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLT 491 [Min Grade: D]

EDLT 493 Senior Project III 3.0 Credits

The Senior Project courses (EDLT 491, 492, 4933) are a set of three courses intended to immerse student teams in the design, implementation, and evaluation of a substantial project. Most educational design research involves teams in their creation, so it is essential to develop those skills. Students collaborate on an extended project to better understand project and time management issues related to large design projects. The courses also facilitate students' integrating materials from other courses in service of better learning environments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLT 491 [Min Grade: D] and EDLT 492 [Min Grade: D]

Electrical & Computer Engineering

Courses

ECE 101 Electrical and Computer Engineering in the Real World 1.0 Credit

This seminar introduces students to highly visible and compelling applications of ECE through the use of familiar real-world applications. The course will highlight some of the high-impact advances of ECE and the importance of ECE in our daily lives. Fundamental concepts, such as electricity, light, computing, networking, and signal processing will be introduced in this context and explained at an introductory level. This course is intended to inspire students to pursue ECE and will lead them directly into ECE 102.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 102 Applications of Electrical and Computer Engineering 2.0 Credits

Introduces the basic fundamentals of ECE through the use of real-world applications. The course will introduce Signals and Systems, Analog electronic basics, as well as Digital numbers and systems. The course will introduce students to basic ECE material, preparing the students for ECE 200 and ECE 201.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 121 Introduction to Entertainment Engineering 3.0 Credits

This introductory survey course will focus on the four prevailing entertainment media: music, images, video, and games. We will explore how each medium is represented digitally and reveal the technologies used to capture, manipulate and display such content. Technical standards used in everyday entertainment devices (mp3, H.264, JPEG 1080p, HDMI) will be explained in layman's terms. The goal is to provide students with technical literacy for using digital media.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 200 Digital Logic Design 4.0 Credits

Number systems and representation, two's complement arithmetic, digital logic devices, switching algebra, truth tables, minimization of Boolean functions, combinational logic design and analysis, sequential circuit analysis and design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 171 [Min Grade: D] or ENGR 103 [Min Grade: D] or ENGR 104 [Min Grade: D]

ECE 201 Foundations of Electric Circuits 4.0 Credits

Covers basic electric circuit concepts and laws; circuit theorems; mesh and node methods; analysis of first- and second-order electric circuits; force and natural response; sinusoidal steady state analysis; complex frequency.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is CAE or classification is Freshman

Prerequisites: PHYS 211 [Min Grade: D] or PHYS 281 [Min Grade: D] or PHYS 102 [Min Grade: D]

ECE 203 Programming for Engineers 3.0 Credits

Fundamentals of computer organization; rudiments of programming including data types, arithmetic and logical expressions, conditional statements, control structures; problem solving techniques for engineers using programming; object-oriented programming; arrays; simulation of engineering systems; principles of good programming practice.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ECE 211 Electrical Engineering Principles 3.0 Credits

Not open to electrical or mechanical engineering students. Covers basic techniques of electric circuit analysis, electronic devices, amplifiers, operational amplifier, and fundamentals of instrumentation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is EE or major is MECH or classification is Freshman

Prerequisites: (MATH 201 [Min Grade: D] or ENGR 231 [Min Grade: D] or MATH 261 [Min Grade: D]) and (PHYS 211 [Min Grade: D] or PHYS 281 [Min Grade: D] or PHYS 102 [Min Grade: D])

Corequisite: ECE 212

ECE 212 Electrical Engineering Principles Laboratory 1.0 Credit

Not open to electrical or mechanical engineering students. Includes experiments involving concepts discussed in ECE 211.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is EE or major is MECH or classification is Freshman

Corequisite: ECE 211

ECE 302 Design with Embedded Processor Project 3.0 Credits

A project-based course on design and implementation of mixed signal systems with embedded processors (digital, analog and software) with applications in signal processing, control, wireless and Internet of Things.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECE 203 [Min Grade: D]

ECE 361 Probability for Engineers 4.0 Credits

This course will cover topics related to probability and statistics. Probability topics include sample space and probability, discrete and continuous random variables, expectation, variance, covariance, correlation, conditional expectation, conditional variance, the weak and strong law of large numbers and the central limit theorem. Statistics topics include properties of a random sample, principles of data reduction, and point estimation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 202 [Min Grade: D] and (ENGR 231 [Min Grade: D] or MATH 261 [Min Grade: D])

ECE 362 Engineering Statistics 3.0 Credits

This course will cover topics related to statistics and probability. Probability topics include sample space and probability; discrete and continuous random variables, expectation, variance, the law of large numbers and the central limit theorem. Statistics topics include properties of a random sample, principles of data reduction, point estimation, hypothesis testing, interval estimation, and linear regression.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ENGR 202 [Min Grade: D] and ENGR 231 [Min Grade: D]) or (ENGR 202 [Min Grade: D] and MATH 261 [Min Grade: D])

ECE 391 Introduction to Engineering Design Methods 1.0 Credit

Introduces the design process, including information retrieval, problem definition, proposal writing, patents, and design notebooks. Includes presentations on problem areas by experts from industry, government, and education.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

ECE 491 [WI] Senior Design Project I 2.0 Credits

Introduces the design process, including information retrieval, problem definition, proposal writing, patents, and design notebooks. Includes presentations on problem areas by experts from industry, government, and education. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECE 391 [Min Grade: D] and ECE 361 [Min Grade: D]

ECE 492 [WI] Senior Design Project II 2.0 Credits

Continues ECE 491. Requires written and oral progress reports. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECE 491 [Min Grade: D]

ECE 493 Senior Design Project III 4.0 Credits

Continues ECE 492. Requires written and oral final reports, including oral presentations by each design team at a formal Design Conference open to the public and conducted in the style of a professional conference.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECE 492 [Min Grade: D]

ECE I199 Independent Study in ECE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE I299 Independent Study in ECE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE I399 Independent Study in ECE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE I499 Independent Study in ECE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE T180 Special Topics in ECE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE T280 Special Topics in ECE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE T380 Special Topics in ECE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE T480 Special Topics in ECE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Electrical & Computer Engineering - Power Engineering

Courses

ECEP 352 Electric Motor Control Principles 4.0 Credits

Introduces machinery principles, magnetic circuits, three-phase circuits, the electrical and economic structure of the power industry, ac and dc machine fundamentals, and power electronic converters and their interfaces with electric motors. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 302 [Min Grade: D] (Can be taken Concurrently) (ECE 201 [Min Grade: D] or ECES 211 [Min Grade: D])

ECEP 354 Energy Management Principles 4.0 Credits

Covers principles of power engineering, including the electrical and economic structure of the power industry (distribution, subtransmission, and bulk transmission levels; environmental issues; the electrical system analysis; the thermal system analysis; links between electromechanics and thermodynamics; and safety issues). Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 302 [Min Grade: D] (Can be taken Concurrently) (ECE 201 [Min Grade: D] or ECES 211 [Min Grade: D])

ECEP 371 Introduction to Nuclear Engineering 2.0 Credits

This course introduces the student to the fundamental topic of nuclear engineering. This course should be the first course for students interested in the nuclear engineering minor, as all of the topics will be discussed in greater detail in other courses. Topics include atomic and nuclear structure, binding energy, reaction kinetics and energetics, and radioactive decay.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 201 [Min Grade: C]

ECEP 372 Radiation Detection and Measurement 3.0 Credits

Introduces students to the fundamentals of radiation detection, and applications of radiation detection equipment.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 371 [Min Grade: D] or ECEP 404 [Min Grade: D] or MEM 371 [Min Grade: D]

ECEP 380 Introduction to Renewable Energy 3.0 Credits

Introduction to Renewable Energy is an undergraduate survey course for engineers, scientists and others interested in energy systems and applications. The course introduces students to the mix of current major electric power sources and the pressures that are forcing a transition to renewable sources. Wind and solar energy will be studied in detail, with others as time allows. Course culminates with an integrating off-grid energy system design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 122 [Min Grade: D] and (PHYS 102 [Min Grade: D] or PHYS 115 [Min Grade: D] or PHYS 154 [Min Grade: D])

ECEP 402 Theory of Nuclear Reactors 4.0 Credits

Introduces students to atomic and nuclear physics, radiation interaction with matter, components of nuclear reactors, neutron diffusion and moderation, nuclear reactor theory, and heat removal from nuclear reactors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 210 [Min Grade: D]

ECEP 403 Nuclear Power Plant Design & Operation 3.0 Credits

Introduces students to the design of nuclear power plants. Topics covered include electrical transmission, non-nuclear related equipment, fluid flow, heat transfer, thermodynamics, heat exchangers, pump, valves, piping and nuclear reactor design. Course includes a final project which is the design of a nuclear power plant.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEP 404 Introduction to Nuclear Engineering 2.0 Credits

Introduces the fundamental scientific, technical, social and ethical issues in nuclear engineering; nuclear reactions and re-radiation, radiation protection and control, nuclear energy production and utilization, nuclear fuel cycle, nuclear materials, controlled fusion and thermonuclear plasma systems, basics of plasma physics and plasma chemistry, nuclear waste management, nuclear reactor safety, analysis of severe nuclear accidents, risk assessment and related issues of engineering ethics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 201 [Min Grade: D] and (ENGR 210 [Min Grade: D] or CHE 206 [Min Grade: D])

ECEP 406 Introduction to Radiation Health Principles 3.0 Credits

This course is intended to impart radiation safety knowledge to the nuclear engineering student. A fundamental knowledge of radiation safety is critical for all nuclear engineers.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 371 [Min Grade: D] or ECEP 404 [Min Grade: D]

ECEP 411 Power Systems I 3.0 Credits

Covers steady state generator, transformer and transmission line modeling used for balanced steady state power system analysis including three-phase to single-phase model conversion, per-unit analysis, generator and line loadability, transformer and transmission line voltage regulation and reactive compensation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEP 352 [Min Grade: D]

ECEP 412 Power Systems II 4.0 Credits

Covers y-bus based analysis of power systems including steady-state power-flow models and algorithms, economic dispatch of power generation, load-frequency control and introduction to transient stability analysis including time-domain simulation and equal area criterion.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEP 411 [Min Grade: D]

ECEP 413 Power Systems III 3.0 Credits

Covers Z-bus-based analysis of power systems including symmetrical component networks of generators, transformers, transmission lines and loads, symmetrical and unbalanced three-phase bus and line faults, and an introduction to power system protection.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEP 412 [Min Grade: D]

ECEP 421 Modeling and Analysis of Electric Power Distribution Systems 3.0 Credits

Introduction to power distribution systems; balanced and unbalanced systems, component and load modeling, radial and weekly meshed topologies; algorithms for unbalanced power studies including radial and general structure solver.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECEP 352 [Min Grade: C]

Corequisite: ECEP 411

ECEP 422 Power Distribution Automation and Control 3.0 Credits

Focuses on distribution management systems and their application: including optimizing network operation - capacitor placement and control, network reconfiguration, service restoration. Modern solution technologies are addressed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 421 [Min Grade: C]

ECEP 423 Service and Power Quality Distribution Systems 3.0 Credits

Focus on power distribution systems: service and power quality assessment including stat estimation, voltage quality, trouble call analysis, service restoration, component and system reliability assessment.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 422 [Min Grade: C]

ECEP 431 Advanced Electromagnetic Energy Conversion I 4.0 Credits

Covers theory and operation of alternating current machinery, with emphasis on design alternatives and the effects of design on performance. Includes construction of machine models from laboratory measurements.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEP 352 [Min Grade: D]

ECEP 432 Advanced Electromagnetic Energy Conversion II 4.0 Credits

Covers dynamic behavior and transient phenomena of rotating machines and the mathematical models used to describe them, generalized machine theory, measurement of parameters for the mathematical models, and measurement of dynamic and transient behavior.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEP 431 [Min Grade: D]

ECEP 441 Protective Relaying 3.0 Credits

Covers operating principles of electromechanical and static relays, fault clearance, and protection of individual parts of a power system. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEP 411 [Min Grade: D] (Can be taken Concurrently)ECEP 352 [Min Grade: D]

ECEP 451 Power Electronic Converter Fundamentals 3.0 Credits

Fundamentals of power electronics that include waveforms, basic power switch properties and magnetic circuits. Introduction to basic power electronic converter circuits: diode and phase-controlled rectifies and inverters; switch-mode converters. Applications to DC and AC power supply systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEP 352 [Min Grade: D]

ECEP 452 Experimental Study of Power Electronic Converters 3.0 Credits

Experimental study of common power electronic converters: diode rectifiers, phase-controlled rectifies, switch-mode inverters. Both hardware and software studies. Additional lectures on: Study of DC-DC switch-mode converters.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 451 [Min Grade: D]

ECEP 453 Applications of Power Electronic Converters 3.0 Credits

Provides a first look at various power electronic applications in residential, commercial and industrial sites. Examples include utility application such as static var compensators (SVC), thyristor switch capacitors (TSC), high voltage direct-current (HVDC) transmission systems among others. In addition, fundamentals of motor drives and their controls are covered. Examples include induction, DC synchronous and specialized motors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 451 [Min Grade: D]

ECEP 461 High Voltage Laboratory 1.0 Credit

Requires students to perform four basic experiments to become familiar with high-voltage techniques and then do a high-voltage design project of their own choosing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEP 352 [Min Grade: D]

ECEP 471 Power Seminar I 0.5 Credits

Discusses current developments in power system operation and research, concentrating on current and future energy sources.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ECEP 472 Power Seminar II 0.5 Credits

Discusses current developments in power system operation and research, concentrating on generating stations, transmission lines, and substations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ECEP 473 Power Seminar III 0.5 Credits

Discusses current developments in power system operation and research, concentrating on distribution, security, and economics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ECEP 480 Solar Energy Engineering 3.0 Credits

Covers design of grid-connected and battery backup grid-connected photovoltaic systems. Both electrical and mechanical aspects are included. Topics include system components (solar cells, charge controllers, maximum power point trackers, inverters, etc.), system economics, computer and web-based design aids, electrical codes and standards, externalities of PV systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: ECEE 302 [Min Grade: D] or ECEE 352 [Min Grade: D] or CHE 431 [Min Grade: D] or ECEP 380 [Min Grade: D]

ECEP 497 Research in Power Systems 0.5-12.0 Credits

Requires independent study in a topic approved by the faculty.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP I199 Independent Study in ECEP 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP I299 Independent Study in ECEP 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP I399 Independent Study in ECEP 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP I499 Independent Study in ECEP 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ECEP T180 Special Topics in ECEP 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP T280 Special Topics in ECEP 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEP T380 Special Topics in ECEP 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP T480 Special Topics in ECEP 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Electrical & Computer Engineering - Computers

Courses

ECEC 301 Advanced Programming for Engineers 3.0 Credits

An advanced introduction to classes and objects; inheritance and polymorphism; abstract classes and interfaces; exception handling; files and streams; garbage collection and dynamic memory allocation; recursion; using linked lists, stacks, queues, and trees; search and sorting algorithms; generic methods and classes; a comparative introduction to dominant programming languages; engineering examples.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECE 203 [Min Grade: D] or CS 203 [Min Grade: D]

ECEC 302 Digital Systems Projects 4.0 Credits

Studies the theory of digital system design and the topdown design methodology using hardware description language and software tools for simulation, synthesis and Field Programmable Gate Array (FPGA) implementation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 171 [Min Grade: D] (Can be taken Concurrently) or ECE 203 [Min Grade: D] and ECE 200 [Min Grade: D]

ECEC 304 Design with Microcontrollers 4.0 Credits

Offers hands-on experience in the design of controllers that incorporate microcontrollers as an embedded component in a larger system. The microcomputer topics to be studied will include architecture, software, programming and interfaces.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECE 200 [Min Grade: D] and (CS 171 [Min Grade: D] or ECE 203 [Min Grade: D] or CS 203 [Min Grade: D])

ECEC 352 Secure Computer Systems: Design Concepts 4.0 Credits

Covers concepts of secure computation, including economics vs. faults, errors, and hidden messages; mathematical foundations of secure computing; design issues in fault-tolerant computing; and testability and cryptography.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEC 302 [Min Grade: D] and MATH 221 [Min Grade: D]

ECEC 353 Systems Programming 3.0 Credits

This course introduces computer systems, including interaction of hardware and software through the operating system, from the programmer's perspective. Three fundamental abstractions are emphasized: processes, virtual memory, and files. These abstractions provide programmers a common interface to a wide variety of hardware devices. Topics covered include linking, system level I/O, concurrent programming, and network programming.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CS 265 [Min Grade: D]

ECEC 355 Computer Organization & Architecture 4.0 Credits

This course will cover the principles of designing microprocessors using solid engineering fundamentals and quantitative cost/performance trade-offs. Topics will cover instruction set architectures, arithmetic for computers, assessing and understanding processor performance, processor datapath and control, pipelining, cache design, and virtual-memory design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ECE 200 [Min Grade: D] or CS 270 [Min Grade: D]) and ECEC 302 [Min Grade: D]

ECEC 356 Embedded Systems 4.0 Credits

Lectures will cover theoretical concepts of embedded and cyber#physical systems including discrete and continuous dynamics, hybrid systems, state machines, concurrent computation, embedded systems architecture and scheduling. Lab involves programming embedded applications for the decentralized software services architecture using C# and the Microsoft Robotics Software Development Kit (SDK) together with the hardware image processing and tracking capabilities of the Kinect sensor.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 304 [Min Grade: D]

ECEC 357 Introduction to Computer Networks 4.0 Credits

History of the Internet; introduction to packet switching, circuit switching and virtual circuit switching; statistical multiplexing; protocol layering; metrics of network performance including bandwidth, delay and loss; medium access protocols and Ethernet; routing algorithms; end-to-end issues; flow and congestion control; an overview of application layer protocols.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECE 203 [Min Grade: D] or CS 171 [Min Grade: D]

ECEC 402 Digital System Projects Embedded Design 3.0 Credits

A project-based course on real-time applications using Field Programmable Gate Array (FPGA), embedded processors (software), IP (Intellectual Property) cores library and custom IP cores.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 302 [Min Grade: D] and ECEC 304 [Min Grade: D]

ECEC 411 Computer Hardware 3.0 Credits

Covers the design and performance of computer hardware devices, including direct memory access, priority arbitration, double buffering, and bus standards. Fall.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECEC 355 [Min Grade: D]

ECEC 412 Modern Processor Design 3.0 Credits

This course introduces modern processor design in a systematic manner. It discusses dynamically scheduled superscalar techniques including multi-issue, dynamic instruction scheduling, speculative execution, and branch prediction; advanced cache designs, and new techniques including SMT and VLIW. The course provides a comprehensive coverage of modern processor architectures.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 355 [Min Grade: D] or CS 281 [Min Grade: D]

ECEC 413 Introduction to Parallel Computer Architecture 3.0 Credits

This course provides an introduction to the fundamental principles and engineering trade-offs involved in designing modern parallel computers (multi-processors). Topics covered include, but are not limited to, shared-memory and message-passing programming, cache-coherence, synchronization, scalable distributed memory multi-processors, and interconnection techniques.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 355 [Min Grade: D] or CS 281 [Min Grade: D]

ECEC 414 High Performance Computing 3.0 Credits

This course is an introduction to high performance computing, including both concepts and applications. Course contents will include discussions of different types of high performance computer architectures (multi-core/multi-threaded processors, parallel computers, etc.), the design, implementation, optimization and analysis of efficient algorithms for uni-processors, multi-threaded processors, and parallel computers, and high performance programming.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 355 [Min Grade: D] or (CS 281 [Min Grade: D] and CS 282 [Min Grade: D])

ECEC 421 Introduction to Operating Systems I 3.0 Credits

Covers basic concepts of computer operating systems, including multiprocessing and multiprogramming systems, lock operations, synchronization, and file structures. Winter.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECEC 355 [Min Grade: D] and CS 260 [Min Grade: D]

ECEC 422 Introduction to Operating Systems I 3.0 Credits

Further develops the topics of ECEC 421. Spring.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEC 421 [Min Grade: D]

ECEC 431 Introduction to Computer Networks 3.0 Credits

Covers topics in computer and telecommunications network design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECE 200 [Min Grade: D] and CS 260 [Min Grade: D]

ECEC 432 Internet Architecture and Protocols 3.0 Credits

Covers architecture, protocols, and services of the Internet with an analytical approach focused on design principles; Internet architecture and topology; architecture of web and mail servers; router architectures; routing protocols; multicasting; multimedia over IP and associated protocols; Quality-of-Service issues in the Internet.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 357 [Min Grade: D] or CS 472 [Min Grade: D]

ECEC 433 Network Programming 3.0 Credits

Covers application layer protocol and how applications use the transport layer; principles and practice of network programming; the client-server model; concurrent processing; introduction to sockets and related functions client and server software design with examples; principles, issues and challenges in e-mail and web application protocols; security protocols; and network life system concepts.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 357 [Min Grade: D]

ECEC 441 Robotic Computer Interface & Control I 3.0 Credits

Covers fundamentals of robotics systems, including mechanics, actuators, sensors, kinematics, and inverse kinematics. Fall.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECES 356 [Min Grade: D]

ECEC 442 Robotic Computer Interface & Control II 3.0 Credits

Covers robot dynamics, Lagrangian and Newton Euler methods, linear control of robots, path planning, and computer implementation. Winter.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEC 441 [Min Grade: D]

ECEC 443 Robotic Computer Interface & Control III 3.0 Credits

Covers robot-computer interface methods, including redundancy, optimal control, robustness, nonlinear control, adaptive control, and multiprocessor control. Spring.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEC 442 [Min Grade: D]

ECEC 451 Computer Arithmetic 3.0 Credits

This course provides an introduction to number representations used in computer arithmetic, issues of complexity in arithmetic operations, fixed point arithmetic, floating point arithmetic, and residue number systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECE 200 [Min Grade: D] and ECEC 355 [Min Grade: D]

ECEC 453 Image Processing Architecture 3.0 Credits

This course covers applications of computing techniques and hardware in image (still and video) processing. Methods of compression (lossless, lossy), video compression, JPEG standards, MPEG standards, processing requirements, and implementations for multimedia.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECE 200 [Min Grade: D] and ECES 301 [Min Grade: D] and ECES 303 [Min Grade: D]

ECEC 455 Intelligent System Architectures 3.0 Credits

This course outlines the principles of designing the architectures for intelligent systems. Methods of knowledge representation are compared for a variety of engineering problems. Methods of sensing and behavior generation are demonstrated for applications in large engineering and information systems including autonomous robots. Principles of goal-oriented computers are discussed, and modules of intelligent systems architectures are described. Theoretical fundamentals and practical techniques for learning are also covered.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MATH 221 [Min Grade: D] and ECEC 355 [Min Grade: D]

ECEC 457 Security in Computing 3.0 Credits

The course introduces ideas from Cryptography and Fault Tolerant Computing. Cryptography studies how to artificially create distortions that being interwoven with computations mask them from eavesdropping. Fault Tolerance studies techniques of suppressing effects of natural noises that operate in computation channels. The course deals with both some introductory issues in Public Key Cryptography and some important aspects of designing Fault Tolerant Systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 355 [Min Grade: D]

ECEC 459 Testing of Hardware 3.0 Credits

Testing has become the largest expense item in the semiconductor industry. There is rapidly being developed new techniques in testing, design for test and built-in self-test because no existing set of techniques can satisfy the existing and future needs. The course reviews, in a unified way, important issues in testing and diagnosis of hardware. Together with the "Security in Computing" course, it brings a design engineer student to the state of the art level in the field.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 355 [Min Grade: D]

ECEC 471 Introduction to VLSI Design 3.0 Credits

This is an introductory course where systematic understanding, design and analysis of digital VLSI integrated circuits will be covered. The course will begin with a review of CMOS transistor operation and semiconductor processes. Logic design with CMOS transistor and circuit families will be described. Specifically, layout, design rules, and circuit simulation will be addressed. Performance metrics will be analyzed in design and simulation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ECE 200 [Min Grade: D] or CS 270 [Min Grade: D]) and (ECEL 301 [Min Grade: D] and ECEL 302 [Min Grade: D])

ECEC 472 Custom VLSI Design & Analysis I 3.0 Credits

This is the first of two courses offered on Custom Very Large Scale Integration (VLSI) circuit and systems design and analysis. An understanding of VLSI integrated circuits is achieved through circuit design and analysis. This course focuses exclusively on high performance digital CMOS VLSI circuit and systems design, although some topics on mixed-signal circuits are also addressed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 471 [Min Grade: D]

ECEC 473 Modern VLSI IC Design 3.0 Credits

This is a project-oriented course where a high-complexity VLSI design project will be assigned to student teams. Team-work, task assignment and team communication will be mediated in an industry setting. Design tasks will cover the entire IC design flow range, from system specification to TRL description to timing and power analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 472 [Min Grade: D]

ECEC 474 ASIC Design I 3.0 Credits

This course will focus exclusively on digital CMOS Application Specific Integrated Circuit (ASIC) systems design and automation. The ASIC physical design flow, including logic synthesis, floorplanning, placement, clock tree synthesis, routing and verification will be presented. These back-end physical design flow steps will also be covered through hands-on practice using industrial VLSI CAD tools. Contemporary design practices will be reviewed and presented in experiments.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECE 200 [Min Grade: D] and ECEC 355 [Min Grade: D]

ECEC 475 ASIC Design II 3.0 Credits

Design and analysis of Application Specific Integrated Circuits (ASICs) will be covered from a systems design perspective. System timing, arithmetic building block and memory block design processes will be presented. Design tasks in a quarter-long, small-complexity processor design project will cover the back-end of the IC design flow range, from RTL synthesis to timing and power analysis. Projects will be performed in a hierarchical group, similar to an industrial setting, with other graduate and undergraduate students.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 474 [Min Grade: D]

ECEC 497 Research In Computer Engineering 0.5-12.0 Credits

Computer engineering students only. Requires independent research in a field approved by the faculty.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CE.

ECEC I199 Independent Study in ECEC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC I299 Independent Study in ECEC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC I399 Independent Study in ECEC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC I499 Independent Study in ECEC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CE.

Cannot enroll if classification is Freshman or Sophomore

ECEC T180 Special Topics in ECEC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC T280 Special Topics in ECEC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC T380 Special Topics in ECEC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC T480 Special Topics in ECEC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Electrical & Computer Engineering - Electroph

Courses

ECEE 302 Electronic Devices 4.0 Credits

Covers principles of operation of semiconductor devices, including PN diodes, bipolar transistors, and field effect transistors (JFET, MOSFET, MESFET). Applications of PN junctions, including solar cells, led, laser diodes. Laboratories reinforce lecture material by allowing students to build, measure and analyze data from simple devices.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: TDEC 211 [Min Grade: D] or ENGR 220 [Min Grade: D]

ECEE 304 Electromagnetic Fields & Waves 4.0 Credits

Covers vector calculus, Coulomb's Law, Gauss' Law, Ampere's Law, Maxwell's equations, Electromagnetic (EM) fields in devices, EM fields in circuits, EM fields in machinery, EM waves, biological effects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 291 [Min Grade: D]

ECEE 352 Analog Electronics 4.0 Credits

Teaches the fundamentals of electronic circuit analysis and design by means of practical projects, such as a dc power supply and an audio amplifier. Covers design with discrete components as well as integrated circuit design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 302 [Min Grade: D] and ECES 301 [Min Grade: D]

ECEE 354 Wireless and Optical Electronics 4.0 Credits

Covers propagation of waves in various media as it relates to wireless communications: reflection, transmission, polarization, wave packets, dispersion, radiation and antennas, microwave electronic devices, optical wave guides, and fiber optics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 301 [Min Grade: D] and ECES 303 [Min Grade: D] and ECEE 304 [Min Grade: D]

ECEE 421 Advanced Electronics I 4.0 Credits

Application-and design-focused course. Analyzes feedback in electronic circuits such as operational amplifiers. Covers design and applications of active filters and other typical electronic circuitry. Includes experiments in the design of multistage transistor circuits, feedback loops, operational amplifiers, and active filters.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 352 [Min Grade: D]

ECEE 422 Advanced Electronic Circuits I 3.0 Credits

Application-and design-focused course. Covers analysis and design of communication circuits and non-linear active circuits; oscillators, mixers, IF and RF amplifiers; and AM and FM modulators.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 421 [Min Grade: D]

ECEE 423 Advanced Electronics Circuits II 3.0 Credits

Application-and design-focused course. Covers non-linear circuits; function and wave form generators; log-amp, multipliers, dividers, power amp, and phase-lock loops; and design of electronics needed to implement different logic circuit families.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 421 [Min Grade: D]

ECEE 434 Digital Electronics 4.0 Credits

Covers basic digital integrated circuit building blocks (inverters, nor and nand logic), CMOS logic gates (dc and transient behavior), drivers, and digital circuits and systems (PLA, gate array, memory). Experiments in semiconductor material characterization, device characterization, circuit and device simulations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 302 [Min Grade: D]

ECEE 441 Lightwave Engineering I 3.0 Credits

Covers fundamentals of wave propagation, including propagation in various fiber wave guides and field distributions, diffraction, attenuation, dispersion, information capacity, and other analytic and design considerations in fiber systems. Fall.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 304 [Min Grade: D]

ECEE 442 Lightwave Engineering II 3.0 Credits

Covers operating principles, construction, and characteristics of sources, couplers, and detectors used in optical systems. Includes equivalent circuit models and principles of generation, transmission, and reception. Winter.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 441 [Min Grade: D]

ECEE 443 Lightwave Engineering III 3.0 Credits

Covers applications of devices and systems in such areas as data, voice, and image trans-mission; industrial automation; process control; medicine; and computers. Includes basic measurement systems. Spring.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEE 442 [Min Grade: D]

ECEE 451 Electroacoustics 3.0 Credits

Applications-oriented course. Covers fundamentals of vibrating systems; equations of motion; acoustical, electrical, and mechanical analogs; properties of waves in fluids; acoustic impedance and plane wave transmission; application to design of transducers; and application of acoustic waves in medical imaging, non-destructive testing, and the biomedical field.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

ECEE 471 RF Components and Techniques 4.0 Credits

This course covers microwave networks (Z, Y, S, T ABCD Parameters), signal flowgraph, impedance matching techniques (lumped and distributed, quarter wave transformers), circulators and isolators, directional couplers (branch line, Wilkinson, Lange, slot waveguide), and filters (lowpass, bandpass, bandstop, highpass). CAD laboratory and design projects are an integral part of this course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 354 [Min Grade: D]

ECEE 472 RF Electronics 4.0 Credits

This course covers static and dynamic characteristics of transistors, unipolar (MOSFET, MESFET, HEMT), bipolar (BJT, HBT), LNA design and realization, power amplifiers, distributed amplifiers, switches, limiters, phase shifters, detectors, mixers, oscillators (Colpitts, YIG turned, reflection, transmission, DRO). CAD laboratory and design projects are an integral part of this course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 471 [Min Grade: D]

ECEE 473 Antennas and Radiating Systems 4.0 Credits

This course covers short and magnetic dipole, radiation pattern, radiation resistance, directivity and gain, line antennas (dipoles, monopoles, V and inverted V antennas), helix, Yagi-Uda, log-periodic, aperture antennas (slot, horn and reflector), printed circuit antennas (patch and spiral), and phased antennas. CAD laboratory and design projects are an integral part of this course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 471 [Min Grade: D]

ECEE 497 Research in Electrophysics 0.5-12.0 Credits

Requires independent research in a topic approved by the faculty.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE I199 Independent Study in ECEE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE I299 Independent Study in ECEE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE I399 Independent Study in ECEE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE I499 Independent Study in ECEE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ECEE T180 Special Topics in ECEE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE T280 Special Topics in ECEE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE T380 Special Topics in ECEE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE T480 Special Topics in ECEE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Electrical & Computer Engineering - Systems

Courses

ECES 201 Introduction to Audio-Visual Signals 4.0 Credits

This introductory engineering course will focus on the digital signal representations commonly used in prevailing entertainment media: audio, images, and video. It will explore how each medium is represented digitally and convey the signal processing concepts used in storing, manipulating, transmitting, and rendering such content. The goal of the course is to provide non-engineering students with a fundamental understanding of core digital signal processing methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 122 [Min Grade: D]

ECES 301 Transform Methods and Filtering 4.0 Credits

This course covers the engineering related concepts of signals and systems, their modeling and analysis. We discuss the problem of formulation of physical systems, plus mathematical solution of models (equations). Continuous-time signals and systems, discrete-time signals and systems, linear time-invariant systems, convolution integrals and sums, Fourier series, Fourier, Laplace and Z-transforms, and system functions will be studied.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (TDEC 221 [Min Grade: D] or ENGR 232 [Min Grade: D] or MATH 262 [Min Grade: D] or MATH 210 [Min Grade: D]) and ECE 201 [Min Grade: D]

ECES 302 Transform Methods and Filtering 4.0 Credits

Covers the Fourier series and the Fourier transform, sinusoidal steady-state analysis and filtering, discrete-time systems and the Z-transform, discrete Fourier transform, network functions and stability, magnitude, phase, poles and zeroes, Nyquist criterion, the Nyquist plot and root loci, stability of one-ports, sensitivity, worst-case design and failure-tolerance.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (TDEC 221 [Min Grade: D] or ENGR 232 [Min Grade: D] or MATH 262 [Min Grade: D] or MATH 210 [Min Grade: D]) and ECE 201 [Min Grade: D]

ECES 303 Transform Methods II 3.0 Credits

This course covers the engineering related concepts of signals and systems, their modeling and analysis. We discuss the problem of formulation of physical systems, plus mathematical solution of models (equations). Continuous-time signals and systems, discrete-time signals and systems, linear time-invariant systems, convolution integrals and sums, Fourier series, Fourier, Laplace and Z-transforms, and system functions will be studied.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 301 [Min Grade: D] or ECES 302 [Min Grade: D]

ECES 304 Dynamic Systems and Stability 4.0 Credits

Covers linear time-invariant circuits and systems; two-and multi-terminal resistors, operational-amplifier circuits, first-order circuits, linear and nonlinear second-order systems, state equation and state variables, eigenvalues and eigenvectors, zero-input response, qualitative behavior of $x' = Ax$ (stability and equilibria), qualitative behavior of $x' = f(x)$, phase portraits, equilibrium states.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 301 [Min Grade: D]

ECES 306 Analog & Digital Communication 4.0 Credits

Covers signal sampling and reconstruction; modulation, angle modulation; digital communications systems, digital transmission.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 301 [Min Grade: D] or ECES 302 [Min Grade: D]

ECES 352 Introduction to Digital Signal Process 4.0 Credits

Covers discrete-time signals, analog-digital conversion, time and frequency domain analysis of discrete-time systems, analysis using Z-transform, introduction to digital filters, discrete-time Fourier transform, Discrete Fourier Transform (DFT), and Fast Fourier Transform (FFT).

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 301 [Min Grade: D] and ECES 303 [Min Grade: D]

ECES 354 Wireless, Mobile & Cellular Communications 4.0 Credits

Covers concepts of wireless systems; propagation effects, including loss, dispersion, fading, transmission, and reception; mobile systems, including design of base units and mobile units; micro cells and pico cells; cell division, including frequency use and reuse; concepts of FDMA, TDMA, and CDMA; error rates and outage probability; and circuits and components for wireless and mobile systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 306 [Min Grade: D]

ECES 356 Theory of Control 4.0 Credits

Covers the foundations of control theory. Includes experiments and demonstrations during lectures and labs that may be jointly held, taking advantage of multimedia and computer-controlled apparatus.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 304 [Min Grade: D]

ECES 358 Computer Control Systems 4.0 Credits

Reviews principles of applications of computer control systems to a variety of industries and technologies, including manufacturing processes, robotic cells, machine cells, chemical processes, network control, investment portfolio control, and real-time expert and learning systems for diagnostics and quality control.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 356 [Min Grade: D]

ECES 411 Convex Optimization in Engineering Systems 3.0 Credits

Covers fundamental of convex optimization including convex sets, convex functions, linear and nonlinear constraints, complementary slackness, Lagrange multipliers, Lagrangian duality, and quadratic programming. Focuses on applications (e.g., signal processing, communications, computer networking, and portfolio management). Focuses on use of Matlab or equivalent software.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECES 301 [Min Grade: D] and ECES 303 [Min Grade: D] and (ENGR 361 [Min Grade: D] or ECE 361 [Min Grade: D])

ECES 412 Simulation of Stochastic Engineering Systems 3.0 Credits

Covers algorithms for generation of pseudo-random numbers, generation of random variates using the inverse transform, acceptance rejection techniques, Monte Carlo simulation, basics of point and interval estimation and hypothesis testing. Coverage of Markov chains, Markov chain Monte Carlo, Metropolis algorithm, simulated annealing, as time permits. Applications include computer networks, statistical physics, derivative pricing. Focus on use of Matlab or equivalent software.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECES 301 [Min Grade: D] and ECES 303 [Min Grade: D] and (ENGR 361 [Min Grade: D] or ECE 361 [Min Grade: D])

ECES 413 Strategies for Repeated Games 3.0 Credits

Covers the gambler's ruin problem, optimality of bold play for subfair games, the Martingale betting system, Kelly betting and the maximum growth rate in superfair games, the multi-armed bandit and its generalizations, Parrondo's paradox for coupled subfair games, basics of auction theory. Focus on use of Matlab or equivalent software.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ECES 301 [Min Grade: D] and ECES 303 [Min Grade: D] and (ENGR 361 [Min Grade: D] or ECE 361 [Min Grade: D])

ECES 421 Communications I 3.0 Credits

Covers analog communications, including linear modulation methods (AM, DSB, SSB), exponential modulation (FM, PM), and noise effects on analog communication systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 306 [Min Grade: D]

ECES 422 Communications II 3.0 Credits

Covers analog (PAM, PPM) and digital (PCM, DM) pulse modulation systems, entropy, source coding, and channel coding.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 421 [Min Grade: D]

ECES 423 Communications III 3.0 Credits

Covers digital transmission systems, baseband and passband, spread-spectrum communications, and basics of wireless and mobile systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECES 422 [Min Grade: D]

ECES 434 Applied Digital Signal Processing 4.0 Credits

This course explores digital signal processing (DSP) concepts through the context of current applications, which range from video encoding to human genome analysis. Topics such as sampling, aliasing, and quantization, are considered in terms of the constraints of particular applications. Discrete-time linear systems, frequency-domain analysis, and digital filtering using Discrete Fourier Transform are examined in-depth and realized through application-specific lab projects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 352 [Min Grade: D]

ECES 435 Recent Advances in Digital Signal Processing 4.0 Credits

Digital signal processing algorithms once thought to be impractical are now implemented in devices, such as household appliances & mobile phones. This course explores the computationally-intensive DSP methods including short-time linear prediction, cepstral analysis, and complex phase reconstruction as well as alternative signal representations and transforms, including the Hilbert, Chirp, and Discrete Cosine Transforms. Laboratory projects will focus on the implementation of these methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 352 [Min Grade: D]

ECES 436 Multi-disciplinary Digital Signal Processing 4.0 Credits

The applications of digital signal processing (DSP) span a wide range of problem domains and disciplines. This course explores the multi-disciplinary aspects of DSP by focusing on a core set of common methods applicable to problems in many fields, such as periodicity detection, signal and power spectrum estimation, and data modeling. Laboratory projects will utilize experiments drawn from a diversity of fields, including medicine, music analysis, image processing, voice/data communications and robotics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 352 [Min Grade: D]

ECES 441 Bioinformatics 3.0 Credits

This course will focus on developing the computational, algorithmic, and database navigational skills required to analyze genomic data that have become available with the development of high throughput genomic technologies. We will also illustrate statistical signal processing concepts such as dynamic programming, hidden markov models, information theoretic measures, and assessing statistical significance. The goals will be achieved through lecture and lab exercises that focus on genomic databases, genome annotation via hidden markov models, sequence alignment through dynamic programming, metagenomic analyses, and phylogenetics with maximum likelihood approaches.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 444 Systems and Control I 4.0 Credits

This course reviews classical control: analysis and design, state space approach to systems analysis and control; Eigenvalue/Eigenvector analysis, model decomposition, state space solutions and Cayley-Hamilton technique and applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 356 [Min Grade: D]

ECES 445 Systems and Control II 4.0 Credits

This course covers Eigenvector single-value decomposition and modal decomposition; controllability, observability and Kalman canonical forms; state controllers and observers and the separation principle.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 444 [Min Grade: D]

ECES 446 Systems and Control III 4.0 Credits

This course covers linear quadratic control, non-linear stability and analysis. Current topics in control include Robust, H-infinity, and Fuzzy Control concepts.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 445 [Min Grade: D]

ECES 462 Medical Robotics II 3.0 Credits

This course will review the emerging, multidisciplinary field of Medical Robotics. The course includes multiple site/field visits to observe Medical Robot systems demonstrations and interaction with the medical team and system manufacturers.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 461 [Min Grade: D]

ECES 486 Cell and Tissue Image Analysis 3.0 Credits

Theory of supervised and unsupervised pattern recognition techniques, with practical programming projects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 487 Pattern Recognition 3.0 Credits

Theory of supervised and unsupervised statistical pattern recognition, presented through practical programming techniques.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 497 Research in Systems Engineering 0.5-12.0 Credits

Electrical engineering students only. Requires independent research in a topic approved by the faculty.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ECES 499 Supervised Study in Systems Engineering 0.5-20.0 Credits

Requires independent study in a topic approved by the faculty.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ECES I199 Independent Study in ECES 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES I299 Independent Study in ECES 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES I399 Independent Study in ECES 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES I499 Independent Study in ECES 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES T180 Special Topics in ECES 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES T280 Special Topics in ECES 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES T380 Special Topics in ECES 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES T480 Special Topics in ECES 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Electrical Engineering Lab

Courses

ECEL 301 [WI] Electrical Engineering Laboratory 2.0 Credits

Offers laboratory experiences in each of the five ECE tracks: computers, controls/robotics, electronics, power and energy, and telecommunications. Each lab consists of a stand-alone module containing: lecture material providing basic theory, references, and laboratory experiments. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECE 200 [Min Grade: D] and ECE 201 [Min Grade: D] and (TDEC 132 [Min Grade: D] or TDEC 133 [Min Grade: D] or ENGR 104 [Min Grade: D] or ENGR 103 [Min Grade: D])

ECEL 302 ECE Laboratory II 2.0 Credits

Offers laboratory experiences in each of the five ECE tracks: computers, controls/robotics, electronics, power and energy, and telecommunications. Each lab consists of a stand-alone module containing: lecture material providing basic theory, references, and laboratory experiments. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEL 301 [Min Grade: D]

ECEL 303 ECE Laboratory III 2.0 Credits

Offers laboratory experiences in each of the five ECE tracks: computers, controls/robotics, electronics, power and energy, and telecommunications. Each lab consists of a stand-alone module containing: lecture material providing basic theory, references, and laboratory experiments.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECEL 302 [Min Grade: D]

ECEL 304 ECE Laboratory IV 2.0 Credits

This course offers laboratory experience, using both modeling software and digital and analog hardware relevant to both electrical and computer engineers. Multi-week design projects and design teams are used to prepare students for Senior Design work.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEL 303 [Min Grade: D]

ECEL 311 ECE Laboratory Methods I 3.0 Credits

Introduces students to MATLAB and PSpice, industry standard CAD software for electronics (analog and digital) and systems engineers. Solve DC bias, DC sweep, AC sweep, and transient problems in PSpice and MATLAB. Build and design simple digital circuits.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECE 200 [Min Grade: D] and ECE 201 [Min Grade: D] and ENGR 103 [Min Grade: D]

ECEL 312 ECE Laboratory Methods II 3.0 Credits

Covers introduction to transistor circuits, PSpice simulations of active devices, transfer function analysis, Bode analysis, active filter analysis and design. Programming and use of Microprocessors and/or FPGA. Perform measurements on devices and circuits.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEL 301 [Min Grade: D] or ECEL 311 [Min Grade: D]

ECEL 401 Lightwave Engineering Laboratory 3.0 Credits

Teaches fundamentals of interaction of light with matter. Waves and photons. Interference and diffraction. Optical fibers and free-space optics. Introduces students to optical communication and imaging.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ECEL 301 [Min Grade: D] and ECEL 302 [Min Grade: D] and ECEE 302 [Min Grade: D]) or (ECEL 311 [Min Grade: D] and ECEL 312 [Min Grade: D] and ECEE 304 [Min Grade: D])

ECEL 402 Nano-Photonics Laboratory 3.0 Credits

Teaches a fundamental knowledge of nanophotonic materials, devices, and applications in a hands-on laboratory setting. Introduces students to photonic bandgaps, photonic crystals, optical sensing methods, holography methods and materials, concepts of surface plasmons and Plasmon resonance.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ECEL 301 [Min Grade: D] and ECEL 302 [Min Grade: D] and ECEE 304 [Min Grade: D]) or (ECEL 311 [Min Grade: D] and ECEL 312 [Min Grade: D] and ECEE 304 [Min Grade: D])

ECEL 403 Bio-Photonics Laboratory 3.0 Credits

Teaches the fundamentals of the interaction of light with matter. Introduces students to different types of optical detection for biomedical applications, Quantized states of matter, Energy levels of atoms and molecules, Absorption, Scattering, Fluorescence, Imaging of cells and molecules, Spectroscopy, and Cancer precursors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ECEL 301 [Min Grade: D] and ECEL 302 [Min Grade: D] and ECEE 304 [Min Grade: D]) or (ECEL 311 [Min Grade: D] or ECEL 312 [Min Grade: D] or ECEE 304 [Min Grade: D])

ECEL 404 Software Defined Radio Laboratory 3.0 Credits

This course introduces students to the concept of software defined radio using the USRP hardware platform and GNU Radio software. Functional blocks of wireless communications systems will be discussed, programmed in Python, and tested on hardware.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ECEL 301 [Min Grade: D] and ECEL 302 [Min Grade: D] and ECES 301 [Min Grade: D] and ECES 303 [Min Grade: D]) or (ECEL 311 [Min Grade: D] and ECEL 312 [Min Grade: D] and ECES 301 [Min Grade: D] and ECES 303 [Min Grade: D])

ECEL 405 Digital Systems Laboratory 3.0 Credits

Students will gain practical knowledge of digital systems and signal processing by designing, simulating, constructing, testing and refining a digital audio recording system.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ECEL 301 [Min Grade: D] and ECEL 302 [Min Grade: D] and ECES 301 [Min Grade: D]) or (ECEL 311 [Min Grade: D] and ECEL 312 [Min Grade: D] and ECES 301 [Min Grade: D])

ECEL 407 General Purpose GPU Programming 3.0 Credits

This course will teach students how to develop parallel algorithms for the GPU and implement them using the CUDA programming interface.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (ECEL 301 [Min Grade: D] and ECEL 302 [Min Grade: D] and ECEC 301 [Min Grade: D] and ECEC 355 [Min Grade: D]) or (ECEL 311 [Min Grade: D] and ECEL 312 [Min Grade: D] and ECEC 301 [Min Grade: D] and ECEC 355 [Min Grade: D])

ECEL I199 Independent Study in ECEL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEL I299 Independent Study in ECEL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEL I399 Independent Study in ECEL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEL I499 Independent Study in ECEL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEL T180 Special Topics in ECEL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEL T280 Special Topics in ECEL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEL T380 Special Topics in ECEL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEL T480 Special Topics in ECEL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Electrical Engineering Technology

Courses

EET 102 Introduction to Engineering Technology 3.0 Credits

The main objective of this course is to introduce the basic concepts and the fundamentals of Engineering Technology (ET). Students are introduced to the four tracks (electrical, mechanical, industrial, and biomedical) in ET and work on the selected topics designed to enhance the problem solving techniques.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EET 201 Circuit Analysis I 4.0 Credits

Introduction to the key electrical terms, basic laws and theorems of electric circuits by concentrating on Direct Current (DC) circuit analysis, power, and energy.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: D] and MATH 110 [Min Grade: D]

EET 202 Circuit Analysis II 4.0 Credits

Introduction to time domain (transient) analysis of R, L, C elements and energy storage in L and C circuits. The response of source-free RL, RC, and RLC circuits are developed followed by response to constant voltage and current sources.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 201 [Min Grade: D]

EET 204 Introduction to Nanotechnology 3.0 Credits

The course provides an introduction to scientific notation, size relationships between nanometers and other metric measures, self assembly, molecular recognition, the history of nanotechnology, and the role and influence of nanotechnology in other technologies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 111 [Min Grade: D] and CHEM 113 [Min Grade: D]

EET 205 Digital Electronics 4.0 Credits

The objective of this course is to introduce AET students to fundamentals of digital electronics starting with the binary number system and proceeding to logic gates, Boolean algebra, combinational logic circuits, and the basic arithmetic units used in digital computers such as adders, counters and shift registers.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 201 [Min Grade: D]

EET 206 Analog Electronics I 4.0 Credits

Students are introduced to linear circuit analysis of passive and active semiconductor components, modeling of non-linear circuit elements, light and heat-dependent semiconductor devices, biasing of three-terminal devices, and semiconductor small-signal models.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 201 [Min Grade: D] and EET 202 [Min Grade: D]

EET 207 Introduction to Laboratory and Process Control 3.0 Credits

This course introduces students to programming techniques used to control laboratory experiments and industrial processes. The emphasis is on applications of LabView and C in real-world measurements and embedded systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EET 208 Introduction to Programming for Embedded Systems 3.0 Credits

This course introduces students to programming techniques used in embedded systems. The emphasis is on applications of C in real-world measurements, analysis, and embedded systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EET 209 Fundamentals of Virtual Instrumentation 3.0 Credits

This course introduces students to programming techniques used to monitor and control laboratory experiments and industrial processes. The emphasis is on applications of LabVIEW in real-world measurements and embedded systems, as well as on the practical aspects of interfacing a computer to various instruments including timing issues, real-time data acquisition and instrument control, instrument status, and acquisition speed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EET 307 Basic Power Systems I 3.0 Credits

Fundamentals of single-phase and three-phase power systems; introduction to symmetrical components and sequence impedances; power transfer modeling; the per-unit system; power transmission line impedance and admittances.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: EET 104 [Min Grade: D]

EET 310 Industrial Application of Nanotechnology 3.0 Credits

This course introduces students to nanotechnology materials, devices, and processes from the perspective of product development and process engineering, manufacturing scale-up, quality assurance, and reliability. Laboratory projects provide students with hands-on experience in fabricating and characterizing nanomaterials and nanodevices, and their applications for renewable energy, solid-state lighting, novel functional materials, and biomedical engineering.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 111 [Min Grade: D] and CHEM 113 [Min Grade: D]

EET 311 Modeling of Engineering Systems 4.0 Credits

Course introduces students to development and application of ordinary differential equations to systems analysis with emphasis on electrical systems. Particular attention is paid to the derivation of differential equations from given practical circuits used in industrial applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 122 [Min Grade: D] and EET 201 [Min Grade: D]

EET 313 Signals and Systems I 4.0 Credits

Course introduces students to applications of the systems analysis to the design of useful circuits and devices used in industrial applications. Covers time and frequency domain circuit analysis (transfer function, convolution) to determine response of the system to the arbitrary input.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 311 [Min Grade: D]

EET 317 Analog Electronics II 4.0 Credits

Students are introduced to four-layer diodes, power amplifiers, differential amplifiers, linear and non-linear operational amplifiers, feedbacks, oscillators, and active filters. Class discussions include practical circuits, troubleshooting, and case studies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 206 [Min Grade: D]

EET 319 PLC Fundamentals 4.0 Credits

Introduces the fundamentals of programmable logic controllers, and PLC application in process control. The course includes both lecture and laboratory aimed at applying fundamental principles to practical projects. The emphasis is on the basics of ladder logic, including timers, counters, and program control.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 205 [Min Grade: D]

EET 320 Renewable Energy Systems 3.0 Credits

This course provides an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternate energy sources and their technology and applications. The class explores society's present needs and future energy demands, examines conventional energy sources and systems, including fossil fuels and then focuses on alternate, renewable energy sources such as solar, wind power, geothermal and fuel cells.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 103 [Min Grade: D] and PHYS 104 [Min Grade: D]

EET 322 Energy Conversion 4.0 Credits

The course covers the fundamentals and the principles of electrical machines and transformers, with an emphasis on their application and installation. The course covers transformer, dc, ac and special machines. Novel energy conversion techniques such as Fuel Cell and Batteries are also discussed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 202 [Min Grade: D]

EET 323 Electrical Systems Design 3.0 Credits

This course covers the basics of industrial systems, including safety, grounding, protection, lighting, distribution, commonly found in residential, commercial and industrial environment. The course formulates the application of standards and codes such as NEC, NEMA and IEEE.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 202 [Min Grade: D]

EET 324 Power Electronics 4.0 Credits

The course covers the basics of the industrial and power electronics over a spectrum of applications and provides an introduction to the emerging technologies in these fields. The course is accompanied by laboratory using hardware and software simulation tools.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 202 [Min Grade: D]

EET 325 Microprocessors 3.0 Credits

Introduces student to fundamentals of microprocessing using an application-oriented approach. Includes fundamental principles and system requirements supplemented with specific implementation examples and practical circuits with detailed design considerations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 205 [Min Grade: D]

EET 333 [WI] Non-Destructive Evaluation of Materials 4.0 Credits

The course presents principles of ultrasound nondestructive evaluation of materials combining projects and hands-on experience with lectures. Students learn the physical principles of measurements of sound velocity in different materials, attenuation coefficients, directivity pattern of transducers and location and dimensions of heterogeneities in materials, such as flaws and cavities. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 103 [Min Grade: D] and PHYS 104 [Min Grade: D]

EET 335 Acoustic Emission 4.0 Credits

The course presents principles of acoustic emission using practical applications in various industries. Physical principles of acoustic emission generation, propagation and detection in engineering materials and structures are presented. This includes principles of stress and strain and the underlying materials science of material deformation, crack growth and failure. Students learn how these principles are utilized to build technical applications of acoustic emission considered as an NDE method.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 103 [Min Grade: D] and PHYS 104 [Min Grade: D]

EET 401 Applied Microcontrollers 4.0 Credits

The course is an introduction to microcontroller hardware and software with an emphasis on embedded control applications. Topics covered include microcontroller architectures, programming, analog and digital input/output, timing, debugging and PC-based software development tools.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 205 [Min Grade: D]

EET 402 Control Engineering 3.0 Credits

The course covers fundamental of control theory and their applications, including, linear systems and feedback, linear system operation and stability, standard methods applicable to the linear systems and basic for designs and applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 311 [Min Grade: D] and EET 313 [Min Grade: D]

EET 404 Signals and Systems II 3.0 Credits

Introduces the analysis of electric circuits under steady sinusoidal conditions, applications of Laplace transformation and complex frequency analysis, and Fourier analysis for representing an arbitrary time function as a sum of sinusoidal functions.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 313 [Min Grade: D] and EET 311 [Min Grade: D]

EET 406 Communication Systems 3.0 Credits

This course introduces AET student to fundamentals of Communication Systems using an integrated approach to analog and digital communications. Design and applications of contemporary communication systems are emphasized via the reduction theory to practice.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 311 [Min Grade: D] and EET 313 [Min Grade: D]

EET 407 Power Systems Fundamentals 3.0 Credits

The course covers the basic principles of the power systems, electric grid, methods to analyze electric grid systems and basic power system protection and stability.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 202 [Min Grade: D] and EET 322 [Min Grade: D]

EET 409 Optical System Design 3.0 Credits

This course introduces ET students to fundamentals of optics and optical systems using an application-oriented approach. Special attention is given to fundamental principles of optical systems and their requirements supplemented with specific applications-based examples.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: D]

EET I199 Independent Study in EET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EET I299 Independent Study in EET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EET I399 Independent Study in EET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EET I499 Independent Study in EET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EET T180 Special Topics in EET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EET T280 Special Topics in EET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EET T380 Special Topics in EET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EET T480 Special Topics in EET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Emergency Management

Courses

EMER 210 Hazard Mitigation 3.0 Credits

This course examines risks associated with natural and man-made hazards and explores how to reduce threats to life and property.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

EMER 215 Public Management in Times of Crisis 3.0 Credits

This course covers comprehensive disaster plans and training for the public manager. The course will include planning for natural disasters and accidents, and planning for events related to terrorism.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

EMER 220 Emergency Incident Risk Management 3.0 Credits

This course will focus on risk management skills used by first responders to emergency incidents. Particular attention will be paid to the emergency operations systems of the Philadelphia police and fire departments in conjunction with the Managing Director's Office of Emergency Management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

EMER 225 Infrastructure Disaster Recovery 3.0 Credits

This course will focus on the recovery of a business after a disaster occurs. This course will take the view of the private business enterprise and ways to maintain "business as usual". The course will provide information about the process of business recovery planning.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

EMER 235 Public Information Strategies 3.0 Credits

This course presents ways organizations handle and disseminate information to the public. Specifically, the course will analyze the role of the public information officer, the procedures for providing information to internal and external audiences, dealing with media outlets, and the importance of crisis communication plans.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

EMER 245 Search and Rescue 3.0 Credits

This course will focus on the fundamentals of Search and Rescue (SAR) skills and training. Students will be taught the proper use of equipment and how to assist people in distress by using SAR systems to provide responses to lost, injured, or overdue people who may be in harm's way in varied environments.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

EMER 380 Special Topics in Emergency Management 0.5-12.0 Credits

Special Topics of interest in emergency management. This course may be repeated for credit.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 4 times for 12 credits

EMER I199 Independent Study in EMER 12.0 Credits

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

EMER I299 Independent Study in EMER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

EMER I399 Independent Study in EMER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

EMER I499 Independent Study in EMER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

Emergency Medical Services

Courses

EMS 307 Critical Incident Stress Management 3.0 Credits

This course explores the theories of cause, effect, and mitigation of stress in public safety personnel. The student examines personal, administrative, and employee concerns, including critical-incident and stress-management services and resources. A further understanding of stress and stress management is gained through self research.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

EMS 445 Organizing Community Response in Disasters 3.0 Credits

This course will cover community preparation, planning, education, and integration of community response agencies into mass events.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Engineering Management

Courses

EGMT 350 Conflict Management for Engineers 3.0 Credits

As the pace of science and technology innovation increases, so too does the role of engineers in solving some of the world's toughest challenges. The prevention of violent conflict and the pursuit of a sustainable peace is just such a challenge. Developed in partnership with professional peacebuilders from the PeaceTech Lab and the US Institute of Peace's Academy for International Conflict Management and Peacebuilding in Washington DC, this course introduces engineering students to the concepts and skills they will need in order to use technology expertise in service of conflict-affected communities. This course provides students with an introduction to the theory and practice of conflict analysis, strategic peacebuilding, and negotiation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 404 [WI] Introduction to Engineering Management Communications 3.0 Credits

Excellence in design is as important to managerial communications as it is for any engineering endeavor. By applying this concept to the challenges that new engineering managers face, the course encourages engineers to aspire to professional competence in writing and speaking as they prepare for management. This helps them in both marketing their job skills and publishing and promoting innovative ideas and solutions. Students learn the rhetoric of managerial communication to affect workplace behavior on multiple levels, effect profitable technological and business outcomes, and promote the success of new products and systems. The basic skills of composition and grammar are also stressed: developing and organizing content, building effective reporting formats, and editing to achieve style and correctness.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 462 Introduction to Engineering Management 3.0 Credits

Introduces the general theory of management, including the processes of planning, organizing, assembling resources, supervising, and controlling. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

EGMT 465 Introduction to Systems Engineering 3.0 Credits

Determining technical requirements for engineering systems and planning technical product design and requirements. Analyzing the functionality, interoperability, and sustainability of new engineering systems. Integrating disparate engineering components for overall system optimization. Planning for testing and evaluation of engineering systems to evaluate conformance with technical requirements. Planning optimized organizational structure for execution of complex engineering programs.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

EGMT I199 Independent Study in EGMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EGMT I299 Independent Study in EGMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EGMT I399 Independent Study in EGMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EGMT I499 Independent Study in EGMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EGMT T180 Special Topics in EGMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EGMT T280 Special Topics in EGMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EGMT T380 Special Topics in EGMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

EGMT T480 Special Topics in EGMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Engineering, General

Courses

ENGR 081 Engr Common Mtng Time: Frosh 0.0 Credits

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENGR 100 Beginning Computer Aided Drafting for Design 1.0 Credit

Introduces students to computer-aided graphics techniques and the use of a state-of-the-art, computer-aided design/drafting package. Students will learn 2-D and 3-D modeling techniques to support the design process. All students will be required to take a competency quiz on 4 of 6 available AutoCAD labs.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 101 Engineering Design Laboratory I 2.0 Credits

This course introduces students to engineering design and practice. Emphasis is placed on the synthesis of knowledge, skills and the methodologies that are the heart of the profession. The course is designed to integrate core scientific foundations into an engineering perspective through the use of team-based projects, computer tools and technical writing. This is the first part of the three term freshman design experience.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 102 Engineering Design Laboratory II 2.0 Credits

This course introduces students to engineering design and practice. Emphasis is placed on the synthesis of knowledge, skills and the methodologies that are the heart of the profession. The course is designed to integrate core scientific foundations into an engineering perspective through the use of team-based projects, computer tools and technical writing. This is the second part of the three term freshman design experience.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 103 Engineering Design Laboratory III 2.0 Credits

This course introduces students to engineering design and practice. Emphasis is placed on the synthesis of knowledge, skills and the methodologies that are the heart of the profession. The course is designed to integrate core scientific foundations into an engineering perspective through the use of team-based projects, computer tools and technical writing. This is the third part of the three term freshman design experience.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 104 Engineering Design Laboratory for Transfers 4.0 Credits

Individualized course specially designed for transfer students. Provides selected educational experiences in engineering design, experimental techniques, and computer skills to round out the student's previous course of study.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 121 Computation Lab I 2.0 Credits

Introduces computation and programming through the use of a mathematical computation system, such as MATLAB. Programming techniques and algorithmic problem solving are introduced in the context of data analytics, basic calculus, modeling, simulation, and visualization. The course also illustrates the strengths and limitations of the scientific software in solving mathematical, engineering and scientific problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 122 Computation Lab II 1.0 Credit

Introduces physics-based simulations through the use of a mathematical computation system, such as MATLAB. Mathematical modeling and simulation of physical processes (static and dynamic) are used as a platform for numerical integration and differentiation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 121 [Min Grade: D]

ENGR 124 Computational Problem-Solving 3.0 Credits

This course sequence introduces computation and programming through the use of a mathematical computation system. Programming techniques and algorithmic problem solving are introduced in the context of data analytics, basic calculus, visualization, physics based modeling and simulations. The course also illustrates the strengths and limitations of the scientific software in solving mathematical, engineering and scientific problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 170 Pre-Calculus Practicum 1.0 Credit

The Pre-calculus Practicum for Engineers is designed to promote excellence in mathematics, team-based approaches to working and learning, and an appreciation for how mathematics is connected with the discipline. Since mathematics is the language of engineering, it is important to master its core concepts at an early stage and to develop the habits of mind required for effective problem solving. Through individual drills, small-group problem sets, and in-class discussion we will reinforce concepts taught in the freshman mathematics sequence and improve fluency with the approaches and strategies linked to a culture of excellence within the discipline.

College/Department: College of Engineering

Repeat Status: Can be repeated 1 times for 2 credits

Restrictions: Cannot enroll if classification is Junior or Pre-Junior or Sophomore or Senior

ENGR 171 Calculus I Practicum 1.0 Credit

The Calculus I Practicum for Engineers is designed to promote excellence in mathematics, team-based approaches to working and learning, and an appreciation for how mathematics is connected with the discipline. Since mathematics is the language of engineering, it is important to master its core concepts at an early stage and to develop the habits of mind required for effective problem solving. Through individual drills, small-group problem sets, and in-class discussion we will reinforce concepts taught in the freshman mathematics sequence and improve fluency with the approaches and strategies linked to a culture of excellence within the discipline.

College/Department: College of Engineering

Repeat Status: Can be repeated 1 times for 2 credits

Restrictions: Cannot enroll if classification is Junior or Pre-Junior or Sophomore or Senior

ENGR 172 Calculus II Practicum 1.0 Credit

The Calculus II Practicum for Engineers is designed to promote excellence in mathematics, team-based approaches to working and learning, and an appreciation for how mathematics is connected with the discipline. Since mathematics is the language of engineering, it is important to master its core concepts at an early stage and to develop the habits of mind required for effective problem solving. Through individual drills, small-group problem sets, and in-class discussion we will reinforce concepts taught in the freshman mathematics sequence and improve fluency with the approaches and strategies linked to a culture of excellence within the discipline.

College/Department: College of Engineering

Repeat Status: Can be repeated 1 times for 2 credits

Restrictions: Cannot enroll if classification is Junior or Pre-Junior or Sophomore or Senior

ENGR 173 Multivariate Calculus Practicum 1.0 Credit

The Multivariate Calculus Practicum for Engineers is designed to promote excellence in mathematics, team-based approaches to working and learning, and an appreciation for how mathematics is connected with the discipline. Since mathematics is the language of engineering, it is important to master its core concepts at an early stage and to develop the habits of mind required for effective problem solving. Through individual drills, small-group problem sets, and in-class discussion we will reinforce concepts taught in the freshman mathematics sequence and improve fluency with the approaches and strategies linked to a culture of excellence within the discipline.

College/Department: College of Engineering

Repeat Status: Can be repeated 1 times for 2 credits

Restrictions: Cannot enroll if classification is Junior or Pre-Junior or Sophomore or Senior

ENGR 199 Preparation for the Engineering Studies 6.0 Credits

Preparation for the Engineering Core Curriculum through intensive, coordinated work in three areas: pre-calculus mathematics, effective study methods, and career evaluation and selection. Topics include: algebra, trigonometry, geometry, note-taking, exam preparation, time management, evaluation of engineering and other career paths. (This course does not count toward graduation requirements).

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENGR 201 Evaluation & Presentation of Experimental Data I 3.0 Credits

Provide a comprehensive introduction to analysis, presentation, and communication of data collected by the engineer. Requires students to conduct experiments on engineering systems, then process and evaluate the collected data. Required presentation of research, results, conclusions, and conjectures from a technical and ethical viewpoint.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 122 [Min Grade: D] and PHYS 101 [Min Grade: D] and ENGR 103 [Min Grade: D]

Corequisite: EXAM 081

ENGR 202 Evaluation & Presentation of Experimental Data II 3.0 Credits

A continuation of ENGR 201.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGR 201 [Min Grade: D]

Corequisite: EXAM 081

ENGR 210 Introduction to Thermodynamics 3.0 Credits

Introduces thermodynamics from a classical point of view. Covers work, heat, entropy, thermodynamic properties, equations of state, and first and second law analysis of closed systems, control volumes, and selected thermodynamic cycles.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 122 [Min Grade: D] and PHYS 101 [Min Grade: D]

Corequisite: EXAM 081

ENGR 220 Fundamentals of Materials 4.0 Credits

Introduces materials and their properties; atomic view and architecture of solids; atomic motion in solids, mechanical, magnetic, electrical and optical properties of materials. Corrosion and degradation of solids.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D] and MATH 122 [Min Grade: D] and PHYS 101 [Min Grade: D]

Corequisite: EXAM 081

ENGR 231 Linear Engineering Systems 3.0 Credits

Provides an overview of systems and modeling; specifically using linear algebra as the model. Specific emphasis will be placed on developing models of engineering systems and the use of computational tools for solutions of the problems. The focus of the lab will be the use of MATLAB for solution of contemporary engineering problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: BMES 201 [Min Grade: D] (Can be taken Concurrently) MATH 122 [Min Grade: D] and (ENGR 121 [Min Grade: D])

Corequisite: EXAM 081

ENGR 232 Dynamic Engineering Systems 3.0 Credits

Provides an overview of dynamic systems and modeling; specifically using differential equations as a model. Specific emphasis will be placed on developing models of dynamic systems and the use of computational tools for solutions of the problems. The focus of the lab will be the use of MATLAB for solution of contemporary engineering problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 231 [Min Grade: D] and (ENGR 121 [Min Grade: D] or BMES 201 [Min Grade: D])

Corequisite: EXAM 081

ENGR 280 Introduction to Global Engineering 2.0 Credits

Introduces students to a broad range of contemporary issues (economic, political, and cultural) engineers face in meeting the challenges of globalization. In addition to responding to weekly presentations, students will engage in and report on an in-depth case study.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 295 Paul Peck Scholars: Survey of Mentorship 1.0 Credit

Mentorship is the first course in the leadership development course sequence required by the Drexel Engineering Paul Peck Scholars Program. This course sequence is designed to develop and enhance the leadership skills among engineering students, emphasizing communication among peer groups and other undergraduate students. This first course in the sequence, is focused on the mentor-mentee relationship as it relates to leadership development. Only students who have been accepted into the Paul Peck Scholars Program are eligible.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Pre-Junior or Sophomore .

ENGR 296 Paul Peck Scholars: Survey of Leadership 1.0 Credit

ENGR 296: Leadership is the second course in the leadership development course sequence required by the Drexel Engineering Paul Peck Scholars Program. This course sequence is designed to develop and enhance the leadership skills among engineering students, emphasizing communication among peer groups and other undergraduate students. As the second course in the sequence, ENGR 296: Leadership builds upon the foundational leadership concepts of trust and mentorship covered in ENGR 295 : Survey of Mentorship, focusing on self-awareness, team dynamics, and emotional intelligence. Only students who have been accepted into the Paul Peck Scholars Program are eligible.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 361 Statistical Analysis of Engineering Systems 3.0 Credits

Probability, random variables, reliability, quality control, design of experiments, regression/correlation, ANOVA and related topics, hypothesis testing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

ENGR 380 Paul Peck Scholars: Capstone 2.0 Credits

This is the final course of the Paul Peck Scholars Program, which aims to improve students' leadership, problem solving, and communication skills through mentorship, scholarship, and civic engagement. This course requires students to utilize the skills developed through their degree and Peck Scholars curricula to solve a problem in the local community. Students will then present their solution to the relevant parties at the end of the term. Students must be accepted into the Paul Peck Scholars Program in order to be eligible.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENGR.

ENGR 491 Senior Project Design I 2.0 Credits

Introduces the design process, including information retrieval, problem definition, proposal writing, patents, and design notebooks. Includes presentations on problem areas by experts from industry, government, and education.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENGR 492 Senior Project Design II 2.0 Credits

Continues ENGR 491. Requires written and oral progress reports.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CIVE 491 [Min Grade: D]

ENGR 493 Senior Project Design III 4.0 Credits

Continues ENGR 492. Requires written and oral final reports, including oral presentations by each design team at a formal Design Conference open to the public and conducted in the style of a professional conference.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENGR I199 Independent Study in ENGR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENGR I299 Independent Study in ENGR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENGR I399 Independent Study in ENGR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENGR I499 Independent Study in ENGR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENGR T180 Special Topics in ENGR 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENGR T280 Special Topics in ENGR 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENGR T380 Special Topics in ENGR 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENGR T480 Special Topics in ENGR 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

English

Courses

ENGL 101 Composition and Rhetoric I: Inquiry and Exploratory Research 3.0 Credits

Develops students' abilities to use writing as a tool for inquiry. Introduces genre theory, writing as a process, revision, and strategies of primary and secondary research. Reviews grammar, style, and documentation conventions. Engages students in reflection and promotes positive attitudes toward writing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENGL 102 Composition and Rhetoric II: Advanced Research and Evidence-Based Writing 3.0 Credits

Advances students' development in the writing processes. Promotes a critical evaluation and integration of information into their own writing as they research complex and open-ended issues. Identifies the relationships between rhetorical situations, the status of claims, and the need for evidence and warrants. Continues review of grammar, style, and documentation conventions. Encourages collaboration and effective search strategies of the Internet and library resources. Promotes students' reflective analysis and a positive attitude toward writing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

ENGL 103 Composition and Rhetoric III: Themes and Genres 3.0 Credits

Advances students' development in the writing and research processes and their understanding of how genres of writing shape meaning. Some courses may focus on the student's academic and discipline-specific experiences; Others may be based on literary or social themes. Promotes a critical reading of texts, reflective analysis, and a positive attitude toward writing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 102 [Min Grade: D]

ENGL 105 Honors Freshman English 3.0 Credits

Develops students' abilities to read and write expository and persuasive academic discourse. Teaches students the components of the writing process and strategies to think and read critically and to present a written argument. Requires students to write expository and persuasive essays and research papers and to keep a journal to express their responses to the material read and studied in the course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HONR.

ENGL 195 English Freshman Seminar 3.0 Credits

This course introduces freshman majors to the practice and study of the English major. It is a foundation for further study as well as a course about how we learn. It prepares the student to be successful in upper-division courses and to become familiar with the basic tools of the discipline. It encourages the creative and critical thinking that is a hallmark of the English major.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENGL 200 [WI] Classical to Medieval Literature 3.0 Credits

A survey of Greek and Roman literature (Homer, Aeschylus, Euripides, Virgil and Cicero), up to and including the Medieval period (Aquinas, Cavalcanti, Chaucer, and Dante). This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 201 Renaissance to the Enlightenment 3.0 Credits

A survey of Western literature from the Renaissance to the Enlightenment, focusing on works by Cervantes, Erasmus, Rabelais, Petrarch, Voltaire, Rousseau, Swift and Pope.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 202 [WI] Romanticism to Modernism 3.0 Credits

A survey of Western literature of the 19th and 20th centuries focusing on the major periods of Romanticism (Blake, Coleridge and Keats), Realism (Balzac and Ibsen), and Modernism (Kafka, Borges and Woolf). This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 203 [WI] Post-Colonial Literature I 3.0 Credits

A survey of nonwestern literatures produced before the modern era in Asia, Africa, and the Middle East, representing the more important periods and genres. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 204 Post-Colonial Literature II 3.0 Credits

A survey of nonwestern literatures written in the 20th century by writers from Asia, Africa, and the Middle East, and focusing on the effects of social, aesthetic and contemporary events on artistic creation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 205 [WI] American Literature I 3.0 Credits

A survey of American literature from Colonial times through the Civil War, including works by such writers as Anne Bradstreet, Emily Dickinson, Frederick Douglass, Cotton Mather, Ralph Waldo Emerson, Nathaniel Hawthorne, Herman Melville, Henry David Thoreau and Walt Whitman. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 206 [WI] American Literature II 3.0 Credits

A survey of American literature from the Civil War through the 21st century, including works by such writers as Kate Chopin, W.E.B. Du Bois, T.S. Eliot, William Faulkner, F. Scott Fitzgerald, Henry James, Philip Roth, Mark Twain and John Updike. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 207 [WI] African American Literature 3.0 Credits

Introduces students to African-American Literature, from the mid-18th century to the present. Provides a basic understanding of social, political and cultural influences and an awareness of the African-American literary tradition. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 211 [WI] British Literature I 3.0 Credits

A historical survey of British literature from its beginning to the end of the eighteenth century. Students will read texts selected to represent major authors, forms and thematic material that illustrates the development of English literature through the medieval and Renaissance periods and seventeenth and eighteenth centuries. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 212 British Literature II 3.0 Credits

A historical survey of British literature from the turn of the nineteenth century to the present; students will read texts selected to represent major authors, forms and thematic material of the Romantic, Victorian and modern periods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 214 Readings in Fiction 3.0 Credits

A basic course, which focuses on fiction as a genre through the study of a variety of short stories and fiction, organized by theme, period or form. One of three genre courses.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 215 [WI] Readings in Poetry 3.0 Credits

A basic course which focuses on poetry as a genre through the study of a variety of poems organized by theme, period or form. One of three genre courses. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 216 [WI] Readings in Drama 3.0 Credits

A basic course which focuses on drama as a genre through the study of a variety of plays organized by theme, period or form. One of three genre courses. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 300 [WI] Literature & Science 3.0 Credits

This course studies the impact of scientific and technological change on works of literature and art produced in various historical periods. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 302 Environmental Literature 3.0 Credits

This course explores the relatively recent discipline of Ecocriticism and considers the literary relationship between human beings and the natural environment--both altered and unaltered by human activity. The approach is interdisciplinary in its investigation of the relationships among science, culture, and personal observation. Students will read a selection of seminal texts of American environmental literature.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 303 Science Fiction 3.0 Credits

Provides reading and discussion of works illustrating the development of modern science fiction.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 304 Young Adult Fiction 3.0 Credits

This course introduces students to young adult (YA) fiction and to secondary sources useful for the appreciation of it. Topics discussed include: young adults as an audience, the genres of YA fiction, keeping up with YA fiction, literary and psychological theory applied to YA fiction.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 305 [WI] The Mystery Story 3.0 Credits

A study of the mystery story, from its inception as a genre in the 19th century to the present, through short stories and novels. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 306 Literature of Baseball 3.0 Credits

An examination of novels, short stories, and poetry about our "national pastime" that illuminate American ideals and values, history and culture from 1845 to the present. A study of how the game's symbols and rituals, its history and mythology help us understand American belief systems and ideologies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 307 Literature of the Holocausts 3.0 Credits

To underline the fact that more than one Holocaust has occurred, the course offers different points of view about the systematic slaughter of several religious and ethnic groups, pre-and post-World War II, through fiction, children's literature and films.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 308 [WI] The Literature of Business 3.0 Credits

In this advanced reading course, students read literary works about business and work and write analytically about these works, grounding that analysis in nonfiction readings from business publications. Course writing assignments ask students to respond to problems and issues raised in the texts. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (ENGL 101 [Min Grade: D] and ENGL 102 [Min Grade: D] and ENGL 103 [Min Grade: D]) or ENGL 105 [Min Grade: A]

ENGL 310 [WI] Period Studies 3.0 Credits

This is a variable topics course, focusing on the literature of a particular period (i.e., Classical Literature; Victorian Literature; the Harlem Renaissance). May be repeated for credit. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 312 Research Project Development 1.0-3.0 Credit

A seminar-style course in which students work on a research or creative project of their own choosing. They acquire knowledge and skills related to the development of researchable original ideas in the domains of humanities areas like literature and philosophy, or social science areas like communication, history or psychology, or a creative work or portfolio.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 12 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D]

ENGL 315 [WI] Shakespeare 3.0 Credits

This course focuses on Shakespeare's major plays and sonnets, providing the historical and cultural contexts that gave rise to his work. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 320 [WI] Major Authors 3.0 Credits

A course focused on intensive study of one or more authors, for example: Jane Austen; Joseph Conrad; Hemingway, Faulkner and Fitzgerald; Writers of the Harlem Renaissance; Carlos Fuentes and Gabriel Garcia Marquez. May be repeated for credit. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 323 Literature and Other Arts 3.0 Credits

A variable topics course which studies relationships between literature and one or more of the visual arts, theater or music (i.e., Surrealism; Memoir and Documentary Film; The Faust Legend). May be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: D]

ENGL 325 Topics in World Literature 3.0 Credits

A variable topics course which focuses on a particular national or regional literature within its cultural, historical and political contexts (i.e., African Literature; French Literature; Latin American Literature). May be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 330 The Bible as Literature 3.0 Credits

This course provides a close reading of selected books of the Old and New Testaments alongside selected literary works to discover both the literary qualities of these texts and their influence on literature.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 335 Mythology 3.0 Credits

This course investigates the specific forms mythological stories have taken in the literature, art and ritual of some or all of the following: Greece, Rome, Iceland, Mesopotamia and Native American and European cultures in the United States.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 340 [WI] Classical Rhetoric 3.0 Credits

A study in the theory and practical application of Greek and Roman rhetorical strategies in composition. Focuses on influential figures, terminology, the five canons, and the ancient composition processes known as "progymnasmata" to look at historical texts, the rhetoric of popular media, and the students' writing. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 101 [Min Grade: D] and ENGL 102 [Min Grade: D]

ENGL 345 American Ethnic Literature 3.0 Credits

A variable topics course which studies the literature of one or more of the United States ethnic populations within their historical and cultural contexts. May be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 350 Jewish Literature and Civilization 3.0 Credits

Focuses on the Jewish Bible, a classic literary document of Western civilization, deemed by many people of the world as fundamental to their religion; stresses aspects of cultural diversity and awareness.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 355 [WI] Women and Literature 3.0 Credits

This course focuses on literature written by, and/or about women and considers issues relating to women's place in literary history. May be repeated for credit. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 360 [WI] Literature and Society 3.0 Credits

This course examines the relationship between literature and the society it reflects and helps shape. May be repeated for credit. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 365 Topics in African American Literature 3.0 Credits

A variable topics course designed to further develop the ideas first presented in the African American Literature survey by exploring, in much more depth, significant authors, periods, and genres within the African American literary and cultural tradition. Topics include Science and Technology in African American Literature; the Slave Narrative; and Black Travel Writing.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 370 Topics in Literature and Medicine 3.0 Credits

This is a variable topics course which focuses on aspects of illness, healing, care-giving, aging, grief, and mortality as presented in narrative. Exploration of how literary construction and analysis affect understanding of these experiences. Topics include ?Illness and Healing in Literature and The Physician in Literature and Film. May be repeated three times for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

ENGL 380 Literary Theory 3.0 Credits

This course examines literary theoretical thinking, and focuses on twentieth century structuralism, post-structuralism, and contemporary theory. We will examine the ways in which language is conceived and reconceived by major theoretical writers and the implications of this rethinking for conceptualizations of history, politics, ideology, sexuality, and trauma, among others.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENGL.

Cannot enroll if classification is Freshman or Sophomore

Prerequisites: ENGL 101 [Min Grade: C] and ENGL 102 [Min Grade: C] and (ENGL 202 [Min Grade: C] or ENGL 203 [Min Grade: C] or ENGL 204 [Min Grade: C] or ENGL 205 [Min Grade: C] or ENGL 206 [Min Grade: C] or ENGL 211 [Min Grade: C] or ENGL 212 [Min Grade: C] or ENGL 214 [Min Grade: C])

ENGL 395 [WI] Special Studies in Literature 3.0 Credits

This is a variable topics course, providing intense literary study on a specific theme. May be repeated for credit. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

ENGL 470 Capstone Seminar in Medical Humanities 3.0 Credits

This seminar gives students the opportunity to synthesize, contextualize, and deepen their understanding of how disciplines in the humanities and the social sciences approach the experiences and implications of illness, aging, mortality and healing. Regular guest lecturers, discussion of assigned readings, student presentations, and written projects.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CMDH.

Prerequisites: (ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: D]) and HUM 315 [Min Grade: B]

ENGL 490 Seminar in English and American Literature 4.0 Credits

An advanced course with variable topics in British or American Literature stressing textual analysis, cultural and historical contexts and research; provides students with intensive preparation for advanced and professional studies.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 12 credits

Restrictions: Can enroll if major is ENGL and classification is Junior or Senior.

ENGL 492 Seminar in World Literature 4.0 Credits

An advanced course with variable topics in World Literature stressing textual analysis, cultural and historical contexts and research; provides students with intensive preparations for advanced and professional studies.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 12 credits

Restrictions: Can enroll if major is ENGL and classification is Junior or Senior.

ENGL 499 Senior Project in Literature 4.0 Credits

Open to English Majors only, the senior project in literature should reflect the student's interest in a specific subject, author or theme and should demonstrate the student's research, critical and analytical expertise at an advanced, pre-professional level.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENGL and classification is Senior.

ENGL I199 Independent Study in ENGL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENGL I299 Independent Study in ENGL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENGL I399 Independent Study in ENGL 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENGL I499 Independent Study in ENGL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENGL T180 Special Topics in English 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENGL T280 Special Topics in English 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENGL T380 Special Topics in English 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENGL T480 Special Topics in English 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

English as a Second Language

Courses

ESL 001 Foundations of University Study 0.0 Credits

High intermediate to advanced English as a second language course.

This course provides ESL students with a foundation for University success through developing academic communication skills and strategies and promoting awareness of the academic and co-curricular culture of the American university.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 15 credits

Restrictions: Can enroll if major is ESL or major is IG.

ESL 002 Foundations of Academic Writing 0.0 Credits

This course introduces ESL students to the academic essay and the process approach to writing as well as reading for different purposes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 003 Foundations of Academic Reading 0.0 Credits

This course introduces ESL students to the skills of critical reading for information, specifically summarizing and evaluating source material.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 004 International Gateway Foundations of Academic Writing for Chemistry 201 0.0 Credits

This course provides International Gateway students with support for success in the CHEM 201 course through developing academic skills and strategies to participate in the sciences.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 010 Listening and Speaking I 0.0 Credits

Low beginning English as a second language. Provides intensive instruction in the development of the following skills: speaking and listening in everyday situations, vocabulary, pronunciation, and grammatical functions. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 011 Reading and Writing I 0.0 Credits

Low beginning English as a second language. Provides intensive instruction in the development of the following skills: reading comprehension, simple inferring, basic vocabulary development, sentence and paragraph writing, basic grammatical structures, and the ability to communicate ideas orally and in writing. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 012 English in Everyday Life 0.0 Credits

Low beginning English as a second language. Prepares students who have trouble talking with and understanding native English speakers in everyday situations such as going to the store or the bank, asking for directions, using the telephone, etc. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 013 Beginning Grammar 0.0 Credits

Beginning English as a second language. Provides instruction and practice in such areas of English grammar as simple verb tenses, sentence structure, modals, and irregular verbs. Placement testing is required. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL.

ESL 020 Listening and Speaking II 0.0 Credits

High beginning English as a second language. Provides intensive instruction in the development of the following skills: speaking and listening (participating actively in spoken interactions and responding appropriately), vocabulary related to topics in the course, pronunciation and intonation patterns, and grammatical functions. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 021 Reading and Writing II 0.0 Credits

High beginning English as a second language. Provides intensive instruction in the development of the following skills: reading comprehension, inferring, vocabulary development, non-academic paragraph writing, basic grammatical structures and mechanics, and the ability to communicate ideas orally and in writing. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 022 Pronunciation and Conversation 0.0 Credits

High beginning to low intermediate English as a second language. Emphasizes vocabulary, pronunciation, and idioms. Gives students a chance to improve and practice their spoken communication skills. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 023 Intermediate Grammar III 0.0 Credits

Low intermediate English as a second language course. Provides instruction and practice in such areas as present, past, and future tense verbs, question structures, nouns and pronouns, and modals. Placement testing is required. Offered as needed. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 024 Presentations with Stories & Legends 0.0 Credits

Beginning to low intermediate. English as a second language. Provides instruction and practice in reading comprehension, writing, listening, and presentations using stories from a variety of sources. Placement testing is required.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL.

ESL 030 Listening and Speaking III 0.0 Credits

Low intermediate English as a second language. Provides intensive instruction in the development of the following skills: pronunciation (sounds, stress, intonation), vocabulary, listening/speaking (participating and responding appropriately in discussions, following directions, completing listening activities), grammatical competence, and repair of communication breakdown. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 031 Reading and Writing III 0.0 Credits

Low intermediate English as a second language. Provides intensive instruction in the development of the following skills: reading comprehension, inferring, vocabulary development, academic paragraph and essay format, grammatical structures and mechanics, and the ability to communicate ideas orally and in writing. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 032 English for Business Purposes 0.0 Credits

Intermediate English as a second language. Provides communication skills needed to do business with English speakers. Topics include small talk and telephone skills, participation in business meeting, presentations, communication through business letters and memos, and business negotiation. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 034 Understanding the News Media 0.0 Credits

Intermediate to advanced English as a second language. Emphasizes listening, discussion, and reading skills as students learn to read newspaper articles and listen to news from a variety of sources. Provides instruction on how the news is made and evaluated. Placement testing is required.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL.

ESL 035 Intermediate Vocabulary Development 0.0 Credits

Intermediate English as a second language course. Provides strategies to improve academic, general, and technical vocabulary; to discover common roots in English words; and to improve reading skills. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 036 TOEFL iBT Listening & Speaking 0.0 Credits

High intermediate to advanced English as a second language. Prepares students to take the Internet-based TOEFL (Test of English as a Foreign Language) for academic purposes. Provides instruction in the listening and speaking sections of the TOEFL. Placement testing is required.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if major is ESL or major is IG.

ESL 037 Intermediate Grammar IV 0.0 Credits

High intermediate English as a second language course. Provides instruction and practice in such areas as comparative structures, passive voice, gerunds and infinitives, and clause structures. Placement testing is required. Offered as needed. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 038 Intermediate Exploring American Life & Language 0.0 Credits

Intermediate English as a second language course. Students evaluate aspects of United States culture and history as presented in selected drama, literature, and music. Additional presentations and writing assignments support development of fluency in speaking and writing skills. Placement testing for this course is required. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 040 Listening and Speaking IV 0.0 Credits

High intermediate English as a second language. Provides intensive instruction in the development of the following skills: pronunciation/fluency (sounds, stress, intonation, linking, phrasing), vocabulary, listening/speaking (participate appropriately in spoken interactions, understand news, mini-lectures), repair of communication breakdown, and grammatical competence. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 041 Reading and Writing IV 0.0 Credits

High intermediate English as a second language. Provides intensive instruction in the development of the following skills: reading comprehension, inferring, vocabulary development, academic essay format, grammatical structures and mechanics, and the ability to communicate ideas orally and in writing. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 042 Advanced Grammar V 0.0 Credits

Low advanced English as a second language course. Provides instruction and practice in such areas as usage of advanced verb tenses, subject-verb agreement, pronouns, and modals. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 043 Intermediate Presentation Skills 0.0 Credits

Intermediate English as a second language course. Provides instruction on preparing, delivering, and evaluating presentations. Explores ways to engage audience and improve performance. Builds confidence through speaking skill development. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 044 Skills for College Success 0.0 Credits

High intermediate to advanced English as a second language. Addresses academic skills topics such as listening to lectures and note taking, reading textbooks and synthesizing information, conducting research, and expanding awareness of the United States academic environment. Placement testing is required. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if major is ESL or major is IG.

ESL 045 TOEIC Preparation 4-6 0.0 Credits

High intermediate to advanced English as a second language. Introduces skills and strategies that are helpful in taking the TOEIC test. Improves listening and reading comprehension skills. Focuses on analyzing types of test questions commonly asked and learning strategies for answering the questions. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 048 TOEFL iBT Reading & Writing 0.0 Credits

High Intermediate to advanced English as a second language. Prepares students to take the Internet Based TOEFL (Test of English as a Foreign Language) for academic purposes. Provides instruction in the reading and writing sections of the TOEFL. Placement testing is required.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 049 Intermediate Pronunciation and Conversation 0.0 Credits

Intermediate English as a second language course. Provides instruction on pronunciation, word stress, and intonation. Gives students a chance to improve and practice their spoken communication skills. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 050 Listening and Speaking V 0.0 Credits

Low advanced English as a second language. Provides intensive instruction in the development of the following skills: pronunciation/fluency (ease, speed, smoothness of speaking), vocabulary, listening/speaking (participate appropriately in spoken interactions, understand news reports, lectures), repair of communication breakdown, and grammatical competence. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 051 Reading and Writing V 0.0 Credits

Low advanced English as a second language. Provides intensive instruction in the development of the following skills: reading comprehension, inferring, vocabulary development, academic essays and the use of source material, grammatical structures and mechanics, and the ability to communicate effectively in writing. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 052 Advanced Vocabulary Development 0.0 Credits

Advanced English as a second language course. Provides strategies to improve academic, general, and technical vocabulary; to discover common roots in English words; and to improve reading skills. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 055 Strategies for Academic Reading 0.0 Credits

Advanced English as a second language. Improves reading comprehension. Provides skills for defining and identifying main and supporting ideas, recognizing transitional words and their role in meaning, and finding organizational patterns. Explores the authors' purpose, opinion, and tone. Placement testing is required. Offered as needed. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 056 GMAT Preparation 5-6 0.0 Credits

Advanced English as a second language. Provides instruction for GMAT reading. Offers strategies to identify key parts of an argument and reviews grammatical and stylistic rules in the sentence correction section. Analyses arguments. Provides instruction for essay writing. Placement testing is required. Offered as needed. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 057 Advanced Vocabulary and Idioms 0.0 Credits

Advanced English as a second language. Provides strategies to improve idiomatic language using authentic sources from a variety of media. Placement testing is required.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 058 Advanced Exploring American Life & Language 0.0 Credits

Advanced English as a second language course. Students evaluate aspects of United States culture and history as presented in selected drama, literature, and music. Additional presentations and writing assignments support development of fluency in speaking and writing skills. Placement testing for this course is required. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 060 Listening and Speaking VI 0.0 Credits

Advanced English as a second language. Provides intensive content-based instruction in the development of the following skills: pronunciation/fluency (ease, speed, smoothness of speaking), vocabulary, listening/speaking (participate appropriately in spoken interactions, understand news reports, lectures), grammatical competence, repair of communication breakdown. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 061 Reading and Writing VI 0.0 Credits

Advanced English as a second language. Provides intensive instruction in the development of the following skills: reading comprehension, inferring, academic writing (including research paper with synthesis, summary, reaction, analysis, and citation of sources), grammar and mechanics, and effective communication in writing. Placement testing is required. Offered all terms. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 062 TOEFL iBT for All Skills 0.0 Credits

High intermediate to advanced English as a second language. Prepares students to take the iBT (Internet Based Test of English as a Foreign Language) for academic purposes. Provides instruction in the listening, speaking, reading, and writing sections of the TOEFL. Placement testing is required.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 12 credits

Restrictions: Can enroll if major is ESL or major is IG.

ESL 063 Advanced Grammar VI 0.0 Credits

High advanced English as a second language course. Provides instruction and practice in such areas as usage of passive tense, noun clauses, adjective clauses, gerunds and infinitives, and conditional sentences. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 064 Advanced Presentation Skills 0.0 Credits

Advanced English as a second language course. Provides instruction on preparing, delivering, and evaluating presentations. Explores ways to engage audience and improve performance. Builds confidence through speaking skill development. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 067 Language of Science Technology Engineering and Mathematics 0.0 Credits

High intermediate to advanced English as a second language course. Provides instruction on building academic vocabulary, reading, and oral skills by incorporating authentic materials from a variety of STEM (Science, Technology, Engineering & Math) fields.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 068 Language of Media and Design 0.0 Credits

High Intermediate-Advanced Listening & Speaking. Develops English as a second language communicative fluency in design-related concepts and vocabulary through the use of authentic materials and experiences.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 0 credits

ESL 069 Advanced Pronunciation and Conversation 0.0 Credits

Advanced Intermediate English as a second language course. Provides instruction on pronunciation, word stress, and intonation. Gives students a chance to improve and practice their spoken communication skills. Placement testing is required. Offered all terms. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 070 GLOBE Business Information 0.0 Credits

Intermediate to advanced level English as a second language. Develops students' ability to read business material, understand key vocabulary and discuss current events in the business sector. Provides instruction in reading and understanding case studies. Placement testing is required. Offered as needed. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 071 GLOBE Business Communication 0.0 Credits

Intermediate to advanced level English as a second language. Improves students' ability to effectively communicate in business setting. Offers strategies for negotiation and provides instruction on cross-cultural communication styles. Placement testing is required. Offered as needed. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 072 Business Site Visits 0.0 Credits

Intermediate to advanced level English as a second language. Prepares students to observe American business practices on site. Develops research skill. Provides instructions and practice in organizing and making presentations as well as letter writing skills. Placement testing is required. Offered as needed. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 073 Introduction to Business Research 0.0 Credits

High-intermediate to advanced level English as a second language. Introduces students to the research process of business related topics and exposes them to American culture and conversation through interaction. Offered as needed. 7.5-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 074 IELTS Listening and Speaking 0.0 Credits

High intermediate to advanced English as a second language. Prepares students to take the IELTS (International English Language Testing System) for academic and professional purposes. Provides instruction in the listening and speaking sections of the IELTS test. Placement testing is required.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 075 IELTS Reading and Writing 0.0 Credits

High intermediate to advanced English as a second language. Prepares students to take the IELTS (International English Language Testing System) for academic and professional purposes. Provides instruction in the reading and writing sections of IELTS. Placement testing is required.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL.

ESL 076 IELTS (International English Language Testing System) Test Preparation All Skills 0.0 Credits

High intermediate to advanced English as a second language. Prepares students to take the IELTS (International English Language Testing System) for academic and professional purposes. Provides instruction in the listening, speaking, reading, and writing sections of the IELTS test. Placement testing is required.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 12 credits

Restrictions: Can enroll if major is ESL or major is IG.

ESL 080 Preparation Course for International Teaching Assistants 0.0 Credits

Intermediate to advanced English as a second language. Prepares new international teaching assistants for their responsibilities in the university. Provides intensive instruction in English language, pedagogy, and the culture of the American classroom. Department permission required. Offered as needed. 18-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 081 Accent Reduction 0.0 Credits

This is an advanced English as a second language course, which provides intensive instruction in the development of speaking and pronunciation skills. Students will practice pronunciation skills by participating actively in spoken interactions and responding appropriately while focusing on vocabulary, pronunciation, intonation patterns, and grammatical functions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ESL or major is IG.

ESL 090 English for Medical Purposes 0.0 Credits

High intermediate to advanced English as a second language. Develops participants' communication skills in medical context. Provides an overview of the American healthcare system and the dynamics of the different participants involved in the system. Placement testing is necessary. Offered as needed. 2.5-2.5-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 091 Special Topics in English Language & Culture 0.0 Credits

Advanced English as a second language. Focuses on specific issues in English structure and usage. Includes issues of discourse, sociolinguistics, and culture. Placement testing is necessary. Offered as needed. 3-0-0.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ESL 110 Introduction to Academic Discourse 3.0 Credits

The course prepares students for courses requiring English academic communication. The course provides a review of English grammar, an introduction to academic writing, reading, and academic support services. Opportunities to interact with other members of the university community are provided. By departmental approval only.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

ESL 180 Topics in English for Academic Purposes 2.0 Credits

This course focuses on the academic discourse of a particular genre and/or content area in English for Specific Purposes or English for Academic Purposes.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 5 times for 12 credits

Entertainment & Arts Management

Courses

EAM 130 Overview of Entertainment and Arts Management 3.0 Credits

Students acquire an understanding of the profit and non-profit organization within a social and governmental context. Of primary focus are the arts organization as an entity, how they are organized and the impact and place they have within the community.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EAM.

EAM 200 Introduction to the Music Industry 3.0 Credits

This course offers an introduction to four key areas of the music business - The recording industry, entertainment contracts, publishing, touring and concert production. Students will be taught by experts in each topic.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EAM.

EAM 211 Strategic Management for Entertainment and Arts Management 3.0 Credits

Explores the concepts of planning and evaluation as it relates to the arts. Instruction will focus on the development of business plans, including research, organization, competition, marketing, staffing, and financial issues (i.e. budgets, etc.). Students present and defend the elements of their plans. Other topics discussed will be leadership skills decision-making, and managing change.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman or Sophomore .

EAM 261 Copyrights and Trademarks 3.0 Credits

This is the introductory law course for EAM managers and discusses topics relating to copyrights, intellectual property rights, and royalties.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: BLAW 201 [Min Grade: D]

EAM 270 Audience Development for Arts 3.0 Credits

This course emphasizes the usefulness and application of marketing theories and concepts to develop audiences and promotes the arts as a valuable social sector, with a focus on marketing planning and strategy development. Focus is placed on marketing research, analysis, planning, strategy development, and development of marketing plans.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: EAM 211 [Min Grade: D]

EAM 301 Gallery and Collection Management 3.0 Credits

Discusses the professional operation of museums and commercial art galleries including advocacy, legal, administration, curatorial, exhibition, and public issues by examining the questions: What are the challenges of managing a museum's collection including acquisition policies, insurance, conservation and storage of art? What resources are needed to manage a gallery?.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

EAM 302 Exhibition Design 3.0 Credits

Discuss key issues in exhibition presentation including visual design elements, accessibility, and approachable presentation strategies. This course also explores theoretical and ethical issues related to museums, art collecting, cultural patrimony, curatorial authority, and diversity.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

EAM 310 Social Media in Entertainment 3.0 Credits

Social Media In Entertainment teaches students how to develop the strategies for using social media as a marketing tool in the arts and entertainment industries. The goal will be to develop a social media strategy for a specific entity utilizing information on strategies and tactics learned during the course, as well as how to integrate this strategy into an overall marketing plan. Students will learn how to craft a strategy, how to evaluate which social media tools and tactics to use to achieve the most effective results and how to successfully implement the strategy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

EAM 312 Introduction to Fund Development for the Arts 3.0 Credits

Course provides an overview of basic fund-raising techniques for non-profit arts organizations. Strategies for raising funds from individuals, corporations, foundations, and government funding sources are reviewed and analyzed. Methodologies for developing a complete fund-raising plan are studied.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EAM.

Prerequisites: EAM 130 [Min Grade: D]

EAM 313 Volunteer and Board Management 3.0 Credits

This course continues the work of EAM 312- Intro to Fund Development for the Arts. It will build on that course by focusing on the area of volunteers for nonprofit organizations. Content will examine the board of directors and other volunteers in relation to governing, managing, operating a nonprofit arts entity.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EAM.

Prerequisites: EAM 312 [Min Grade: D]

EAM 321 Box Office and Venue Management 3.0 Credits

Focuses on the operational management tasks. Students explore the marketing and promotional component of box office management, the use of technology and ticket sales, and managing people.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: EAM 211 [Min Grade: D]

EAM 322 Performing Arts Touring and Promotion 3.0 Credits

This course provides an overview of organizing performing arts tours and events by discussing administrative and management responsibilities of touring including booking, logistics, staffing, promotion and decision making.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior.

EAM 325 Producing for Live Entertainment 3.0 Credits

This course is experience-based and designed to familiarize students with all aspects of producing a live entertainment event and to discuss and develop the necessary skills to do so successfully through practical experience. The course provides an overview of the issues routinely encountered by producers of live events, both commercial and non-profit, through the actual producing of an arts/entertainment event. Skills developed include working creatively with artists; understanding project management, planning and budgeting; revenue projection and management (including possible fundraising); understanding technical and logistical issues around production; and successful execution.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

EAM 340 Artist Representation and Management 3.0 Credits

This course teaches EAM students who will be representing or managing artists, or will be working with agents or artist managers, the nature of those jobs and the challenges of successfully working with talent to promote and monetize their careers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EAM and classification is Junior or Senior.

EAM 350 Arts, Culture and Society 3.0 Credits

Examines the role of arts, impact on society, exploring key cultural policy issues including community standards and censorship, and different approaches to funding. Readings, films, discussions and projects explore questions as the social functions of the arts, the use of art for advocacy and patronage over the world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

EAM 361 Law for Entertainment and Arts Management Managers 3.0 Credits

Examines the relationship between the arts and law, including contracts, license fees, labor-management agreements, liability, immigration law, use fees, first amendment issues, and the formation of partnerships and corporations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: EAM 261 [Min Grade: D]

EAM 365 Media and Entertainment Business 3.0 Credits

This course focuses on media networks and other major players in the media and entertainment business, examining their interdependence, and discussing major trends and tendencies on the market and their impact on the art and entertainment field.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

EAM 391 [WI] Promotion, Press and Publicity 3.0 Credits

This course addresses media positioning and addresses relationship development, press releases, PSA's, CD promotional development and other methods for promoting arts and entertainment. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

EAM 399 Independent Study in Entertainment and Arts Management 12.0 Credits

Provides individualized study in entertainment and arts management in a specialized area of study. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 4 times for 12 credits

Restrictions: Cannot enroll if classification is Freshman

EAM 401 Writing for Arts Managers 3.0 Credits

Focuses on non-marketing writing, with a significant portion of the class focusing on the development and writing of proposals seeking funding for arts organizations. The course covers in-depth the standard elements of a complete professionally prepared proposal, as well as exposing students to alternate formats.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A] or HUM 108 [Min Grade: D]) and EAM 312 [Min Grade: D]

EAM 461 Entertainment Publishing 3.0 Credits

A detailed look at the publishing industry, including history and economics of publishing. Industry segments to be covered include books, periodicals and new media. Topics include developer/publisher issues, laws, industry operating characteristics, distribution and industry trends.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: EAM 361 [Min Grade: D]

EAM 465 Special Topics in Entertainment and Arts Management 1.0-3.0 Credit

Provides study in entertainment and arts management on a special topic. This course may be a lecture or laboratory course. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 5 times for 15 credits

EAM 471 Fine Arts Market Development 3.0 Credits

Examines the dynamics of the commercial visual arts market, including international auction houses such as Sotheby's and major private collectors. Answers questions like: How is the market value (price) of art works determined?.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

EAM 472 Trends in Visual Arts 3.0 Credits

Exploration of recent developments in the visual arts in the US and abroad. Includes the reviewing of major visual arts exhibitions and emerging artists and artistic trends within the decade. Field trips to area galleries and art museums are included.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

EAM 491 Entertainment and Arts Management Senior Project 1.0 Credit

Senior Project is a thesis course on a topic of the student's choice over the three quarters of senior year in close cooperation with a faculty advisor. The student will present their final product to a jury in their final quarter of senior year.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 3 credits

Restrictions: Can enroll if major is EAM and classification is Senior.

EAM I199 Independent Study in Enteratinment & Arts Management 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EAM I299 Independent Study in Enteratinment & Arts Management 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EAM I399 Independent Study in Enteratinment & Arts Management 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 4 times for 12 credits

EAM I499 Independent Study in Enteratinment & Arts Management 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EAM T180 Special Topics in Entertainment & Arts Management 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EAM T280 Special Topics in Entertainment & Arts Management 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EAM T380 Special Topics in Entertainment & Arts Management 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EAM T480 Special Topics in Entertainment & Arts Management 1.0-3.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 5 times for 15 credits

Entrepreneurship and Innovation

Courses

ENTP 100 Innovation Neighborhood 1.0 Credit

This course is designed to introduce students to the numerous entrepreneurial activities that are part of Drexel University and the greater Philadelphia region. The course sparks curiosity about innovations and ideas not commonly encountered, and stimulates creative thinking about new opportunities.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

ENTP 101 Life Strategies I 3.0 Credits

Life Strategies is a two term series which reinforces entrepreneurship as an increasingly important life skill. First in the series, Life Strategies I, has two thrusts. It first explores the accelerating job market evolution and why future careers and earning a living will be vastly different from even recent history. Facts presented make the case people should embrace entrepreneurship as a "habit of mind" as they maneuver future career options. The course then introduces the personal skill set valuable to entrepreneurs, skills every student should consider honing to help them navigate their future whether or not they plan to be an entrepreneur.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

ENTP 102 Life Strategies II 3.0 Credits

Life Strategies II introduces the fundamentals of starting an entrepreneurial endeavor. The course provides students with a basic understanding of startup enterprise essentials and why a startup isn't just a smaller version of a large business. The course is intended to give a student who has no business training the ability to frame a potential business idea for consideration by others using only a few simple models, common sense, and logic. Life Strategies I is a prerequisite.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Prerequisites: ENTP 101 [Min Grade: D]

ENTP 205 Ready, Set, Fail 3.0 Credits

There are many students who say they want to be an entrepreneur, but they are often not ready for the risk that comes with starting and growing a business. Taking risks requires a deep appreciation of failure. This course will teach students how to appreciate failure, learn from it, and use these experiences to build future success in an entrepreneurial setting.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

ENTP 210 Leading Start-Ups 3.0 Credits

Entrepreneurs face unique leadership challenges, especially when founding a new company. This course provides the aspiring entrepreneur with tools and frameworks necessary for creating strategy, building companies, and assembling human capital with limited resources. By exploring what entrepreneurial leaders actually do, and how they do it, the student will learn through experiential exercises both the challenges and the excitement of starting a new venture.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

ENTP 215 Building Entrepreneurial Teams 3.0 Credits

The overall goal of this course is to evaluate the different approaches in forming teams during the startup of a new company. We will compare and contrast evidence-based and anecdotal team formation models to determine their advantages and disadvantages as well as their effects on the expected outcomes.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENTP 210 [Min Grade: D]

ENTP 250 Ideation 3.0 Credits

Innovation is the driving force behind today's economy and ideation supports an individual's ability to innovate. This course provides students with tools, methods and self-reflection techniques necessary to bring new ideas into reality. Through creative innovation, successful entrepreneurs not only create new ventures but also re-invent companies to remain competitive in an ever-changing market. Students in this course will use ideation techniques to develop new ideas, change or build upon established practices and apply these techniques in approaching and analyzing business situations. Students will be able to apply creative skills more effectively both personally and professionally.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

ENTP 270 Social Entrepreneurship 3.0 Credits

This course examines how social entrepreneurs launch successful ventures to address the world's most challenging social and environmental problems. The course introduces students to frameworks and methodologies that challenge current models to advance original solutions to existing problems. A passion for social change is advanced by adopting a market orientation and data-driven approaches that encompass both social and financial outcomes.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

ENTP 275 Women and Minority Entrepreneurship 3.0 Credits

Today, women and minority entrepreneurs are starting new business ventures at a quick pace. Yet there are few resources for these business owners to improve the historically high failure rate or grow their new venture. In this course, students will understand how race, gender, or ethnicity plays a part in establishing a women- or minority-owned enterprise. The course examines the current state of minority and women's entrepreneurship along with the conditions that support or block minority or women entrepreneurs.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

ENTP 325 Early Stage Venture Funding 3.0 Credits

This course provides students with an understanding of the process, opportunities and challenges associated with early stage venture funding. It exposes you to the concepts, practices and tools related to the funding needs of early stage ventures with a focus on bootstrapping, friends/family financing and angel-stage investment. The course will include an understanding of the unique needs of family businesses, small businesses and social ventures, as well as a deep look at alternative (but increasingly popular) fund raising techniques such as crowdfunding. This will be accomplished through a combination of field projects, readings, cases, and speakers designed to convey the unique environment of investments and new ventures.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ACCT 115 [Min Grade: D] or ACCT 120 [Min Grade: D] or ACCT 110 [Min Grade: D]

ENTP 329 Entrepreneurship & New Technologies 3.0 Credits

Creating a new technology venture offers unique challenges. Indeed, innovation and advances in technology are prevalent, and technological innovation leads to competitive advantage. Students are introduced to the challenges of new technology-based companies that include: the complexity of intellectual property, research team development, and sources of funding. This course will examine entrepreneurship in technology markets and take a deep view of what it takes to be a technology entrepreneur.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENTP 340 Managing Entrepreneurial Growth 3.0 Credits

Managing growth includes leveraging assets at every stage and controlling the risk. This course will focus on areas that are essential to a new venture's growth, including planning, marketing, talent management, and financial performance. Students will examine the growth opportunities of a venture and develop an experiential growth plan that will provide the greatest impact for a firm.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENTP 350 Dynamics of the Family Firm 3.0 Credits

This course studies the unique dynamics of family firms and the complex issues involved with creating, owning, and successfully operating a family business. Students will examine ownership structures, strategic human-resource issues, governance, strategy, marketing, family dynamics, culture, and philanthropy.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENTP 360 Franchising 3.0 Credits

Franchising is rapidly increasing worldwide. There is a growing need among franchise owners for employees with industry experience and know-how, and there are growing opportunities for entrepreneurs who want to start a franchise. Together, these developments present a unique opportunity for the entrepreneur. This course offers various aspects of starting, developing, and managing a franchise.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENTP 370 Global Entrepreneurship 3.0 Credits

This course focuses on international opportunity identification for new and emerging companies; market analysis; joint ventures, regional legal and cultural issues and financing foreign ventures. The course will provide students with an understanding of the complexities faced by entrepreneurs doing business in a global environment and with knowledge, which will help them to be successful within the global context. In classroom discussion, emphasis will be placed on entrepreneurship in China, India and Latin America however class projects will touch upon numerous countries across the globe.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENTP 385 Innovation in Established Companies 3.0 Credits

This course provides students with an understanding of how companies remain competitive using innovation as the driving force behind product or service development. Entrepreneurs challenge assumptions and create value in established organizations. While most executives would agree that innovation is the key to a sustainable business in the 21st century, few seem to understand how to make it a reality. Students will be introduced to various kinds of internal and joint ventures, such as corporate venture-capital investments, alliances, mergers, and acquisitions to create value and promote entrepreneurship within an organization. Students will develop skills that are important for careers in an entrepreneurial setting and corporate venture activities.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENTP 390 Clean Tech Ventures 3.0 Credits

This course will provide the groundwork to understanding new venture development in clean energy markets. Through experiential learning, specifically, field visits to local energy companies, and through guest speakers, students will develop an appreciation and understanding of the market conditions and policy implications of new ventures in this sector.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENTP 410 Thought Leadership 3.0 Credits

The individual entrepreneur faces many challenges. This course takes a philosophical and ethical approach to developing the entrepreneurial mindset. This course examines the ethical challenges in a start-up venture or high-growth firm, as illustrated through discussions by guest speakers—serial entrepreneurs. Students will be required to reflect on the varying viewpoints presented by the distinguished experts, and will develop their own approaches and philosophies regarding "the entrepreneur" and the "process of entrepreneurship."

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENTP 440 Launch It!: Early Stage 3.0 Credits

This course is designed for students interested completing one of four minors offered by the Close School of Entrepreneurship: Entrepreneurship and Innovation, Social Entrepreneurship, Energy Innovations or Health Innovations. In the course, students will be expected to identify an opportunity and propose the launch of a company. Working in teams, students will also learn how to experiment with different business models, validate a market need, and build all facets of a start-up company. Students will be expected to achieve milestones and propose key risks on which the business' success depends.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

ENTP 450 Launch It! 3.0 Credits

This course is designed for those serious about being entrepreneurs. Students will be expected to work on the actual launching of a start-up. The course involves talking to customers, partners, competitors, experimenting with different business models, validating a market need through customer development, and building all facets of a start-up company. *Admission to this course requires submission of a business application form and approval of the application by the professor.

College/Department: Close School of Entrepreneurship

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENTP 205 [Min Grade: D] and ENTP 250 [Min Grade: D] and ENTP 325 [Min Grade: D]

ENTP I199 Independent Study in ENTP 1.0-12.0 Credit

Various topics of interest in the field of entrepreneurship will be reviewed. Topics will vary from term to term.

College/Department: Close School of Entrepreneurship

Repeat Status: Can be repeated multiple times for credit

ENTP I299 Independent Study in ENTP 1.0-12.0 Credit

Various topics of interest in the field of entrepreneurship will be reviewed. Topics will vary from term to term.

College/Department: Close School of Entrepreneurship

Repeat Status: Can be repeated multiple times for credit

ENTP I399 Independent Study in ENTP 1.0-12.0 Credit

Various topics of interest in the field of entrepreneurship will be reviewed. Topics will vary from term to term.

College/Department: Close School of Entrepreneurship

Repeat Status: Can be repeated multiple times for credit

ENTP I499 Independent Study in ENTP 1.0-12.0 Credit

College/Department: Close School of Entrepreneurship

Repeat Status: Can be repeated multiple times for credit

ENTP T180 Special Topics in Entrepreneurship 1.0-12.0 Credit

This course covers various topics of particular relevance to the study of entrepreneurship.

College/Department: Close School of Entrepreneurship

Repeat Status: Can be repeated multiple times for credit

ENTP T280 Special Topics in Entrepreneurship 12.0 Credits

This course covers various topics of particular relevance to the study of entrepreneurship.

College/Department: Close School of Entrepreneurship

Repeat Status: Can be repeated multiple times for credit

ENTP T380 Special Topics in Entrepreneurship 1.0-12.0 Credit

This course covers various topics of particular relevance to the study of entrepreneurship.

College/Department: Close School of Entrepreneurship

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ENTP T480 Special Topics in Entrepreneurship 1.0-12.0 Credit

This course covers various topics of particular relevance to the study of entrepreneurship.

College/Department: Close School of Entrepreneurship

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Environmental Engineering

Courses

ENVE 300 Introduction to Environmental Engineering 3.0 Credits

Overview of environmental engineering practice: water resources, water and waste control, solid waste, air pollution, risk management and environmental health. Population and resource demand forecasting, chemistry and microbiology necessary to solve basic problems is included.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CAEE 201 [Min Grade: D]

ENVE 302 Environmental Transport and Kinetics 3.0 Credits

Covers applications of mass balances to describing transport environmental systems, diffusive and dispersive processes, and coupling of transport and kinetic models.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHE 201 [Min Grade: D]

ENVE 335 Industrial Safety 3.0 Credits

Examines safety in the workplace, loss prevention principles, Occupational Safety and Health Act implementation, accident investigation techniques, and basics of loss control and risk management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENVE 410 Solid and Hazardous Waste 3.0 Credits

Provides an overview of municipal and industrial waste management, including design and economic analysis. Discusses options such as landfilling and incineration from engineering, social, and regulatory perspectives. Reviews physical, chemical, and biological treatment of hazardous waste.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENVE 415 Recycling of Materials 3.0 Credits

This course will examine the selection criteria for recycling component materials. Recycling involves both reusing materials for energy applications and reprocessing materials into new products.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVE 302 [Min Grade: D]

ENVE 416 Urban Water Resources & Infrastructure Systems 3.0 Credits

This course covers planning, design, and operation of water and wastewater systems in urban areas. Topics include domestic and firefighting water supply, treatment, storage and distribution; wastewater collection and treatment; stormwater collection, peak flow attenuation and treatment, and protection of source/receiving water aquatic habitat.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVE 300 [Min Grade: D] and CIVE 330 [Min Grade: D] and CIVE 430 [Min Grade: D]

ENVE 421 Water and Waste Treatment II 3.0 Credits

Covers processes used for water purification and waste treatment, containment and immobilization of hazardous wastes, and ultimate disposal of residues and hazardous materials.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

ENVE 422 Water and Waste Treatment Design 3.0 Credits

Covers integration of processes into a complete treatment system. Includes detailed design procedures to control wastes, prevent environmental contamination, and protect drinking water quality.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVE 421 [Min Grade: D]

ENVE 435 Groundwater Remediation 3.0 Credits

Reviews physical, chemical, and biological remediation technologies for contaminated sites and groundwater by in-site and ex-site applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENVE 450 Data-based Engineering Modeling 3.0 Credits

This course covers empirical methods to understand and model engineering systems. Students will learn to develop evaluate statistical models and use three common statistical software packages, Excel, SPSS, and R.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

Prerequisites: ENGR 361 [Min Grade: D] or CHE 335 [Min Grade: D] or MEM 361 [Min Grade: D] or MATH 311 [Min Grade: D]

ENVE 455 Geographic Information Systems 3.0 Credits

The course provides grounding in fundamental principles of GIS, and achieves understanding through hands on practical laboratories. Course topics include: spatial reference systems, geographic data theory and structures, structures, spatial analysis tools, functions and algorithms, GIS data sources, compilation and quality, and GIS project design and planning.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

ENVE 460 Fundamentals of Air Pollution Control 3.0 Credits

Fundamental topics with regard to the formation and control of air pollutants are studied. This course provides strong foundation for engineers who will be involved in the development of engineering solutions for industrial air pollution prevention and design, development or selection of air pollution control devices and systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 465 Indoor Air Quality 3.0 Credits

Introduces basic concepts about indoor air quality, indoor air pollutants, including their sources and health effects, transport of pollutants, modeling of pollutant concentration in buildings, and ventilation as well as air cleaning systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVE 302 [Min Grade: D] or AE 220 [Min Grade: D]

ENVE 470 Industrial Ecology 3.0 Credits

Industrial Ecology (IE) is an evolving view of industrial operations which seeks to design processes and manufacture products in such a way to minimize and optimize their environmental interactions. IE borrows the analogy from nature that "waste" from one organism is "food" for another. Within the "technosphere", the organization in which economic processes and activities are conducted by humans, IE uses the evolving tools life cycle assessment (LCA), material flow analysis (MFA), and economic valuation, to explore novel approaches to minimizing waste stocks and flows at both micro and macro levels.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 240 [Min Grade: B-] and ENVE 300 [Min Grade: B-]

ENVE 471 Environmental Life Cycle Assessment 3.0 Credits

This course provides undergraduate engineering students with an enhanced skill set to permit them to cooperate more fully in the sustainable design and planning of engineering systems. Students will be introduced to the systems analysis modeling approaches, life cycle assessment (LCA) and material flow analysis (MFA), and will explore research-oriented aspects of the methods and their application in engineering design, decisions, and public policy.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVE 300 [Min Grade: B-] and CIVE 240 [Min Grade: B-]

ENVE 485 Professional Environmental Engineering Practice 1.0 Credit

Professional and ethical considerations in environmental engineering practice. Career management and lifelong learning.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENVE and classification is Senior.

ENVE 486 Environmental Engineering Processes Laboratory I 2.0 Credits

Laboratory experiments on common environmental engineering unit processes are performed. Students use data to draw conclusions relevant to design of full-scale systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENVE and classification is Senior.

Prerequisites: ENVE 302 [Min Grade: D] and ENVS 401 [Min Grade: D]

ENVE 487 Environmental Engineering Processes Laboratory II 2.0 Credits

Laboratory experiments on common environmental engineering unit processes are performed. Students use data to draw conclusions relevant to design of full-scale systems. Continuation of ENVE 486.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENVE and classification is Senior.

Prerequisites: ENVE 486 [Min Grade: D]

ENVE 491 [WI] Senior Project Design I 3.0 Credits

Introduces the design process. Covers information retrieval, problem definition, proposal writing, patents, and design notebooks. Explores problem areas through presentations by experts from industry, government, and education. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ENVE 302 [Min Grade: D]

ENVE 492 [WI] Senior Design Project II 3.0 Credits

Continues the work started in ENVE 491. Requires written and oral progress reports. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ENVE 491 [Min Grade: D]

ENVE 493 [WI] Senior Design Project III 3.0 Credits

This course is the final sequence in the design project. It requires written and oral final reports, including oral presentations by each design team at a formal Design Conference open to the public and conducted in the style of a professional conference. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ENVE 492 [Min Grade: D]

ENVE I199 Independent Study in ENVE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENVE I299 Independent Study in ENVE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENVE I399 Independent Study in ENVE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENVE I499 Independent Study in ENVE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENVE T180 Special Topics in ENVE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENVE T280 Special Topics in ENVE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENVE T380 Special Topics in ENVE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENVE T480 Special Topics in ENVE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Environmental Graphic Design

Courses

EVGD 200 Introduction to Environmental Graphic Design 4.0 Credits

This course is an introduction to the Environmental Graphic Design specialty including wayfinding systems, architectural graphics, signage, exhibit design, and mapped and themed environments.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: VSCM 230 [Min Grade: D] and VSCM 240 [Min Grade: D]

EVGD 210 Architectural Signage 4.0 Credits

Architectural Signage focuses on identification and wayfinding systems within a built environment. This course explores means and methods through class exercises and assigned projects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: EVGD 200 [Min Grade: D]

EVGD 220 Wayfinding 4.0 Credits

This course explores the discipline of wayfinding in an urban environment through the use of visual clues and directional hierarchy, including typography, symbols, and color.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: EVGD 210 [Min Grade: D]

EVGD 310 Design Techniques and Materials 3.0 Credits

This course introduces a wide range of materials and techniques and explores how they may be applied to develop a successful environmental graphics project.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: EVGD 220 [Min Grade: D]

EVGD 320 Exhibit Design 4.0 Credits

This exploration of exhibit design focuses on communicating a narrative visually through the design of space, graphics, objects, and interactivity.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: VSCM 230 [Min Grade: D] and VSCM 240 [Min Grade: D] and EVGD 200 [Min Grade: D]

EVGD 421 Environmental Branding 4.0 Credits

This course explores the marketing power of a branded identity when it is visually and spatially applied to a retail environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: EVGD 320 [Min Grade: D]

EVGD 496 Senior Thesis in Environmental Graphic Design 3.0 Credits

Senior Thesis is a personal investigation that evidences advanced problem solving in Environmental Graphic Design. Proposals must have faculty approval.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: EVGD 320 [Min Grade: D] and EVGD 421 [Min Grade: D]

EVGD I199 Independent Study in EVGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EVGD I299 Independent Study in EVGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EVGD I399 Independent Study in EVGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EVGD I499 Independent Study in EVGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EVGD T180 Special Topics in Environmental Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EVGD T280 Special Topics in Environmental Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EVGD T380 Special Topics in Environmental Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

EVGD T480 Special Topics in Environmental Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Environmental Science

Courses

ENVS 101 Introduction to Environmental Science 5.0 Credits

Students will be introduced to a variety of disciplines and techniques necessary to effectively study local stream, marsh, lake, and terrestrial ecosystems. Students will examine the physical, chemical, and biological elements with these ecosystems with an emphasis on biological elements. Some of the field experiences will include learning how to sample algae, higher plants, invertebrates, fish and salamanders, and methods for surveying and monitoring marshes and selected physical and chemical measurements.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENSS or major is ES or major is GEO.

ENVS 102 Natural History, Research and Collections 2.0 Credits

Students will learn about the scope, nature and uses of the specimen collection, methods of collection care, maintenance and growth for different taxonomic groups. Students will learn how biodiversity research questions and projects are conceived and implemented. Students will observe and collect specimens and data, and begin to learn analyses and publication of results. Students will gain an appreciation for the role of natural history collections in modern research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENVS or major is GEO.

ENVS 169 Environmental Science 3.0 Credits

This course provides an introduction to environmental problems and their causes, cultural changes, worldviews, ethics and environment. It covers such topics as science, matter and energy, ecosystems and how they work, air and air pollution, climate, global warming, and ozone loss, waste minerals and soil, solid, toxic and hazardous wastes, protecting food sources and energy resources.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BIO or major is ENVS

ENVS 201 Practical Identification of Plants and Animals 2.0 Credits

This course provides instruction and hands on experience in using print and online taxonomic keys, field guides and reference collections of real specimens for identification of plants, animals and fungi. The emphasis is on the flora and fauna of the Philadelphia region and learning how to use identification tools in the field and lab. The main objective is to have students understand the importance of accurate identification of organisms and to develop basic knowledge and skills that can be extended and applied to organisms widely.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENVS.

Prerequisites: BIO 124 [Min Grade: D]

ENVS 202 Tree of Life 2.0 Credits

This course reviews the diversity of life in the context of phylogenetic history as the organizing principle. The course emphasizes recent discoveries of living and fossil taxa, breakthroughs and controversies in resolving relationships, and the key evolutionary innovations in eukaryotes, such as multicellularity, major shifts in habitat, parasitism, symbiosis, and complex morphological novelties.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENVS or major is GEO.

Prerequisites: BIO 124 [Min Grade: D]

ENVS 203 The Watershed Approach 2.0 Credits

Students will integrate several disciplines of study to compare an urbanized to a non-urbanized stream ecosystem. All elements of the stream ecosystem and its watershed will be examined. Field experience will include learning how to assess the physical properties of a stream, measure and monitor water quality, sample invertebrates and vertebrates.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENVS.

Prerequisites: ENVS 101 [Min Grade: D] or BIO 126 [Min Grade: D]

ENVS 212 Evolution 4.0 Credits

Aspects of the fact of evolution are discussed in class, including early evolutionary thought, pivotal moments in the history of life, and evidences for evolution from fossils, genetics, and living organisms. Key concepts include natural selection, speciation, adaptation, vicariance, inclusive fitness, and evodevo. Non-scientific arguments pertaining to evolution are refuted.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 100 [Min Grade: D] or BIO 101 [Min Grade: D] or BIO 107 [Min Grade: D] or BIO 109 [Min Grade: D] or BIO 124 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 226 Discoveries in Animal Behavior 3.0 Credits

The course explores the incredible diversity of animal behavior using specially selected examples of recent research findings. It focuses on the adaptiveness of behavior: how animals solve problems posed by their physical and social environments. We will consider implications of research on other species for understanding our own (human) behavior. Non-majors only.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 230 General Ecology 3.0 Credits

This course examines how organisms interact with the biological and physical world and bridges the natural sciences with the social sciences. Using evolutionary theory as its basis, this course will cover topics spanning multiple levels of organization within the science of ecology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 126 [Min Grade: D] or BIO 141 [Min Grade: D] or BIO 101 [Min Grade: D] or BIO 109 [Min Grade: D]

ENVS 247 Native Plants and Sustainability 3.0 Credits

Plants are an integral part of our daily lives in nearly every way, directly or indirectly. Increasingly, our landscapes are becoming dominated with species that are introduced from other parts of the world (intentionally or by accident), displacing many of the species that were once key components of our ecosystems. The impacts of the loss of native plants are profound. This course will give students an overview of the many reasons why native plants are critically important to us, and the problems that arise when non-native plants replace them. There will be discussions about topics ranging from evolutionary theory, conservation, agriculture, public health, nutrition, and more.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 254 Invertebrate Morphology and Physiology 3.0 Credits

Provides comparative study of the major invertebrate groups, relationships between physiology and organismal structure, phylogenetic relationships and classification, development, and life histories.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 100 [Min Grade: D] or BIO 101 [Min Grade: D] or BIO 107 [Min Grade: D] or BIO 109 [Min Grade: D] or BIO 124 [Min Grade: D]

Corequisite: ENVS 255

ENVS 255 Invertebrate Morphology and Physiology Lab 2.0 Credits

This laboratory course provides a comparative study of the morphology of representative species from the major invertebrate groups. How their structural features relate to their physiology and behavior is emphasized. Identification of species, examining phylogenetic relationships, and understanding life histories will relate organisms to their ecological roles.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Corequisite: ENVS 254

ENVS 260 Environmental Science and Society 3.0 Credits

This course is a multidisciplinary introduction to the range of disciplines that make up the environmental sciences. The aim of this course is to provide an understanding of basic physical, ecological and social sciences that focus on the study on the natural environment and its interaction with human society.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 275 Global Climate Change 3.0 Credits

This course provides a multidisciplinary introduction to the issue of global climate change. It focuses on the scientific evidence for climate change, its impact on natural and human systems, actions that can be taken to mitigate or adapt to climate change and the political and cultural dynamics of this issue.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 280 Special Topics 12.0 Credits

Special topics offered in biodiversity, earth and environmental science. Topics include recent multidisciplinary areas of environmental concern.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS 284 Physiological and Population Ecology 3.0 Credits

Examines the role of physiological adaptation in the ecology of plants and animals and the principles of population biology as applied to biological systems. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 230 [Min Grade: D]

ENVS 285 [WI] Population Ecology Laboratory 2.0 Credits

This laboratory course will introduce the basic concepts of populations ecology in context of their modern ramifications and will prepare students for advanced research in population ecology. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 284 [Min Grade: D] (Can be taken Concurrently)

ENVS 286 Community and Ecosystem Ecology 3.0 Credits

Introduces the principles of community and ecosystem ecology.

Emphasizes the role of community structure and ecosystem organization in the ecology of plants and animals.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 230 [Min Grade: D]

ENVS 287 Community Ecology Laboratory 2.0 Credits

This laboratory course will introduce the basic concepts of community ecology in context of their modern ramifications and will prepare students for advanced research in community and ecosystem ecology. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 286 [Min Grade: D] (Can be taken Concurrently)

ENVS 289 Global Warming, Biodiversity and Your Future 3.0 Credits

Human induced global warming is changing the physical environment, ecological systems, and human systems around the world. We will explore causes, effects, and consequences of global warming using NASA satellite information and current scientific and semi-popular writings. Students will understand the implications of global climate change for their futures.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 302 Environmental Chemistry Laboratory 2.0 Credits

In this course students will learn basic techniques for chemical analysis of environmental samples, including biological material, water and soil. Students will also learn to utilize more manual methods but will also use electronic data acquisition systems and further develop their scientific writing skills.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENVS.

Prerequisites: CHEM 103 [Min Grade: D]

ENVS 304 Energy and the Environment: Iceland 3.0 Credits

This course studies how an economy and culture changes when it switches from fossil to alternative energy. In the last 30 years Iceland has switched from a poor country fueled by fossil fuels to one of the wealthiest nations in Europe, with only 20 percent of its energy coming from fossil fuels. In this class students will synthesize data/knowledge into flow diagrams of the economy of Iceland and then use the synthesis to understand the impacts of energy development and extraction on the environment and society.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 305 Iceland Intensive: Green Energy 1.0 Credit

Students will attend an intensive course in Iceland on energy plants and their impact on the environment. The course in Iceland will bring students to various energy facilities to examine their operation and better understand how these facilities impact the environment and serve society. Before each tour of a power plant students will attend a lecture at Reykjavik University on power production and its role in fueling economies and its potential impacts on the environment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: ENVS 304

ENVS 308 GIS and Environmental Modeling 3.0 Credits

Students will learn how to write computer programs to read data directly from digital maps and then perform various spatial analyses and modeling tasks. The class will include an introduction to spatial- and geo-statistics; techniques for determining ecological riches of organisms; methods for modeling basic forcing factors such as solar radiation, water temperature; approaches for modeling the flow of water in a landscape; and ultimately, combining these techniques to model or simulate ecosystems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENVS or major is ES or major is GEO.

ENVS 310 Introduction to Environmental Chemistry 3.0 Credits

This course uses a topic-based approach to the chemistry of the environment. Students in this course are expected to have a minimal/ some knowledge of chemistry, with a desire of applying this knowledge to the environment. Topics of interest include environmental chemistry of water, water pollution, water treatment, geochemistry, atmospheric chemistry, air pollution, hazardous materials and resources.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 103 [Min Grade: D]

ENVS 312 Systematic Biology 3.0 Credits

This is an introduction to systematic biology. The primary tasks of systematics are 1) the discovery, description, and classification of biodiversity to construct a general reference system for life on Earth; 2) the reconstruction of the "tree of life": the descent relationships among units of biodiversity at multiple hierarchic levels from genes to phyla; and 3) the application of reconstructions of decent relationships to the study of evolution. Phylogenetic systematics, concerned with units of biodiversity at the species level and above, will be emphasized.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVS 202 [Min Grade: D] or BIO 126 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 315 Plant Animal Interactions 3.0 Credits

Plant-animal interactions provide us with some of the most remarkable examples of adaptation and co-evolution. They are also key determinants of ecosystem functions. This course will provide a survey of the diversity of plant-animal interactions, the multidisciplinary approaches used to understand their ecology and evolution, and their importance to ecosystem services that sustain human societies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D]

ENVS 322 Tropical Ecology 3.0 Credits

This is a course in the ecology of tropical rain forests and dry forests. Tropical ecology will explore the physical and biological factors that result in the formation of the forest, the effect of human impact, the effectiveness of management, and the future of these forests.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 323 Tropical Field Studies 3.0 Credits

Ecology of tropical rain forests and dry forests. We will explore physical and biological factors that result in formation of these forests, effect of human impacts on these forests, effectiveness of management of these forests, and the future of these forests in Costa Rica in the field. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D] or BIO 109 [Min Grade: D]

ENVS 324 Microbial Ecology 3.0 Credits

Studies the relationships of microbes with plants, animals, and the environment, both biotic and abiotic components. Examines the key role of microbes in the functioning of ecosystems affecting decomposition, disease, nutrient cycling, and energy flow. Studies these processes and the role of microbes in the natural functions of ecosystems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 221 [Min Grade: D] or ENVR 316 [Min Grade: D] or ENVS 316 [Min Grade: D]

ENVS 326 Molecular Ecology 3.0 Credits

Through a combination of lecture, discussion, and computational exercises, students will learn how molecular tools have been used to study genetic variation. They will then learn how these studies have provided answers to previously unanswered questions in fields including ecology, evolution, behavior, conservation, and forensics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 230 [Min Grade: D] or ENVS 284 [Min Grade: D] or BIO 211 [Min Grade: D] or BIO 218 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 327 Molecular Ecology Laboratory 2.0 Credits

Through a combination of laboratory and computational exercises, students will develop a toolkit for applied molecular studies of ecology and evolution. The course will focus on initiating or continuing a novel research project relating to one of several topics within the field of molecular ecology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 230 [Min Grade: D] or ENVS 284 [Min Grade: D] or BIO 211 [Min Grade: D] or BIO 218 [Min Grade: D]

ENVS 328 Conservation Biology 3.0 Credits

This course we will detail the loss of biodiversity and explore related issues, including the theories and practices of conservation biology and the solutions currently and the solutions currently being formulated to enhance the preservation of species on our planet. The course will explore potential limitations to these strategies and provide an appreciation of the relevance of ethics, economics and politics to biodiversity conservation while promoting the potential for individual action to influence conservation efforts.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D]

ENVS 330 Aquatic Ecology 3.0 Credits

Studies the relationships between aquatic plants and animals and their environment. Introduces the study of the ecology of lakes, rivers, ponds, and streams.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 333 Wetland Ecology 3.0 Credits

Examination of the structure, function, and dynamics of wetland ecosystems. Topics include geomorphology, hydrology, biogeochemistry, plant and animal adaptations to wetland environments, and wetland policy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D]

ENVS 334 Watershed Ecology 3.0 Credits

Watershed ecology explores the linkages among aquatic ecosystems and their water catchment or watershed. Aquatic ecosystems are influenced by physical, chemical, and biologic factors in "the watershed." The conditions in the watershed influence aquatic ecosystems at several spatial-scales, for example areas neighboring a stream, "the riparian zone," influences water temperature much more than those areas further away from the stream. Incorporating spatial scale into watershed studies is a developing field with many opportunities to advance watershed science and the associated environmental regulations and policies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D]

ENVS 336 Terrestrial Ecology 5.0 Credits

Studies the relationships between terrestrial plants and animals and their environment. Introduces the study of the ecology of local ecosystems, such as the Poconos and the New Jersey Pine Barrens.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: BIO 126 [Min Grade: D] or ENVR 230 [Min Grade: D] or ENVS 230 [Min Grade: D]

ENVS 341 Equatorial Guinea: Society & Environment 4.5 Credits

A lecture and community outreach course based at the National University of Equatorial Guinea that combines instruction in mankind's relationship with the natural environment (human population, natural resources, environmental degradation, pollution, biodiversity loss and climate change) with environmental outreach activities specific to Equatorial Guinea.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 342 Equatorial Guinea: Natural Resource Economics 4.5 Credits

A lecture course based at the National University of Equatorial Guinea that combines instruction in the economic implications of natural resources (renewable and non-renewable resources, efficient utilization, market performance, government controls, sustainability and discounting) with a university-wide guest lecture series addressing local issues.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 343 Equatorial Guinea: Field Methods 3.0 Credits

A lecture and field excursion course based at the University of Equatorial Guinea combining instruction in standard methods for studying rainforest communities (expedition planning; GPS and mapping, forest diversity and productivity; wildlife population monitoring) with multi-day field experiences in Bioko Island's remote protected areas.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 344 Equatorial Guinea: Field Research 6.0 Credits

An intensive research course that takes advantage of the unspoiled rainforest adjacent to the Moka Wildlife Center, a university-affiliated research station located in the highlands of Bioko Island, Equatorial Guinea (Central/West Africa). Opportunities exist for student research on topics including primates, antelope, birds, chameleons, butterflies and plants.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

ENVS 351 Resource and Environmental Economics 4.0 Credits

Examines the microeconomic and quantitative aspects of markets for both renewable and exhaustible resources, and the interaction between the energy and resource sectors of the economy and between the productive sectors of the economy and the natural environment, with evaluation of major public initiatives and issues in these areas.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: D] and ECON 202 [Min Grade: D]

ENVS 352 Ornithology 3.0 Credits

Birds are among the most ubiquitous, diverse, and charismatic animals and we know a great deal about their biology through the contributions of both professional Ornithologists and citizen scientists alike. This course will touch on a variety of topics, including evolution, ecology, behavior, conservation, and biological diversity of birds.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 126 [Min Grade: D] or ENVS 230 [Min Grade: D]

ENVS 354 Ichthyology 3.0 Credits

This course will explore fish and the link between their diversity in form and ecological function. This combined lecture-lab course will cover the basic systematics, evolutionary relationships, biogeography, structure, physiology, life history, and ecology of fishes and lampreys.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 126 [Min Grade: D] or ENVS 230 [Min Grade: D]

ENVS 360 Evolutionary Developmental Biology 3.0 Credits

Evolutionary Developmental Biology (Evo-Devo) compares developmental processes between organisms to determine how these mechanisms evolved in light of ancestral relationships. Topics include “your inner fish,” how to “build” a dinosaur, and the reducibly simple evolution of the eye. Also explored are developmental controls such as environmental factors and molecular mechanisms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 212 [Min Grade: D] or BIO 217 [Min Grade: D]

ENVS 364 Animal Behavior 3.0 Credits

The mechanisms, ecology and evolution of the activities of animals in relation to their natural environment. Topics include development and control (neural and hormonal) of behavior, adaptations for survival, feeding, and predator avoidance, strategies of habitat selection, communication, reproduction, and social behavior.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 212 [Min Grade: D] or BIO 126 [Min Grade: D]

ENVS 365 Animal Behavior Laboratory 2.0 Credits

An observational study of the behavior of a captive group of social animals at the Philadelphia Zoo including species selection, background research, ethogram construction, 16 hours of quantified observation, analysis of data and written report.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D]

ENVS 370 Practice of Environmental Economics 3.0 Credits

The focus of this course is on the real world implications of environmental resources exploitation and economic tools for dealing with them. Areas include air and water pollution, toxic wastes and mineral, water and forestry resource harvesting/extraction.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: D] and ECON 202 [Min Grade: D]

ENVS 382 Field Botany of the New Jersey Pine Barrens 4.0 Credits

This course focuses on plant identification skills that are necessary to conduct scientific botanical surveys. The vascular flora of the New Jersey Pine Barrens, including rare plant species, is emphasized with special reference to habitat and community analysis. Non-vascular species are examined but not emphasized.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

ENVS 383 Ecology of the New Jersey Pine Barrens 4.0 Credits

Course focuses on the ecology of the New Jersey Pine Barrens. Students learn field methods, identify index species (flora and fauna), perform community analyses, and use equipment for measuring abiotic variables (soil and water). Field exercises focus on key aspects of the regional ecology: fire, soil and water.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D]

ENVS 385 Systems Ecology 3.0 Credits

Systems Ecology will provide the tools to integrate and synthesize disciplines of sciences to understand the development, disruption, and dynamics of ecosystems. Students will learn general systems theory about how elements of an ecosystem interact with other parts of the system and how exogenous or external variables drive ecosystem processes. The course will show how to combine field data with simple mathematics in step by step calculations to describe, study, and emulate complex systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 126 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 388 Marine Field Methods 4.0 Credits

Course focus is on the ecology of local marine environments. Students learn marine field survey methods, identification of marine organisms, habitat analyses, and use of equipment for measuring abiotic variables. Students sample fish, plankton and invertebrate species aboard the Drexel 25 foot Research Vessel Peter Kilham.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D]

ENVS 390 Marine Ecology 3.0 Credits

This course studies major processes in the marine environment, especially relationships between organisms and the factors that influence their abundance.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 391 Freshwater and Marine Algae 3.0 Credits

Origin and evolution of various algal groups, principles and methods of algal systematics, algal ecology, and use of algae as environmental indicators. Field trips to local streams, ponds and wetlands where students will collect algal samples and record environmental data. Lab work will include sample processing and algal identification.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

Prerequisites: BIO 124 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 392 Ichthyology and Herpetology 3.0 Credits

Many species of fishes, amphibians and reptiles face extirpation from their former ranges and some face total extinction within our lifetime. This course investigates major regional and global issues concerning viability of these organisms and addresses solutions using concepts of population ecology, community ecology, physiological ecology and conservation biology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

ENVS 393 Entomology 3.0 Credits

This course introduces students to some of the major topics in the field of entomology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 124 [Min Grade: D] or BIO 141 [Min Grade: D]

Corequisite: ENVS 394

ENVS 394 Entomology Laboratory 2.0 Credits

This course introduces students to some of the major practical topics in the field of entomology. The course consists of lab work, collecting trips, and creation of an insect collection.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 124 [Min Grade: D] or BIO 141 [Min Grade: D]

Corequisite: ENVS 393

ENVS 400 Cascade Mentoring 2.0 Credits

Provides senior ENVS students with mentoring and service opportunities within the Environmental Science curriculum. The course will also cover issues of ethics, professional development and career counseling. ENVS senior students will be required to enroll as a peer mentor for one of these six courses. Seniors will work with faculty to help plan and deliver experiential activities and will act as mentors and tutors for first and second year students enrolled in these courses.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 6 credits

Restrictions: Can enroll if major is ENVS and classification is Senior.

ENVS 401 Chemistry of the Environment 3.0 Credits

Covers principles of physical and organic chemistry applicable to the study and evaluation of environmental conditions, especially the pollution of air, water, and soil (including chemical changes and reactions in the environment).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 102 [Min Grade: D] or CHEM 122 [Min Grade: D]

ENVS 405 Atmospheric Chemistry 3.0 Credits

Introduces the principles of atmospheric physics and photochemical kinetics as a prelude to understanding the atmospheric chemical system. Examines the chemistry of the natural atmosphere to prepare for the understanding of how pollutants interact with natural species. Considers pollution of the stratosphere and the troposphere.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVR 401 [Min Grade: D] or ENVS 401 [Min Grade: D]

ENVS 409 Environmental Surveying and GIS 3.0 Credits

This course is a field intensive course that gives students hands on training on state-of-the-art surveying gear. Students will learn the principals of surveying used by field ecologists or geoscientists, including types of surveying gear, how to use it in the field, and how to analyze collected data.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 410 Physiological Ecology 3.0 Credits

Examines mechanisms by which physiological factors affect and limit the distribution and abundance of animals, including physiological and behavioral thermoregulation, heat and cold tolerance, acclimation, metabolism, osmoregulation and dehydration tolerance, feeding strategies, digestion and feeding patterns, energy and water budgets, toxins and optimality theory.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 412 Biophysical Ecology 3.0 Credits

Covers energy balances and methods of heat transfer in organisms, including convection, conduction, radiation, evaporation, and metabolism and steady-state and transient energy balances, including mass balances, water uptake and evaporation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MATH 239 [Min Grade: D] or MATH 123 [Min Grade: D]) and (PHYS 153 [Min Grade: D] or PHYS 102 [Min Grade: D])

ENVS 413 Advanced Population Ecology 3.0 Credits

One of the greatest issues concerning life on Earth and human impact on the planet is whether species will survive or go extinct. This course explores how wild populations change over time and investigates the concepts and quantitative methods used to determine the viability of plant and animal populations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 284 [Min Grade: D]

ENVS 414 Advanced Community Ecology 3.0 Credits

Community ecology is the study of how populations of organisms interact with each other and the physical environment. Students will investigate the underlying principles that explain and predict interactions among populations of organisms, and how these principles can be used to conserve and manage wild animal and plant communities.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENVS 286 [Min Grade: D]

ENVS 417 Stream Assessment 3.0 Credits

Most stream and river ecosystems are stressed by human activities, and aquatic ecologists are frequently called upon to assess problems, make scientific evaluations and provide management recommendations. A main goal of this course is to provide problem-solving experiences in stream assessment based on example real-world environmental questions. The assessments will provide students opportunities to address issues they may face as ecologists, engineers, managers and policy makers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVS 230 [Min Grade: D] or BIO 126 [Min Grade: D] or BIO 141 [Min Grade: D]

ENVS 438 Biodiversity 3.0 Credits

This course explores major patterns of biodiversity that biologists have documented across the planet. The course begins with an overview of major types of biodiversity, focusing on species diversity, and methods for measuring and analyzing biodiversity. Next it explores major patterns of biodiversity that are fundamental to ecology and conservation, and theories for the causes of biodiversity patterns.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 124 [Min Grade: D] or ENVS 230 [Min Grade: D]

ENVS 441 [WI] Issues in Global Change I: Seminar 2.0 Credits

Discusses and evaluates topics such as records of climate change, atmospheric chemistry and global warming, the greenhouse effect, ozone depletion, acid rain, decreased biodiversity, desertification, deforestation, and sea-level rise. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENSS or major is ENVS or major is GEO and classification is Senior.

ENVS 442 Issues in Global Change II: Research 2.0 Credits

Requires students to focus on a particular change topic or issue in order to analyze it, prepare a research report, and present a final seminar.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENSS or major is ENVS or major is GEO and classification is Senior.

Prerequisites: ENVS 441 [Min Grade: D]

ENVS 443 Issues in Global Change III: Synthesis 2.0 Credits

The purpose of this course is to provide seniors in Environmental Science and Ecology with an opportunity to make an in-depth examination of the factors causing global change in the 21st century, to analyze their own data as well as that in the literature, to synthesize new ideas and to report orally and in writing on their findings.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ENSS or major is ENVS or major is GEO and classification is Senior.

Prerequisites: ENVS 442 [Min Grade: D]

ENVS 470 Advanced Topics in Evolution 3.0 Credits

Discusses and evaluates selected topics such as population and quantitative genetics, genomics in evolutionary analysis, fitness concepts and modes of selection, species concepts and modes of speciation, evolution of development and complex adaptations, biological diversification over space and time, adaptive radiation and extinction, historical biogeography. Topics for each term will be selected based on current research and interest.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 12 credits

Prerequisites: ENVS 212 [Min Grade: D] or BIO 217 [Min Grade: D]

ENVS 497 Research 0.5-12.0 Credits

Provides guided research in ecology, earth science and environmental science.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

ENVS I199 Independent Study in ENVS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS I299 Independent Study in ENVS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS I399 Independent Study in ENVS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS I499 Independent Study in ENVS 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS T180 Special Topics in Environmental Science 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS T280 Special Topics in Environmental Science 12.0 Credits

Special topics offered in biodiversity, earth and environmental science. Topics include recent multidisciplinary areas of environmental concern.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS T380 Special Topics in Environmental Science 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS T480 Special Topics in Environmental Science 12.0 Credits

Special topics offered in environmental science. Topics include recent multidisciplinary areas of environmental concern.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Environmental Studies & Sustainability

Courses

ENSS 120 Introduction to Environmental Studies 3.0 Credits

This course looks at the many topics that fall under the interdisciplinary focus of environmental studies, such as biodiversity, preservation, conservation, sustainability, deforestation, environmental justice, risk society, treadmill of production, and climate change. Students will be introduced to the ideas, issues and practices linked to these concepts.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENSS 275 Global Climate Change 3.0 Credits

This course provides a multidisciplinary introduction to the issue of global climate change. It focuses on the scientific evidence for climate change, its impact on natural and human systems, actions that can be taken to mitigate or adapt to climate change and the political and cultural dynamics of this issue.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENSS 280 Special Topics 1.0-12.0 Credit

This course will explore current issues and interests in Environmental Studies. The topic will vary each term.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENSS 325 Introduction to Urban and Environmental Planning 4.0 Credits

This course serves to introduce students to the field of urban and environmental planning. In doing so, this course seeks to expose students to the skill sets used by planners: including the planning process; citizens participation models; community needs assessment; data analysis and presentation; plan implementation and evaluation; and professional ethics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENSS 326 Cities and Sustainability 3.0 Credits

This course will provide an overview of the issue of sustainability planning and policy for cities. Topics include how we define sustainability for cities, and how we measure its progress and impacts. The course will also cover how land reuse planning impacts the development of green space, including parks, gardens and urban agriculture, as well as green building, the green economy and the impact of sustainability planning on public health outcomes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENSS 341 Environmental Movements in America 4.0 Credits

Focuses on key collective actors and institutions that are involved in the creation of U.S. environmental policies, including historical and cultural processes of change involving social movements, environmental advocacy organizations, foundations, and the media.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENSS 345 Sociology of the Environment 4.0 Credits

Examines acts of nature vs. acts of man, food and health, environmental politics, social movements and environmental issues, environmental and development policies, and environmental and global change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENSS 346 Environmental Justice 4.0 Credits

Focuses on the political economy of environmental injustice and the impact of social movements addressing it; impact of chemical pollutants on human health; and the scientific and legal issues surrounding the study and regulation of pollutants.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENSS 347 Introduction to Environmental Policy Analysis 4.0 Credits

Introduction the development and implementation of U.S. environmental policy, including historical development, political process, methods of analysis and creation of laws, regulations and budgets.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ENSS 499 Independent Study 1.0-12.0 Credit

Provides a course of independent study in Environmental Studies. Topics for study must be approved in advance of registration by the advisor and the instructor involved.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENSS I199 Independent Study in ENSS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENSS I299 Independent Study in ENSS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENSS I399 Independent Study in ENSS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENSS I499 Independent Study in ENSS 1.0-12.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENSS T180 Special Topics in Environmental Studies & Sustainability 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENSS T280 Special Topics in Environmental Studies & Sustainability 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENSS T380 Special Topics in Environmental Studies & Sustainability 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENSS T480 Special Topics in Environ Stu & Sustainability 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Fashion Design

Courses

FASH 201 Survey of the Fashion Industry 3.0 Credits

Introduces the materials and methods used to design, develop, and market the fashion product, including current vocabulary and foundation of knowledge about industry practices and career opportunities.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FASH 210 Presentation Techniques in Fashion 3.0 Credits

Introduces the presentation techniques and skills used for communication in the fashion industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D])

and FASH 201 [Min Grade: D]

FASH 211 Fashion Drawing I 3.0 Credits

Examines the fashion figure, fabrication, and conceptual design through the use of black, white, and gray media. Includes classroom drawing from a live model and weekly critiques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 111 [Min Grade: D]

FASH 212 Fashion Drawing II 3.0 Credits

Examines fashion forms, fabrication, and conceptual design through the use of color and mixed media. Works toward the development of a personal "fashion look" and an understanding of drawing as it relates to the fashion industry. Includes live model.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 211 [Min Grade: D]

FASH 220 Textile Design 3.0 Credits

Instructs the student in both traditional and digital techniques of textile design. Investigates layout, repeats, and coordinated fabric groups.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]

FASH 230 Textiles for Fashion Design 3.0 Credits

Examines the textile manufacturing industry and the fundamental processes involved in producing fabrics made of natural or manufactured fibers. Includes basic textile terminology and production processes as well as selection and evaluation of fabrics based on aesthetics, performance and care characteristics.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FASH.

FASH 241 Construction Skills 4.0 Credits

Develops a proficiency in basic garment construction. Emphasizes facility with industrial equipment. Introduces production techniques and an overall awareness of standards of quality.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FASH 251 Fashion Design I 4.0 Credits

Poses fashion problems to be solved, with an emphasis on elements of design. Explores use of half-scale experimentation and development of "studies" as an aid in developing design ideas.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 304 [Min Grade: D]

FASH 252 Fashion Design II 4.0 Credits

Explores sources of inspiration and requires students to translate and develop source material into creative garments. Stresses the extension and elaboration of ideas within a specific market.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 251 [Min Grade: D]

FASH 310 Presentation Techniques 3.0 Credits

Introduces the presentation techniques and skills used for communication in the fashion industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]) and FASH 201 [Min Grade: D]

FASH 311 Textile Design 3.0 Credits

Instructs the student in both traditional and digital techniques of textile design. Investigates layout, repeats, and coordinated fabric groups.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]

FASH 313 Fashion Drawing for Industry 3.0 Credits

Covers sketching and specification drawing for the professional designer. Emphasizes communicating with manufacturers, pattern-makers, and assistants, regarding, garment construction, detailing, and fabrication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 210 [Min Grade: D]

FASH 314 Fashion Presentation Drawing 3.0 Credits

Requires the creation of a portfolio of original designs executed in a medium of choice. Explores various market segments of the industry and includes project reviews by critics who are specialists in these areas.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

FASH 315 Computer Aided Design for Patternmaking 3.0 Credits

Develops skills in patternmaking, markermaking, and grading, using the computer as a tool.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 342 [Min Grade: D]

FASH 316 Computer Aided Design for Fashion Design 3.0 Credits

Explores the use of computers in the fashion industry and develops presentation skills using industrial and commercial software.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 313 [Min Grade: D]

FASH 317 Technical Design 3.0 Credits

Technical Design is crucial in managing technical information internally and externally within a fashion design company. The student is trained in the essential skills of creating technical packages using data programs and sketching, conducting fittings, maintaining specs, and grading patterns and how to communicate information efficiently in a global fashion industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FASH.

Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: FASH 342 [Min Grade: D]

FASH 341 Flat Pattern Design 4.0 Credits

Explores basic patternmaking techniques and manipulations and establishes comparisons between drafting and draping techniques in the development of standard slopers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 241 [Min Grade: D]

FASH 342 Draping Design 4.0 Credits

Covers garment development by the draping method. Advances skills of FASH 341.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 341 [Min Grade: D]

FASH 343 Tailoring 4.0 Credits

Provides intensive investigation of materials and construction techniques used in tailoring. Uses a combination of garment production methods, including a strong emphasis on couture practices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 342 [Min Grade: D]

FASH 349 Fashion Design I 4.0 Credits

Poses fashion problems to be solved, with an emphasis on elements of design. Explores use of half-scale experimentation and development of "studies" as an aid in developing design ideas.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 204 [Min Grade: D] or VSST 304 [Min Grade: D]

FASH 350 Fashion Design II 4.0 Credits

Explores sources of inspiration and requires students to translate and develop source material into creative garments. Stresses the extension and elaboration of ideas within a specific market.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 251 [Min Grade: D] or FASH 349 [Min Grade: D]

FASH 351 Fashion Design III 4.0 Credits

Requires development of original designs and execution incorporating draping, drafting, and flat-pattern techniques. Facilitates the development of a realistic approach to garment design in terms of industrial restrictions, and market segmentations. Includes professional critiques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 252 [Min Grade: D] and FASH 343 [Min Grade: D]

FASH 352 Fashion Design IV 4.0 Credits

Expands and broadens technical skills and lays the groundwork for development of the senior collection. Includes couture evening wear techniques and research processes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 351 [Min Grade: D]

FASH 399 Independent Study in Fashion Design 0.5-12.0 Credits

Provides individualized study in fashion design in a specialized area of study. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

FASH 433 Couture Techniques 3.0 Credits

Expands and broadens technical skills and lays the groundwork for development of the senior collection. Includes couture evening wear techniques and research processes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 351 [Min Grade: D]

FASH 450 Machine Knitting 3.0 Credits

Machine Knitting is an introduction to knitwear design specialization. Students learn to style and draw knit garments to develop a professional portfolio. Technical information regarding yarn analysis, stitch construction, pattern and garment construction are the focus of this class.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is FASH.

Prerequisites: FASH 241 [Min Grade: D] and VSST 112 [Min Grade: D]

FASH 451 Accessory Design 3.0 Credits

This course provides students with concepts and skills to design traditional and contemporary fashion accessories with emphasis in embroidery; applique; hand painting; and clay, plastic and ceramic work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 241 [Min Grade: D]

FASH 452 Millinery Design 3.0 Credits

Familiarizes students with the techniques and processes involved in hat making. Emphasis will be placed on historical perspectives and materials.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 241 [Min Grade: D]

FASH 453 Intimate Apparel Design 3.0 Credits

This course will offer an introduction to the foundations and sleepwear marketplace. Primary focus will be on the design and execution of two pieces for this market. Students will learn how to construct a bra (molded cups) and how to incorporate these details into their final looks for this market. In addition, students will learn the safe operation of the specialty sewing machines for knit construction.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 251 [Min Grade: D]

FASH 454 Advanced Fashion Drawing 3.0 Credits

Through in-class creative assignments with experimental techniques, students learn to respond rapidly, originally, and with increased focus to resolve drawing and design problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 212 [Min Grade: D]

FASH 464 Professional Portfolio 3.0 Credits

This course will involve preparation and execution of a finished designer portfolio for couture, 7th Avenue or the boutique American market.

Included in the preparation is research of their chosen entry into the market via history, visuals and customer profile.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FASH and classification is Senior.

Prerequisites: FASH 314 [Min Grade: D]

FASH 465 [WI] Special Topics in Fashion Design 0.5-12.0 Credits

Provides study in fashion design on a special topic or on an experimental basis. May be repeated for credit if topics vary. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

FASH 466 Business of Fashion 3.0 Credits

Presents the following topics in seminar fashion merchandising, retail distribution, interpreting consumer demand, merchandise assortment planning, unit and inventory control and pricing, fashion marketing and manufacturing, including the marketing process, components of the fashion industry, market evaluation, demographic and psychological factors, manufacturing components and processes, and case studies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FASH and classification is Senior.

FASH 467 Style and the Media 3.0 Credits

Fashion Journalism is reading and writing about all aspects of fashion, including reporting, criticism and commentary about photography related to fashion published in newspapers or magazines, displayed on websites, aired on radio and/or TV. The style of the writers and also the aspects of dress they found significant is examined.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FASH 477 Fashion Design Seminar 3.0 Credits

Provides reading and discussion of pertinent topics of current concern in the professional area of fashion design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

FASH 491 Collection I 4.0 Credits

The second of a three-part series in which the student develops the senior collection. Requires the student to demonstrate the synthesis of a personal aesthetic and technical acumen.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: FASH 352 [Min Grade: D]

FASH 492 Collection II 3.0 Credits

Requires completion of senior collection and presentation in student fashion show.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FASH 491 [Min Grade: D]

FASH I199 Independent Study in Fashion Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FASH I299 Independent Study in Fashion Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FASH I399 Independent Study in Fashion Design 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FASH I499 Independent Study in Fashion Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FASH T180 Special Topics in Fashion Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FASH T280 Special Topics in Fashion Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FASH T380 Special Topics in Fashion Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FASH T480 Special Topics in Fashion Design 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Film & Video

Courses

FMVD 110 Basic Shooting and Lighting 3.0 Credits

An introduction to the basics of shooting and lighting for film and video production through demonstrations, lectures, screenings and hands-on use of digital video and still cameras and lighting equipment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMVD 115 Basic Editing 3.0 Credits

Theoretical and practical principles of editing using a computer-controlled and post-production system utilizing sync sound film and video material. This class is a hands-on workshop. Screenings of excerpts from feature and short films are used to demonstrate editorial concepts.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMVD 120 Basic Sound 3.0 Credits

A thorough analysis of sound theory and practical applications to give students the tools to understand how sound can be successfully recorded, edited, sweetened and re-recorded (mixed) for film and video.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMVD 200 Acting for the Screen 3.0 Credits

This course examines the issues and techniques specific to acting for the camera. Through weekly workshops students address the limitations and relationships actors face in performing for the camera. The class explores various acting styles and schools of thought and involves extensive scene study and performance in a video setting.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMVD 202 Directing for the Screen 3.0 Credits

This course provides students with an understanding of the role of a director in film and television. Students focus on the development of comprehensive skills for directing technical personnel, exposure to directing styles, communicating with actors and cinematic choices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 206 Audio Production and Post 3.0 Credits

This course is an introduction to the creation and manipulation, of digital audio files. It is geared towards the Digital Media student, with respect to applying soundtrack elements to their images. Topics will include recording dialog, location sound recording, sound effects design, music editing, and multi-track mixing.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

FMVD 207 Location Sound Recording 3.0 Credits

This course will focus on training students to record quality sound for films in any location.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 210 Documentary Video Production 3.0 Credits

Builds on the knowledge of cinematic language and basic production technique learned in FMVD 110. Students become familiar with documentary shooting and editing strategies and produce final documentary projects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FMVD 110 [Min Grade: D]

FMVD 215 Narrative Video Production 3.0 Credits

This course applies the basic skills learned in Screenwriting, Shooting and Lighting, Sound, Editing and Directing towards the creation of a fictional narrative film with increased emphasis on intermediate production and post-production technologies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D] and FMVD 202 [Min Grade: D] and SCRP 280 [Min Grade: D]

FMVD 218 Intermediate Cinematography 3.0 Credits

This course provides advanced focus in cinematic concepts and techniques and their use in electronic filmmaking.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 220 Experimental Video Production 3.0 Credits

This course explores experimental theses and techniques in video. Self discovery, working through a process, and developing varied strategies are part of each student's journey that culminates in a finished experimental film.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 226 Intermediate Sound 3.0 Credits

This course is designed to build upon the audio production recording skills achieved in FMVD 120-Basic Sound. Students will learn how to operate advanced industry standard field recorders and mix sound for multiple set microphones, including wireless microphones, and will become adept at troubleshooting potential film production audio issues.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 120 [Min Grade: D]

FMVD 228 Visual Storytelling 3.0 Credits

This course explores a variety of techniques and principles that are used to tell a visual story. It asks how we might differentiate a story told in images and sounds from one told in writing and investigates how techniques of cinematography, editing, and mise-en-scène contribute to the exposition of a story and to the articulations of its meaning.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FMVD.

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 232 Film Action Choreography 3.0 Credits

In this course, a variety of different types of action scenes ranging from fistfights to car chases will be studied. Through screenings of successful action scenes and shot by shot analysis the student will learn the importance of camera placement and ample coverage. Through the combination of screenings and hands on action arrangement the student will gain an understanding of what is involved in a successful action sequence and have to skills to execute them.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 234 Legal Basics for Filmmakers 3.0 Credits

This course is designed to provide students with knowledge of basic business and legal issues in the film industry, and to develop a working understanding of intellectual property, contracts and other issues which apply to filmmaking, to assist the student in understanding the legal issues related to creative works.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMVD 235 Intermediate Lighting 3.0 Credits

Emphasizes learning to model figures and shape scenery with light for film and video production. Covers methods of creating mood and atmosphere through light appropriate to the story of a particular film or video.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FMVD 110 [Min Grade: D]

FMVD 237 Intermediate Editing 3.0 Credits

This course will build upon Adobe Premiere and Avid editing principles taught in FMVD 115-Basic Editing, with increased emphasis on editing aesthetics.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 242 Film Production Design 3.0 Credits

This course is designed to instruct in the techniques and methods of designing a set for film and television.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMVD 286 Producing for Features 3.0 Credits

Producing will cover all aspects associated with producing a feature film in both the Hollywood and Independent arenas.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMVD 291 Film and Video Internship 0.5-3.0 Credits

The student does a non-paying internship in the field of film and video for academic credit, working a minimum of 100 hours in a 10-week term for 3 credits. The student provides an initial informational sheet on the internship and submits a final paper on the experience. May be repeated for credit. The first time the course may be taken for 3 credits. After that, the course may be repeated, but for 1 credit each time. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is FMVD.

FMVD 295 Hollywood 101 3.0 Credits

This course will present an overview of how the business of Hollywood is really done. We'll examine the role of producers, agents, managers, entertainment attorneys, publicists, and studio and network executives.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EAM or major is FMVD or major is SCRP.

FMVD 305 Special Effects Make-up 3.0 Credits

Introduction to the materials and techniques used in the creation of a character or special effects make-up for film and video. Through demonstrations and hands-on projects, students learn the basics of cosmetic application and more specialized techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMVD 306 Micro-budget Filmmaking 3.0 Credits

This course will prepare students to make quality films on very small budgets. We will look at how aspiring filmmakers can survive in the world after college without access to an equipment office and readily available crews. Students will examine the early work of contemporary filmmakers and apply these lessons to a 5 - 8 minute short film.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

FMVD 307 Cutting Trailers 3.0 Credits

View, analyze and produce theatrical trailers and promos, as well as study the marketing methods that drive these productions. The history of trailers will also be studied.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 237 [Min Grade: D]

FMVD 310 Camera Operators Workshop 3.0 Credits

A hands-on introduction to the role of the camera operator in filmmaking.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FMVD.

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D] and FMVD 218 [Min Grade: D]

FMVD 315 Audio Post Production 3.0 Credits

Sound Post-Production is a workshop that allows students to thoroughly focus on the audio portion of editing. In this course, the individual components of sound design are presented and students in order to understand how all the components work together to form a solid soundtrack.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 316 Post Color Correction 3.0 Credits

This course is designed to introduce students to the aesthetic and technical techniques of color grading using Blackmagic Design's DaVinci Resolve. Color Grading requires students to grasp the concepts of video scopes, color theory, and the glossary of colorist terms.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 237 [Min Grade: D]

FMVD 317 Directing the Score 3.0 Credits

This course will provide the filmmaker student with the communication tools to direct a film score composer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 320 Steadicam Workshop 3.0 Credits

A hands-on introduction to the use of the Steadicam as a creative production tool. The course will cover basic theory, set-up, and operation of the Steadicam with various cameras.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 310 [Min Grade: D]

FMVD 322 Production Workshop I 3.0 Credits

The first of a two-course sequence in which students produce a larger scale film, in terms of crew size, production value and story.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FMVD 215 [Min Grade: D]

FMVD 323 Production Workshop II 3.0 Credits

The second of a two-course sequence in which students produce a film or video project.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: FMVD 322 [Min Grade: D]

FMVD 324 Visual Effects for Film Editors 3.0 Credits

This course will introduce students to commonly used techniques in visual effects using Adobe After Effects. Students will learn workflow between After Effects and both Premiere and Avid editing systems, as well as integration with Photoshop and Illustrator.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 237 [Min Grade: D]

FMVD 325 Stop Motion Animation 3.0 Credits

This course will explore the technique and expressive possibilities of traditional Stop Motion Animation. Students will learn to shoot objects or models one frame at a time to create the illusion of movement and life.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

FMVD 327 Advanced Lighting 3.0 Credits

This course expands upon lighting techniques taught in FMVD 235, Basic Lighting.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 235 [Min Grade: D]

FMVD 328 New Technologies in Film 3.0 Credits

This is a hands-on course that instructs in the use of emerging technologies in the film industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FMVD or major is TELE.

Prerequisites: FMVD 310 [Min Grade: B]

FMVD 341 Creating Credits and Opticals 3.0 Credits

This course is designed to present a "real world" introduction to creating open and close title sequences for film and television.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 237 [Min Grade: D]

FMVD 344 Music Video Production 3.0 Credits

This course will study the history of Music Videos. Students will then develop and produce videos for artists represented by MAD DRAGON RECORDS.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMVD 365 Special Topics in Production 3.0 Credits

Focuses on a particular aspect of film and video production, such as cinematography, directing, or editing. The course may be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FMVD 105 [Min Grade: D] or FMVD 110 [Min Grade: D]

FMVD 399 Independent Project in Film and Video 0.5-12.0 Credits

Students plan and produce a project in the area of film and video with faculty supervision. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is FMVD.

Cannot enroll if classification is Freshman

FMVD 400 Advanced Directing 3.0 Credits

This hands-on class explores the communication between actors and directors in the film industry. In a workshop setting, using professional actors, students work on scenes rotating as directors.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 202 [Min Grade: D]

FMVD 410 Running a Production Company 3.0 Credits

This course explores the practical implications of starting and running a small media production business. Emphasis will be placed on the nuts and bolts of bookkeeping, marketing, sales, strategic planning and tax compliance. Students will create a personal business plan and create marketing material promoting their business.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

FMVD 415 Advanced Editing 3.0 Credits

This course builds upon the intermediate skills taught in FMVD 237-Intermediate Editing. Students advance towards editing larger scale productions, address challenges to specific types of projects, and explore advanced techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FMVD and classification is Senior.

Prerequisites: FMVD 237 [Min Grade: B]

FMVD 420 Advanced Audio Post-Production 3.0 Credits

This course is designed to provide the student with an advanced understanding of the techniques and practices of the sound designer, sound editor, dialogue editor, sound effects editor, music editor, and re-recording mixer for film and television.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 315 [Min Grade: D]

FMVD 430 Advanced Cinematography 3.0 Credits

This course provides students with exposure to the principles of advanced cinematography and videography both in theory and practical experiences.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 230 [Min Grade: D]

FMVD 465 Special Topics in Film and Video 3.0 Credits

Covers special topics in the area of film and video. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FMVD 105 [Min Grade: D] or FMVD 110 [Min Grade: D]

FMVD 490 Directed Studies in Film and Video 0.5-12.0 Credits

Students undertake specified studies in the field of film and video with faculty supervision. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

FMVD 495 Senior Project in Film and Video 3.0 Credits

The student plans and produces a long-term project during the senior year with faculty supervision. The project is expected to integrate the academic and practical knowledge the student has acquired in the area of film and video.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is FMVD and classification is Junior or Senior.

Prerequisites: FMVD 323 [Min Grade: D]

FMVD I199 Independent Study in Film & Video 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMVD I299 Independent Study in Film & Video 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMVD I399 Independent Study in Film & Video 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMVD I499 Independent Study in Film & Video 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMVD T180 Special Topics in Game Film & Video 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMVD T280 Special Topics in Game Film & Video 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMVD T380 Special Topics in Game Film & Video 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMVD T480 Special Topics in Game Film & Video 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Film Studies

Courses

FMST 101 Film History I: Emergence 3.0 Credits

This course covers the emergence and evolution of film narrative in the first half of the 20th Century, as well as the core concepts of film analysis that help us understand this process. We will focus on the artistic and institutional factors contributing to the rise and decline of Classical Hollywood Cinema.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMST 102 Film History II: New Waves 3.0 Credits

This course investigates the liberation of film aesthetics in the latter half of the 20th Century, and how filmmakers of this era redefined their medium. Particular emphasis is placed on the "new waves" of filmmaking in Western Europe and the "New Hollywood" revolution that soon followed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMST 101 [Min Grade: D]

FMST 103 Film History III: Trends 3.0 Credits

This course explores recent trends in domestic and international cinema, including the independent and multi-national filmmaking movements and ideologies that flourished around the turn of the 21st Century, as well as current developments in mainstream Hollywood cinema.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMST 102 [Min Grade: D]

FMST 150 American Classic Cinema 3.0 Credits

This course explores the richness and variety of American Classic Cinema while instructing in the basic principles of cinematic storytelling.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMST 160 European Cinema 3.0 Credits

This course surveys European Cinema from the period immediately after World War I to the present and looks at the work of several different directors whose work is representative of some of the dominant trends that have influenced western cinema.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 245 Non-Western Cinema 3.0 Credits

This is a survey of what has come to be considered World Cinema that originated outside of Europe and the United States. This course examines films that are great works of cinema that express the culture from which they spring as well as the unique artistic sensibilities and idea of their directors.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 250 The Documentary Tradition 3.0 Credits

Involves intensive study of major documentary film and video works. Covers topics including propaganda, documentary's relationship to social reality, documentary aesthetics, and the problem of "truth" in documentary.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 255 Hitchcock 3.0 Credits

A study of Hitchcock's use of cinematic techniques to tell complex, provocative stories.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 260 The Western 3.0 Credits

Explores the genre of the classic American Western. Students analyze a selection of Westerns to acquire an understanding of the human and cinematic values they embody.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 262 Film Comedy 3.0 Credits

Examines a broad selection of film comedies in search of principles that underlie successful film comedy.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 263 Rock - N - Roll Cinema 3.0 Credits

This class will explore the particularly close relationship between Rock and Roll and Cinema, focusing on the various impacts one has on the other.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 264 Russian Cinema 3.0 Credits

This course is an overview of Russian cinema of the 20th century.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 265 Special Topics in Cinema Studies 3.0 Credits

Examines a particular topic in cinema studies, such as national cinemas (e.g., Australian cinema), genres (e.g., film noir), particular filmmakers (e.g., Ingmar Bergman), or particular theoretical issues (e.g., film and social change). The course, but not the same topics, may be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

FMST 266 The Cinematographer's Art 3.0 Credits

This course examines the craft and style of some of the greatest feature film cinematographers.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 270 Controversial Films 3.0 Credits

This course examines some particularly controversial intersections of art and life in the cinema. It explores a variety of films that either addressed or incited controversies and discusses controversial topics surrounding race, ethnicity, religion, sexuality and politics as depicted in film.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 271 Sex in Film: Beyond Hollywood's Gaze 3.0 Credits

This course considers the history of the representation of sexuality in cinema. It looks especially at the international art films that brought a new sexual sophistication to the narrative film; the brief era of "porno chic" when American pornography seemed poised to challenge Hollywood; and the inner workings of the adult film industry. Finally, this course is also a critical study of the relations between narrative eroticism and forms of human expression.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 272 War Films 3.0 Credits

In this course, we will examine the cinematic representation and meaning of warfare as they pertain to the major epochs of warfare from WWII to the present.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 275 Breakthroughs of Contemporary Film Directors 3.0 Credits

This course looks at the breakthrough films that "made" the careers of their directors by setting them on a course of institutional and popular recognition. We will analyze the content and form of these films, the various social, economic, and historical forces that led to their creation, as well as the particular technical components and innovations that established these directors and their styles.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 276 Great Years in Cinema: 1999 3.0 Credits

1999 proved to be one of the greatest years in cinematic history in terms of the quality of films, the popular and critical acclaim of those films and the influence that these films would have in the years that followed. This course will examine and analyze the factors that likely contributed to the high volume of quality films released that year.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

FMST 290 Hollywoodland I 3.0 Credits

This course examines the history, culture and mythology of Hollywood through ten films, ranging from the silent era to the present, which the entertainment industry has made about itself. Topics to be covered include the growth of Los Angeles as a city, perceptions of stars and producers, the coming of sound in 1927 and the intersection of entertainment and politics. Films to be shown include "A Star is Born," "Sunset Boulevard," "The Front," "A Face in the Crowd," and other lesser-known works. Readings: "What Makes Sammy Run?," "The Last Tycoon," "The Day of the Locust," and "Once in a Lifetime."

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMST 291 Hollywoodland II 3.0 Credits

This course continues to examine the history, culture and mythology of Hollywood through films the entertainment industry has made about itself. In this course, the films looked at are primarily from the 1980s on, including "The Stunt Man," "My Favorite Year," "The Comedian" and "The Artist." Also discussed: the effect of television on the film industry, the breakup of the studio system in the late 40's-early 50's, the rise of programming created for HBO and other pay cable outlets, and changing perceptions of the business itself.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMST 200 [Min Grade: D]

FMST 293 Japanese Cinema: Kurosawa 3.0 Credits

This course will be a survey of some of the major films of Akira Kurosawa, who is widely heralded as one of the greatest filmmakers of the 20th century. His films will be looked at in the context of both Japanese cinema, especially the cinema that preceded him, and world cinema in general.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMST 304 Film Voice and Style 3.0 Credits

Imitation is the sincerest form of flattery; however, filmmakers also must develop their own unique voice and style. In this course students will undertake an in-depth study of a particular filmmaker, style, genre, or movement and submit a paper, film or project that will be the summation of their research.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMST 340 French New Wave 3.0 Credits

This course screens films by all five members of the French New Wave movement and examines the works of others who both influenced these five men and were also part of the aesthetic development in France during this period.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMST 345 Italian Neo Realism 3.0 Credits

Students are exposed to Italian Neorealism, its historical connection to Italy's post WWII, its technique of realism and its influence on later Italian and international films.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMST 352 The Horror Film 3.0 Credits

This course reviews the history of the horror film and its various sub-genres and analyzes the methods employed in the most successful films. Students dissect the representation of evil and the impact these films have on culture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMST 355 Contemporary Cinema 3.0 Credits

Students interpret and assess contemporary film in light of film history and aesthetics. Includes viewing and analysis of a different current film each week.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FMST I199 Independent Study in FMST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMST I299 Independent Study in FMST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMST I399 Independent Study in FMST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMST I499 Independent Study in FMST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMST T180 Special Topics in Film Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMST T280 Special Topics in Film Studies 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMST T380 Special Topics in Film Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

FMST T480 Special Topics in Film Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Finance

Courses

FIN 150 Financial Literacy 4.0 Credits

Financial literacy is designed to help students understand their personal financial lives. Students will be exposed to how to make everyday decisions (e.g., rent/buy a house or lease/own a car) as well as understand credit cards, student loans, consumer purchasing decisions, insurance, and other financial decisions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

FIN 301 Introduction to Finance 4.0 Credits

Covers financial structure of a corporation, short-and long-term financial policies, sources and uses of capital funds, asset valuation, capital budgeting, and corporate growth.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: (STAT 201 [Min Grade: D] or STAT 205 [Min Grade: D] or STAT 261 [Min Grade: D]) and (ACCT 115 [Min Grade: D] or ACCT 110 [Min Grade: D] or HRM 310 [Min Grade: D])

FIN 302 Intermediate Corporate Finance 4.0 Credits

Provides an in-depth treatment of long-term financing decisions, including estimation of the cost of capital, financial leverage, dividend policy, and working capital analysis.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 301 [Min Grade: C] and (STAT 202 [Min Grade: C] or STAT 206 [Min Grade: C])

FIN 321 Investment Securities & Markets 4.0 Credits

Covers stocks, bonds, other investment vehicles, and operation and regulation of the stock market.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: FIN 301 [Min Grade: C] and (STAT 202 [Min Grade: C] or STAT 206 [Min Grade: C])

FIN 323 Risk Management 4.0 Credits

Provides a fundamental understanding of risk and return, modern portfolio theory, asset pricing models, performance evaluation, and the use of derivatives to hedge and manage risk.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: FIN 321 [Min Grade: C] and (STAT 202 [Min Grade: C] or STAT 206 [Min Grade: C])

FIN 325 Financial Institutions and Markets 4.0 Credits

Covers understanding of the financial system from the money-creation process to the functioning of the Federal Reserve System to the role and management of financial institutions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: FIN 301 [Min Grade: C] and (STAT 202 [Min Grade: C] or STAT 206 [Min Grade: C])

FIN 330 Derivative Securities 4.0 Credits

The analysis and pricing of derivative securities including futures and options: applications to risk management and portfolio management.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 323 [Min Grade: C]

FIN 332 Investment Analysis 4.0 Credits

Introduces investment analysis, with particular emphasis on financial statement analysis.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: FIN 321 [Min Grade: C]

FIN 335 Entrepreneurial Finance 4.0 Credits

The purpose of the course is to bring financial management decision, tools and techniques typically applied in corporate contexts into the realm of entrepreneurship. This course presents the importance of understanding and applying entrepreneurial finance methods and tools to help ensure a successful venture.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 301 [Min Grade: C]

FIN 338 Money and Capital Markets 4.0 Credits

Covers the organization and operation of the money and capital markets and key institutional financial intermediaries.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FIN 325 [Min Grade: C]

FIN 340 Seminar in Finance 4.0 Credits

Covers current topics and selected cases in finance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FIN 302 [Min Grade: D] and FIN 321 [Min Grade: D] and FIN 325 [Min Grade: D]

FIN 341 Applied Portfolio Management 4.0 Credits

This course covers topics related to portfolio management. Students will learn how to analyze industries, select securities for inclusion in investment portfolios, and analyze portfolio performance. Students will participate in the management of a real investment portfolio for the duration of the course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 321 [Min Grade: C]

FIN 342 Advanced Portfolio Management 4.0 Credits

This course covers advanced topics related to portfolio management. Students will learn how to analyze industries and the investment potential of individual securities in depth. They will also learn advanced methods for analyzing portfolio performance and investment strategy. Students will participate in the management of a real investment portfolio for the duration of the course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 341 [Min Grade: C]

FIN 346 Global Financial Management 4.0 Credits

Examines the investment and financing strategies of multinational corporations. Covers topics including capital acquisition in the international environment, international investment borrowing, international corporate restructuring, currency swaps and recapitalizations, hedging techniques, and international risk-management instruments.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: FIN 301 [Min Grade: C]

FIN 348 Corporate Financial Reporting to Executives 4.0 Credits

Provides decision support to the corporate executive leadership team in visualizing the short-term and long-term financial picture of the firm.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 301 [Min Grade: C] and ACCT 115 [Min Grade: C]

FIN 350 Personal Finance 4.0 Credits

Covers key personal financial documents, taxes, credit, insurance, and investments.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

FIN 450 Personal Wealth Management 4.0 Credits

The focus of this course will be on the logic and principles underlying personal financial management as well as implementing tools and techniques for achieving sound financial goals. Topics include: investment decision analysis, consumer credit, tax planning, actuarial opportunities, financial investment strategies, and retirement planning.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 302 [Min Grade: C] and FIN 321 [Min Grade: C]

FIN I199 Independent Study in FIN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

FIN I299 Independent Study in FIN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

FIN I399 Independent Study in FIN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

FIN I499 Independent Study in FIN 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

FIN T180 Special Topics in FIN 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

FIN T280 Special Topics in FIN 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

FIN T380 Special Topics in FIN 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

FIN T480 Special Topics in FIN 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Senior.

Food Science

Courses

FDSC 100 ServSafe 1.0 Credit

This course is designed for students who will be involved in food service, either at the institutional or commercial levels. It is also of interest to students who desire practical applications of food and kitchen sanitation and related environmental studies. This course concentrates on measures that must be taken to protect consumers from foodborne diseases and other hazards that can be caused from eating those foods. ServSafe Certification exam through the National Restaurant Association is administered.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

FDSC 120 Food and the Senses 3.0 Credits

This course is designed to help students develop their palates through understanding the different approaches to the sensory properties of food. By starting with simple ingredients and building in complexity of flavor profile, students will be introduced to the field of sensory evaluation.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

FDSC 154 Science of Food and Cooking 4.0 Credits

Covers the physical and chemical characteristics of food components including sugars, starches, proteins, and fats and their changes during preparation and cooking. Also considers the interaction of components in foods such as eggs, dairy products, meats, and cereals and the formulation of baked goods. Methods of sensory evaluation are included.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

FDSC 270 Microbial Food Safety and Sanitation 4.0 Credits

Covers topics including types, sources and growth of microorganisms in food; food spoilage; foodborne infections and intoxications and their prevention; chemical contamination; pest control and sanitation standards in foodservice operations; and FDA and local regulations.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

FDSC 350 Experimental Foods: Product Development 3.0 Credits

Covers the ingredients used in the development of new food products and the process of developing new food products. Objective and subjective testing procedures are demonstrated in laboratory. Students propose and carry out a food development project.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 154 [Min Grade: D]

FDSC 401 Modernist Cuisine 3.0 Credits

The nexus of cuisine, gastronomy, and food science. This course explores the history, techniques, science, creative inspiration, and the new equipment that encompasses the contemporary aspect of modern cuisine (molecular gastronomy). A broad range of foods will be prepared to facilitate a familiarization with the range of modernist cuisine.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CAS or major is CLSC or major is CULA or major is HOSP.

Cannot enroll if classification is Freshman

Prerequisites: CULA 115 [Min Grade: D] or CULA 120 [Min Grade: D]

FDSC 450 Food Microbiology 3.0 Credits

Covers application of microbiological principles to food safety, production, nutrient quality, and spoilage.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 270 [Min Grade: D]

FDSC 451 Food Microbiology Laboratory 2.0 Credits

Teaches laboratory techniques of food microbiology with emphasis on food production and quality assurance procedures. Should be taken with FDSC 450 concurrently. Please see the department for more information.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 270 [Min Grade: D] (Can be taken Concurrently)

Corequisite: FDSC 450

FDSC 454 Microbiology & Chemistry of Food Safety 3.0 Credits

Provides advanced study of chemicals of food safety significance, with emphasis on the effects of compounds normal to food. Includes regulations and controls.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 436 [Min Grade: D] or BIO 203 [Min Grade: D]

FDSC 456 Food Preservation Processes 3.0 Credits

Covers fundamentals of food processing and preservation, including techniques and methods employed to extend the useful life of food products, and the significance of changes in the composition of foods due to the processing, enzymatic activity, microbial action and chemical change.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: NFS 215 [Min Grade: D] or NFS 400 [Min Grade: D] or BIO 311 [Min Grade: D]

FDSC 458 Nutritional Impact of Food Processing Methods 3.0 Credits

Covers the effect of processing on foods, emphasizing nutritional and chemical aspects. Includes topics such as synthetic foods, food additives, current food processing methods, nutritional policy, consumer dietary patterns, and food product trends.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: (FDSC 154 [Min Grade: D] and NFS 215 [Min Grade: D]) or (NFS 154 [Min Grade: D] and NFS 400 [Min Grade: D]) or (NFS 154 [Min Grade: D] and NFS 215 [Min Grade: D])

FDSC 460 Food Chemistry 3.0 Credits

Covers physicochemical properties of food constituents, including the application of underlying scientific principles to the processing of foods and biological materials.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: NFS 215 [Min Grade: D] or NFS 400 [Min Grade: D] or BIO 311 [Min Grade: D]

FDSC 461 Food Analysis 3.0 Credits

Provides analysis of foods and biological samples, with emphasis on their chemical composition and physicochemical properties.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: NFS 216 [Min Grade: D] or NFS 404 [Min Grade: D] or BIO 306 [Min Grade: D]

FDSC 468 Functional Foods 3.0 Credits

This course covers a range of functional foods and food components, their health conferring benefits, mechanisms of actions, and possible applications in the food industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 154 [Min Grade: D] and NFS 215 [Min Grade: D]

FDSC 487 Food Engineering 3.0 Credits

This course deals with understanding and implementing basic engineering concepts to solve quantitative problems in food engineering and processing. Concepts such as units and dimension, mass and energy balance, heat transfer, mass transfer, psychometrics and fluid flow will be covered.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: D] and MATH 102 [Min Grade: D]

FDSC 490 Seminar in Food Science 1.0 Credit

Current topics in food science will be studies with presentations by invited speakers and students. This course may be repeated for credit.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated 3 times for 3 credits

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

FDSC 491 Senior Project I 2.0 Credits

Students will identify a research problem, synthesize a literature review of the problem and then develop a research proposal to be presented both in written form and defended orally.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 350 [Min Grade: D]

FDSC 492 Senior Project II 2.0 Credits

Students will carry out the research protocol developed in FDSC 491. The data generated will be analyzed to answer the research questions posed in FDSC 491. The final results will be presented both orally and in written form.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 491 [Min Grade: D]

FDSC I199 Independent Study in FDSC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

FDSC I299 Independent Study in FDSC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

FDSC I399 Independent Study in FDSC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

FDSC I499 Independent Study in FDSC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

FDSC T180 Special topics in FDSC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

FDSC T280 Special topics in FDSC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

FDSC T380 Special topics in FDSC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

FDSC T480 Special topics in FDSC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

French

Courses

FREN 101 French I 4.0 Credits

Introductory French. Includes listening, speaking, reading, and writing. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

FREN 102 French II 4.0 Credits

Continues FREN 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 101 [Min Grade: C]

FREN 103 French III 4.0 Credits

Continues FREN 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 102 [Min Grade: C]

FREN 201 French IV 4.0 Credits

Intermediate French. Includes grammar review, listening, speaking, and reading, with individual audiolingual practice. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 103 [Min Grade: C]

FREN 202 French V 4.0 Credits

Continues FREN 201. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 201 [Min Grade: C]

FREN 203 French VI: Conversations & Composition 4.0 Credits

Provides intensive practice in comprehension and written and oral communication. Emphasizes development of writing skills and increased oral competence in everyday situations. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 202 [Min Grade: C]

FREN 310 Advanced Writing and Speaking 4.0 Credits

French 310 provides advanced practice in written and oral communication, including journalistic, professional, and creative writing. Examines contemporary cultural contexts through media and news.

Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 202 [Min Grade: C]

FREN 311 [WI] Introduction to French Stylistics 3.0 Credits

Provides advanced practice in comprehension and written and oral communication, based primarily on periodicals and contemporary media. Offered every term. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 203 [Min Grade: C]

FREN 312 [WI] French Stylistics 3.0 Credits

Continues FREN 311. Provides extensive study of the techniques of translation and communication. Offered all terms. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 311 [Min Grade: C]

FREN 313 [WI] Advanced French Stylistics 3.0 Credits

Continues FREN 312. Provides advanced training in oral and written communication in French. Particularly recommended for students who have pre-proficiency status, French minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: FREN 312 [Min Grade: C]

FREN 320 Introduction to Language for the Professions 3.0 Credits

This course provides an introduction to communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C]

FREN 330 Introduction to Identities and Communities 3.0 Credits

This course provides an introduction to the analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C]

FREN 331 Introduction to Studies in French Literature 3.0 Credits

Advanced French. Reading, writing, and extensive conversational practice, based on masterpieces of French literature.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 332 Studies in French Literature 3.0 Credits

Includes reading and oral and written analysis of representative texts in French literature, including familiarization with the historical and cultural contexts. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 333 Advanced French Literature 3.0 Credits

Continues FREN 332. Provides advanced study of French literature. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 340 Introduction to Power and Resistance 3.0 Credits

This course provides an introduction to the analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C]

FREN 350 Introduction to Language, Media, and Society 3.0 Credits

This course provides an introduction to the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C]

FREN 351 Introduction to Business and Professional French 3.0 Credits

Provides intensive oral practice and written work in business, professional, and commercial French. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 352 Business and Professional French 3.0 Credits

Advanced Business and Professional French. Advanced practice in oral and written French for business and the professions. Based on advanced texts, periodicals, and technical journals.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 353 Advanced Business and Professional French 0.5-20.0 Credits

Provides advanced study in business and professional terminology, with emphasis on the structure and protocols of the business world. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 160 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 371 Special Studies in French Civilization and Culture 3.0 Credits

Presents an integrated approach in French to the civilization, culture, history, and literature specific to the areas in which the language is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 312 [Min Grade: C]

FREN 410 Advanced Grammar and Translation 3.0 Credits

This course provides advanced grammar instruction and fosters translation and communication skills within a contemporary cultural context. The content of this course may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 411 [WI] Special Studies in Advanced French Stylistics 3.0 Credits

Particularly recommended for students who have proficiency status, French minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FREN 312 [Min Grade: C]

FREN 420 Advanced Studies in Language for the Professions 3.0 Credits

French 420 provides an advanced communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. The content of FREN 420 may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 430 Advanced Studies in Identities and Communities 3.0 Credits

French 430 provides an advanced analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of FREN 430 may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 431 [WI] Special Studies in Advanced French Literature 3.0 Credits

Particularly recommended for students who have proficiency status, French minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FREN 312 [Min Grade: C]

FREN 440 Advanced Studies in Power and Resistance 3.0 Credits

French 440 provides an advanced analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of FREN 440 may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 450 Advanced Studies in Language, Media, and Society 3.0 Credits

French 450 provides an advanced analysis of the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of FREN 450 may change every term it is offered and is repeatable for credit. Taught in French.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: FREN 310 [Min Grade: C] and (FREN 320 [Min Grade: C] or FREN 330 [Min Grade: C] or FREN 340 [Min Grade: C] or FREN 350 [Min Grade: C])

FREN 451 Special Studies in Advanced Business and Professional French 3.0 Credits

Continues FREN 353, with emphasis on the structure and protocols of the European Union. Particularly recommended for students who have proficiency status, French minors, and students interested in graduate study and/or international careers. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FREN 312 [Min Grade: D]

FREN 471 [WI] Special Studies in French Civilization 3.0 Credits

Presents an integrated approach, at the advanced level, to the civilization, culture, history, and literature of a given period specific to the areas in which French is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FREN 312 [Min Grade: C]

FREN 480 French Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

FREN I199 Independent Study in FREN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN I299 Independent Study in FREN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN I399 Independent Study in FREN 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN I499 Independent Study in FREN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN T180 Special Topics in French 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN T280 Special Topics in French 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN T380 Special Topics in French 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

FREN T480 Special Topics in French 0.5-12.0 Credits

Recommended for French minors and for students with proficiency status. Offered all terms. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 96 credits

Game Art & Production

Courses

GMAP 231 Scripting for Game Design 3.0 Credits

This course explores modern game engine scripting languages that are event-driven, control the art assets, provide multiplayer communication, and database access.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: CS 140 [Min Grade: D]

GMAP 260 Overview of Computer Gaming 3.0 Credits

This course presents an overview of computer gaming, including its history, its foundation in traditional games and its contemporary forms. The relationship among genres, platforms and audiences are examined and critical evaluation skills are developed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

GMAP 345 Game Development Foundations 3.0 Credits

This course introduces students to the computer game design process. Students also learn how the individual skills of modeling, animation, scripting, interface design and storytelling are coordinated to produce interactive media experiences.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (ANIM 141 [Min Grade: D] or DIGM 141 [Min Grade: D] or CS 265 [Min Grade: D]) and (DIGM 260 [Min Grade: D] or GMAP 260 [Min Grade: D])

GMAP 347 Serious Games 3.0 Credits

This course explores development of games for education. Goals include understanding and appreciating the psychology of play and the principles of game design in developing educational games.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: GMAP 378 [Min Grade: D]

GMAP 348 Experimental Games 3.0 Credits

This course explores new ideas and innovative gameplay through constraints of team size and shortened development cycles.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: GMAP 377 [Min Grade: D]

GMAP 367 Character Animation for Gaming 3.0 Credits

This course focuses on character animation techniques for real-time graphics, including cyclical animations, procedural animation, motion capture and integration into game engines.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ANIM 212 [Min Grade: D] and GMAP 345 [Min Grade: D]

GMAP 368 Artificial Intelligence in Gaming 3.0 Credits

This course teaches the use and integration of state machines into game engines, as well as other methods for creating and controlling Non Player Characters (NPCs).

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: GMAP 345 [Min Grade: D] and CS 172 [Min Grade: D]

GMAP 369 Mobile Game Development 3.0 Credits

This course explores development of games for mobile platforms. Specifically addressed will be platform issues such as processor speed, screen resolution, user interface and memory.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: GMAP 377 [Min Grade: D]

GMAP 377 Game Development: Workshop I 3.0 Credits

This course examines the roles of the executive producer and the development team in taking a computer game from concept to design document through production. Students will work in small teams to research and plan a production effort that results in a pre-production prototype.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: GMAP 345 [Min Grade: D] or DIGM 345 [Min Grade: D]

GMAP 378 Game Development: Workshop II 3.0 Credits

This course provides an environment in which the pre-production of GMAP 377 Game Development: Workshop I can be taken through a full production effort. Students work in small teams to bring a selected prototype to completion.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: GMAP 377 [Min Grade: D] or DIGM 361 [Min Grade: D]

GMAP 399 Independent Project in Game Art and Production 0.5-12.0 Credits

Supervised planning and execution of a project in the area of Game Art and Production.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

GMAP 421 Advanced Game Design and Production 3.0 Credits

This course will step through the various modules of game engines, enabling students to gain access to real-time shaders and materials, particle systems and animation techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: GMAP 377 [Min Grade: D]

GMAP 465 Special Topics in Game Production 3.0 Credits

Addresses current topics in Game Art and Production. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

GMAP I199 Independent Study in Game Art and Production 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

GMAP I299 Independent Study in Game Art and Production 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

GMAP I399 Independent Study in Game Art and Production 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

GMAP I499 Independent Study in Game Art and Production 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

GMAP T180 Special Topics in Game Art and Production 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

GMAP T280 Special Topics in Game Art and Production 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

GMAP T380 Special Topics in Game Art and Production 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

GMAP T480 Special Topics in Game Art and Production 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

General Business

Courses

BUSN 101 Foundations of Business I 4.0 Credits

Introduces the fundamental structures and functions of business organizations and the opportunities for career advancement within such organizations. Develops relevant business skills for professional success, emphasizing teams, communication, and real-world examples.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman or Sophomore .

BUSN 102 Foundations of Business II 4.0 Credits

Exposes students to the external environments (local, national, and international) within which business organizations operate. Continues to build on important managerial and communication issues.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman or Sophomore .

Prerequisites: BUSN 101 [Min Grade: D]

BUSN 103 Advanced First Year Business Seminar 2.0 Credits

Continues to address topics and professional development introduced in the Foundations of Business I and II courses. Further develops students' knowledge and skills in a variety of areas, which may include effective boardroom presentations, individual financial strategy, leadership issues, corporate communication, career management and decision making. May be repeated once for credit.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 2 times for 4 credits

BUSN 110 Orientation Seminar for Evening Students 1.0 Credit

Assists students in the transition to a university environment. Provides exposure to ideas and life skills that are essential to success at Drexel, in the business community, and beyond. Emphasizes faculty, administration, and peer contact.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 111 Foundations for Business 4.0 Credits

Provides an integrated foundation for future business courses. Orients transfer and evening students to the main disciplines and functions of business, in both the internal and external environments; enables hands-on analysis of information and decision-making in a competitive arena; and provides an opportunity to develop teamwork and to enhance communication, presentation, and other management skills.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

BUSN 112 [WI] Career Management Business Residency 4.0 Credits

Provides students with a practical framework for career planning through the use of career assessments, interactive exercises, and personal reflections. Students will investigate viable career paths, analyze internal and external motivators, and enhance their communication, leadership, and presentation skills through an online simulation, electronic portfolio, and employer site visit. This is a writing intensive course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 200 Introductory Seminar in Business Research 4.0 Credits

This course provides an overview of methods used in business research. It will cover the development of research questions and hypotheses, research design and methods used in business, and the analysis and interpretation of data.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman or Sophomore .

BUSN 211 Peer Mentoring & Leadership Practicum 2.0 Credits

This course is designed to highlight and develop mentoring and leadership skills required to guide and assist incoming freshmen in their transition to college. Students will develop critical thinking as it relates to leadership and the integration of those skills. The course is experiential in nature as students will immediately look to apply knowledge gained within the course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Sophomore.

Prerequisites: UNIV 101 [Min Grade: B]

BUSN 260 Introduction to Business Analytics 4.0 Credits

This course introduces mathematical models that can be used to improve decision-making within an organization. Topics will include analytical tools such as optimization, simulation, and Visual Basic for Applications (VBA) for problem solving and decision support in all areas of business, including supply chain networks, operations, finance, economics, and marketing. Students will make extensive use of Excel and several spreadsheet based add-ins to solve real business problems, improve business processes, and help make important business decisions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 301 Accounting and Finance for Nonfinancial Professionals 3.0 Credits

A study of the accounting process and financial evaluation to enable nonfinancial professionals to work effectively with accountants and financial specialists in order to understand financial responsibilities within their profession and to make sound financial decisions. Basic accounting principles, financial statements, and financial analysis techniques will be emphasized.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

BUSN 430 Mentoring & Leadership Development Practicum 2.0 Credits

The role of the Peer Mentor is one of a role-model, tutor and trusted colleague. This course is designed to teach mentoring skills required by Teaching Assistants in BUSN 101 and for early career managers.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FIN 301 [Min Grade: B] and ACCT 115 [Min Grade: B] and ACCT 116 [Min Grade: B]

BUSN 431 Mentoring & Leadership Development Practicum 2.0 Credits

The role of the peer mentor is one of a role model, tutor and trusted colleague. This course is designed to teach mentoring skills required by Teaching Assistants in BUSN 102 and for early career managers.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FIN 301 [Min Grade: B] and ACCT 115 [Min Grade: B] and ACCT 116 [Min Grade: B]

BUSN 432 Leadership & Mentoring Practicum 4.0 Credits

The role of the TA is one of a role-model, tutor and trusted colleague. This course is designed to guide and assist upperclassmen as they support BUSN 101/102 students in their initial journey into business as well as provide leadership insights and experiences that highlight these secondary leadership roles.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: FIN 301 [Min Grade: B] and ACCT 115 [Min Grade: B] and ACCT 116 [Min Grade: B]

BUSN 460 Business Analytics Senior Project 4.0 Credits

The senior project serves as a capstone for business analytics majors. The course provides an opportunity for students to develop a project that draws on their skills in the areas of data management, mathematical modeling, and statistical analysis to support data driven decision-making processes. Student often choose a project in the area of their second major (marketing, finance, etc.) and thus the project provides deeper insight into organizational decision-making in a functional area of business.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: OPR 320 [Min Grade: C-] and MIS 343 [Min Grade: C-] and MIS 349 [Min Grade: C-] and (STAT 331 [Min Grade: C-] or STAT 335 [Min Grade: C-] or ECON 350 [Min Grade: C-]) and (OPR 330 [Min Grade: C-] or MKTG 366 [Min Grade: C-] or ECON 301 [Min Grade: C-])

BUSN I199 Independent Study in BUSN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BUSN I299 Independent Study in BUSN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BUSN I399 Independent Study in BUSN 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BUSN I499 Independent Study in BUSN 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

BUSN T180 Special Topics in BUSN 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BUSN T280 Special Topics in BUSN 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BUSN T380 Special Topics in BUSN 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BUSN T480 Special Topics in BUSN 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

General Design Arts

Courses

CDA 399 Independent Study 0.5-12.0 Credits

Provides individualized study in an area related to a major within the College of Design Arts. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

CDA 465 Special Topics 12.0 Credits

Provides study on a special topic or on an experimental basis. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

CDA I199 Independent Study in General Design Arts 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

CDA I299 Independent Study in General Design Arts 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

CDA I399 Independent Study in General Design Arts 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

CDA I499 Independent Study in General Design Arts 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

CDA T180 Special Topics in General Arts Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

CDA T280 Special Topics in General Arts Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

CDA T380 Special Topics in General Arts Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

CDA T480 Special Topics in General Arts Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

General Studies

Courses

GSTD 100 Strategies for Academic Success 1.0 Credit

This course explores the learning process to assist students in achieving academic success. Self-assessments, personal reflection, and relevant electronic resources are used to foster students' development as self-directed learners. Topics include: study skills, learning strategies, personal development, academic planning and tracking, visioning, and goal setting. The goal of this course is to help improve students' efficacy in the areas of academic self-management, self-direction, and resource utilization.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

GSTD 111 Learning Skills & Strategies 3.0 Credits

This course prepares traditional undergraduate students for the expectations and challenges of college life.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman.

GSTD 150 Introduction to World Religions 3.0 Credits

This course introduces significant Eastern and Western religions.

Hinduism, Buddhism, Confucianism, Daoism, Judaism, Christianity and Islam are examined. Each religion is studied as a system of thought that constructs a worldview considering its origin, its sacred texts, the human condition, and the future eternity.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

GSTD 200 Lifelong Learning Theory & Practice 3.0 Credits

Introduces theories and practical skills necessary for successful learning in a variety of environments. Covers self-efficacy development, autonomous learning, critical thinking, critical reading, learning to learn, effective researching and writing, goal setting theories, and practical strategies necessary to support learning in university, career, and personal contexts.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

GSTD 210 Fact & Fiction in Film 3.0 Credits

This course focuses on the creative process of film storytelling using documented historical fact and artistic license of fiction. Factual material, reasonable opinions, and scurrilous rumors about well-documented historical events will be analyzed. Films about these events will be viewed, critiqued and analyzed.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

GSTD 380 Advanced Special Topics in General Studies 1.0-4.0 Credit

Covers upper-level special topics of interest in General Studies. This course may be repeated for credit.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated 11 times for 12 credits

GSTD 400 Practicum 3.0 Credits

Combines classroom theory with practical application at the student's worksite. Requires students to demonstrate the ability to apply classroom learning to situations benefiting a corporation. Includes an orientation, proposals, reports on works-in-progress, and a portfolio.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GSTD and classification is Senior.

GSTD 491 Senior Project in General Studies 3.0 Credits

The senior project covers planning and execution of a capstone project that integrates the academic and practical knowledge acquired in the student's course of study. Students will complete a research proposal, a research project or an integrative portfolio.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GSTD and classification is Senior.

GSTD I199 Independent Study in GSTD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

GSTD I299 Independent Study in GSTD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

GSTD I399 Independent Study in GSTD 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

GSTD I499 Independent Study in GSTD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

GSTD T180 Special Topics in GSTD 1.0-4.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated 11 times for 12 credits

GSTD T280 Special Topics in GSTD 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

GSTD T380 Special Topics in GSTD 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

GSTD T480 Special Topics in GSTD 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

Geography Education

Courses

EDGE 210 Geography Education 3.0 Credits

This course is an introduction to geographic concepts, themes and elements; designed to build a foundational understanding and analytical tools to examine the world from a geographic perspective. The course emphasizes the unique qualities of world regions, and the spatial interaction of people, elements, and regions, as well as major regional and global problems and prospects.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGE 211 Geography Education: Teacher Laboratory 1.5 Credit

A teaching methods and techniques laboratory designed to prepare pre-service PK-12 teachers to effectively help their future students better understand and analyze their world utilizing geographic concepts, themes and elements. The weekly labs correspond directly to the content represented in EDGE210:Geography Education.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDGE 210 [Min Grade: D]

EDGE I199 Independent Study in EDGE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDGE I299 Independent Study in EDGE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDGE I399 Independent Study in EDGE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDGE I499 Independent Study in EDGE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDGE T180 Special topics in EDGE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDGE T280 Special topics in EDGE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDGE T380 Special topics in EDGE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDGE T480 Special topics in EDGE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

Geoscience

Courses

GEO 101 Physical Geology 4.0 Credits

This course is an introduction to geology emphasizing the role of plate tectonics. Topics include formation of minerals, igneous, sedimentary, and metamorphic rocks, volcanoes, earthquakes, depositional environments, and geological hazards. Labs focus on mineral and rock identification, map skills, and 3D visualization.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GEO 102 History of the Earth 4.0 Credits

The history of the earth and the evolution of life on earth are examined. Geological and biological processes that allow us to reconstruct the past are emphasized. Topics include geologic time, plate tectonics, and the nature of the fossil record. Lab exercises include hands-on fossil identification and the use of fossils as tools to explore the history of the earth.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GEO 103 Introduction to Field Methods in Earth Science 2.0 Credits

This is an introductory course in earth science that provides experience with the fundamental skills and methods for the field study of the earth and earth processes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GEO 201 [WI] Earth Systems Processes 3.0 Credits

Students will examine local and global environmental changes from an earth systems perspective. Important concepts include feed-back loops, tipping points, the "butterfly effect," and geological time. From a geological perspective, students will examine: natural and anthropogenic climate change; soil degradation; sea-level rise; plate tectonics; and natural hazards, such as coastal storms, levee breaks, earthquakes, tsunamis, landslides and more.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GEO 205 Dinosaurs and Their World 3.0 Credits

An introduction to dinosaur paleontology, this course focuses on the scientific method as applied to dinosaur studies. Topics include dinosaur evolution, the history of dinosaur research, an overview of dinosaurs, and birds as living dinosaurs. This is suitable for all majors.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GEO 207 Introduction to Oceanography 3.0 Credits

This course provides a topics-based approach to the field of Oceanography and its disciplines. Provides a solid understanding of the discipline of oceanography and a foundation to pursue further advanced topics in oceanography or to learn about how our planet works.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GEO 210 Structural Geology 4.0 Credits

Students in this course will explore the physical and geometric structures within the earth's crust and the ways in which these structures reflect natural history. Mapping techniques and methods of describing stress and strain in rocks will be covered, while emphasizing visualization of three-dimensional relationships. Students will learn practical analytical techniques and foundational field skill. This course is at the heart of field geology and will prepare students for a successful summer field camp experience.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 101 [Min Grade: D] and GEO 301 [Min Grade: D]

GEO 215 Mineralogy 4.0 Credits

In this course, students will study mineralogy and optical mineralogy, with a focus on describing minerals within their geologic context. The foundations of mineralogy will be covered, including: crystallography, chemical bonding, controls on mineral structure, mineral stability, and crystal growth. Students will learn physical and chemical analytical methods to examine mineral composition and structure. Hand-sample identification will be emphasized in the laboratory component. In the field, students will learn to identify rock-forming minerals within the context of historical geological events.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 101 [Min Grade: D]

GEO 301 Advanced Field Methods in Earth Science 2.0 Credits

This skills course focuses on fundamental and commonly used geoscience field techniques. Students will learn surface and subsurface mapping, coring techniques and core analysis, remote sensing techniques, and sampling techniques. This course builds on GEO 103 and prepares students for advanced field studies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 103 [Min Grade: D]

GEO 306 Environmental Geology 4.0 Credits

Students in this course will focus on interactions between humans and the geosphere. Students will develop an understanding of a broad range of natural and human-induced geohazards, from earthquakes and tsunamis to industrial pollution and anthropogenic climate change. Regional examples will be emphasized, such environmental industrial contamination and remediation efforts in the Delaware Valley and hydraulic fracturing for natural gas in Pennsylvania.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 101 [Min Grade: D]

GEO 309 Geochemistry 4.0 Credits

This course is a topics-based approach to the field of geochemistry with emphasis on aqueous systems, both marine and freshwater. Topics include: composition of the earth and oceans; chemical equilibrium; solubility; thermodynamics; oxidation-reduction reactions; organic geochemistry; isotope geochemistry; contaminant geochemistry; applications of geochemistry; consequences of weathering; composition of surface waters; geochemical modeling; and selected areas of interest.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 103 [Min Grade: D] or CHEM 123 [Min Grade: D]

GEO 310 Sedimentary Environments 4.0 Credits

Students in this course develop an understanding of sedimentary processes and the ability to interpret paleoenvironments based on sedimentological parameters. Topics include current flow, bedforms, siliciclastic and carbonate rocks, fluvial, coastal, and Aeolian environments, taphonomy, and paleosols.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 101 [Min Grade: D]

GEO 311 Stratigraphy 4.0 Credits

Students in this core course will learn the about foundations of stratigraphy, including the discovery of "Deep Time." Lithostratigraphic, chronstratigraphic, and geochronologic principles will be examined, including the development of the geological time scale. Students will learn to construct stratigraphic cross-section, though lithostratigraphic, biostratigraphic, and sequence stratigraphic correlation. Practical techniques, such as magnetostratigraphy and electrologging will be covered and students will gain hands-on, field experience in stratigraphic settings ranging from the Paleozoic to the Pleistocene.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 310 [Min Grade: D]

GEO 320 Invertebrate Paleontology 4.0 Credits

This course focuses on the evolution of hard-bodied invertebrates from the Cambrian period to today. Topics include taxonomy, taphonomy, biostratigraphy, and paleoecology. Natural selection, functional morphology, extinction and adaption are emphasized. The lab focuses on hands-on fossil identification.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 124 [Min Grade: D] or BIO 141 [Min Grade: D] or (BIO 109 [Min Grade: D] and BIO 110 [Min Grade: D])

GEO 322 Vertebrate Paleontology 4.0 Credits

This course focuses on the evolution of vertebrates from the Cambrian Period to today. Topics include cartilaginous and bony fishes, amphibians, turtles, crocodiles, pterosaurs, birds, and mammals. Natural selection, cladistics, functional morphology, adaptation and extinction are emphasized.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 124 [Min Grade: D] or BIO 141 [Min Grade: D] or (BIO 109 [Min Grade: D] and BIO 110 [Min Grade: D])

GEO 340 Quaternary Geology 4.0 Credits

Students in this course will examine a great variety of evidence used to establish the history and scale of environmental changes during the most recent geological time period – the Quaternary. The evidence ranges from landforms and sediments to fossil assemblages and isotope ratios. Understanding the Quaternary Period, which encompasses all of human history, is critical for the future well being of our species.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 101 [Min Grade: D]

GEO 342 Geomorphology 4.0 Credits

Students in this course will learn how landscapes originate and develop over time, through an integrative approach that covers all of the major constructional and erosional processes. The fundamentals of sediment entrainment, transport, and deposition will be applied to landform evolution. Students will learn about the importance of geomorphology in environmental geology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 101 [Min Grade: D]

GEO 346 Coastal Geology 4.0 Credits

This course will furnish an understanding of the tectonic framework, hydrographic regime, climatic setting, and geological components that determine the morphology and behavior of coastlines. The response of coasts to changes in sea level, sediment supply, and human development will be examined. Fundamental geomorphic processes, such as wave-driven currents and tidal dynamics, will be covered.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 101 [Min Grade: D]

GEO 348 Oceanography 4.0 Credits

This course provides a topics-based approach to the field of oceanography with special emphasis on marine geology and geochemistry. Provides a solid understanding of the discipline of oceanography and a foundation to pursue further advanced topics in oceanography.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 101 [Min Grade: D] or CHEM 101 [Min Grade: D]

GEO 350 Volcanology 3.0 Credits

Volcanology is a study of the origin, properties, and processes involved in the formation and eruption of volcanoes. The student taking this course will be introduced to the various types of volcanism on Earth and in the Solar System, methods of volcano monitoring, and human and environmental impacts of volcanic eruptions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GEO 365 Field Methods in Paleocology 4.0 Credits

Weekly fieldtrips to the Inversand fossil sites in New Jersey form the basis for this course. Students will learn the rudiments of stratigraphy and fossil identification and will learn excavation and data collection techniques. Collected fossils will be prepared by students in labs at Drexel University and at the Academy of Natural Sciences.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GEO 401 Igneous and Metamorphic Petrology 4.0 Credits

Students in this course will explore the processes that control the genesis of igneous and metamorphic rocks, with emphasis on igneous processes. In the laboratory portion of the course students will learn identification and classification of petrographic specimens. Students will gain hand-on experience identifying igneous and metamorphic rocks in the field.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D] and GEO 101 [Min Grade: D] and GEO 215 [Min Grade: D]

GEO 412 Geology of Groundwater 4.0 Credits

Students in this course will learn the theoretical basis and practical techniques of hydrogeology. The significance of groundwater for ecosystem health, including human well-being, will be emphasized. Students will learn commonly used industrial techniques, such as hydrograph analyses, borehole measurements, and stream gauge techniques and will gain hands-on experience assessing hydrogeology in the field.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is AE or major is CIVE or major is ENVE

Prerequisites: CHEM 102 [Min Grade: D] and (MATH 239 [Min Grade: D] or MATH 123 [Min Grade: D]) and GEO 101 [Min Grade: D]

GEO 418 Geophysics 4.0 Credits

Students in this course will learn geophysical concepts and practical (and marketable) skills for using geophysical techniques in the field. Students will gain hands-on experience in seismic profiling, borehole logging and other techniques important in environmental consulting and the energy industry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GEO 101 [Min Grade: D] and (MATH 239 [Min Grade: D] or MATH 123 [Min Grade: D]) and (PHYS 153 [Min Grade: D] or PHYS 102 [Min Grade: D])

GEO 497 Research 12.0 Credits

Students pursue a specific area of research in geoscience under the direction of a geoscience faculty member. Faculty permission required.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GEO I199 Independent Study in GEO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GEO I299 Independent Study in GEO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GEO I399 Independent Study in GEO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GEO I499 Independent Study in GEO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GEO T180 Special Topics in Geoscience 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GEO T280 Special Topics in Geoscience 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GEO T380 Special Topics in Geoscience 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GEO T480 Special Topics in Geoscience 12.0 Credits

In this course, students will explore specific areas not covered in the regularly offered Geoscience courses. The course will be taught by teaching faculty members of the Geoscience Program, Drexel professors who are members of the Geoscience Faculty Committee, or by visiting professors.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

German

Courses

GER 101 German I 4.0 Credits

Introductory German. Includes listening, reading, writing, and speaking. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GER 102 German II 4.0 Credits

Continues GER 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 101 [Min Grade: C]

GER 103 German III 4.0 Credits

Continues GER 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 102 [Min Grade: C]

GER 201 German IV 4.0 Credits

Intermediate German. Includes grammar review, listening, speaking, and reading. Recommended for students who wish to attain oral competence. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 103 [Min Grade: C]

GER 202 German V 4.0 Credits

Continues GER 201. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 201 [Min Grade: C]

GER 203 German VI: Conversation & Composition 4.0 Credits

Provides intensive practice in comprehension and written and oral communication. Emphasizes development of writing skills and increased oral competence in everyday situations. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 202 [Min Grade: C]

GER 310 Advanced Writing and Speaking 4.0 Credits

This course provides advanced practice in written and oral communication, including journalistic, professional, and creative writing. Examines contemporary cultural contexts through media and news.

Examines contemporary cultural contexts through media and news.

Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 202 [Min Grade: C]

GER 311 [WI] Introduction to German Stylistics 3.0 Credits

Provides advanced practice in comprehension and written and oral communication, based primarily on periodicals and contemporary media. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 203 [Min Grade: C]

GER 312 [WI] German Stylistics 3.0 Credits

Continues GER 311. Provides extensive study of the techniques of translation and communication. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 311 [Min Grade: C]

GER 313 [WI] Advanced German Stylistics 3.0 Credits

Continues GER 312. Provides advanced training in oral and written communication in German. Particularly recommended for students who have pre-proficiency status, German minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GER 312 [Min Grade: C]

GER 320 Introduction to Language for the Professions 3.0 Credits

This course provides an introduction to communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

GER 330 Introduction to Identities and Communities 3.0 Credits

This course provides an introduction to the analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C]

GER 331 Introduction to Studies in German Literature 3.0 Credits

Advanced German. Reading, writing, and extensive conversational practice, based on masterpieces of German literature.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 332 Studies in German Literature 3.0 Credits

Includes reading and oral and written analysis of representative texts in German literature, including familiarization with the historical and cultural contexts. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 333 Advanced German Literature 3.0 Credits

Continues GER 332. Provides advanced study of German literature.

Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 340 Introduction to Power and Resistance 3.0 Credits

This course provides an introduction to the analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C]

GER 350 Introduction to Language, Media, and Society 3.0 Credits

This course provides an introduction to the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C]

GER 351 Introduction to Business and Professional German 3.0 Credits

Provides intensive oral practice and written work in business, professional, and commercial German. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 352 Business and Professional German 3.0 Credits

Advanced business and professional German. Advanced practice in oral and written German for business and the professions. Based on advanced texts, periodicals, and technical journals.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 353 Advanced Business and Professional German 3.0 Credits

Provides advanced study in business and professional terminology, with emphasis on the structure and protocols of the business world. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 371 Special Studies in German Civilization & Culture 3.0 Credits

Presents an integrated approach in German to the civilization, culture, history, and literature specific to the areas in which the language is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: GER 312 [Min Grade: C]

GER 410 Advanced Grammar and Translation 3.0 Credits

German 410 provides advanced grammar instruction and fosters translation and communication skills within a contemporary cultural context. The content of GER 410 may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 411 [WI] Special Studies in Advanced German Stylistics 3.0 Credits

Continues GER 313. Particularly recommended for students who have proficiency status, German minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: GER 312 [Min Grade: C]

GER 420 Advanced Studies in Language for the Professions 3.0 Credits

This course provides advanced communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 430 Advanced Studies in Identities and Communities 3.0 Credits

This course provides an advanced analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 431 [WI] Special Studies in Advanced German Literature 3.0 Credits

Continues GER 333. Particularly recommended for students who have proficiency status, German minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: GER 312 [Min Grade: C]

GER 440 Advanced Studies in Power and Resistance 3.0 Credits

This course provides an advanced analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 450 Advanced Studies in Language, Media, and Society 3.0 Credits

This course provides an advanced analysis of the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of this course may change every term it is offered and is repeatable for credit. Taught in German.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: GER 310 [Min Grade: C] and (GER 320 [Min Grade: C] or GER 330 [Min Grade: C] or GER 340 [Min Grade: C] or GER 350 [Min Grade: C])

GER 451 Special Studies in Advanced Business and Professional German 3.0 Credits

Continues GER 353, with emphasis on the structure and protocols of the European Union. Particularly recommended for students who have proficiency status, German minors, and students interested in graduate study and/or international careers. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: GER 312 [Min Grade: C]

GER 471 [WI] Special Studies in German Civilization 3.0 Credits

Presents an integrated approach, at the advanced level, to the civilization, culture, history, and literature of a given period specific to the areas in which German is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: GER 312 [Min Grade: C]

GER 480 German Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GER I199 Independent Study in GER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER I299 Independent Study in GER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER I399 Independent Study in GER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER I499 Independent Study in GER 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER T180 Special Topics in German 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER T280 Special Topics in Germany 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER T380 Special Topics in German 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GER T480 Special Topics in German 0.5-12.0 Credits

Recommended for German minors and for students with proficiency status. Offered all terms. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Global Studies

Courses

GST 190 Global Research Methods 3.0 Credits

Introduction to research and writing in Global Studies. It covers quantitative, qualitative, and mixed approaches to GST research. Students learn to use international studies research databases and the websites of international organizations. Drawing on the content areas from the four GST concentrations, students construct a research design for a topic of their choice.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GST 225 Women and Human Rights Worldwide 3.0 Credits

Women's human rights emerged in the 1980's as a special area, distinct from existing human rights norms. They are intended to better defend women's rights throughout the world. This class will consider women's human rights in a global context, looking at all parts of the world. We will examine women's rights around various topics such as health, social position, exile, war, censorship, childhood, and work. Academic literature, fiction, and film will all contribute to an understanding of the topic.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GST 230 Women Arab Writers 3.0 Credits

From Maghrebian Algeria and Morocco to Middle Eastern Egypt and Iraq and Lebanon, Arab women writers depict life in their countries or an unnamed desert state, from the 1940's to the Iraq War, raising critical questions about society, politics, economics and woman's place in doing so.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GST 235 African Francophone Women Writers 3.0 Credits

An introduction to the writing of some Francophone women writers from West and Sub-Saharan Africa. With each writer, the status, roles and challenges of women in their respective countries and societies will be examined.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GST 260 Evil Isms 3.0 Credits

From antisemitism to totalitarianism in the name of religion or politics (communism, nazism) to terrorism, this course focuses on prejudices and ideologies, how they variously expressed themselves negatively throughout time and space to the present, how they have been counteracted or still, always, do need counteracting.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GST 320 Building Global Bridges 3.0 Credits

This course is designed to develop an understanding of international development. Students learn about the practical challenges of development work from local needs to grant writing, fundraising, implementation strategies, and project evaluation. They study the theoretical and practical frameworks for poverty reduction and democracy development as well as the agencies involved.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GST 359 Culture and Values 3.0 Credits

This course provides an in-depth comparative study of the historical, social and cultural imperatives of major world civilizations, with particular emphasis on the philosophical and cultural diversity of today's global society. This class is required for, and restricted to, GST majors. Students will also be guided through the process of writing a thesis on a topic of interest to them, and that builds on their experience as a GST major.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GST 360 Civilizations 3.0 Credits

This is an interdisciplinary seminar designed to give students an understanding of the modern cultural attitudes, ethical values, and sociopolitical norms of major civilizations in a given geographical area and their relationship to one another. The content of GST 360 may change every term it is offered and is repeatable for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

GST 370 Iran Then and Now 3.0 Credits

This course explores some of Iran's past (18th and 19th centuries) but focuses on the 20th and 21st centuries. Politics, culture, religion, literature and film will be studied through Iranian eyes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GST 435 Model Organization of American States 3.0 Credits

Prepares students to participate in a model session of the Organization of American States (OAS) in Washington D.C. Covers international political economy, structure and operation of OAS, characteristics of designated country, and public speaking and debate. Open to Global Studies majors only.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 5 times for 18 credits

GST I399 Independent Study in Global Studies 1.0-12.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 48 credits

GST T280 Special Topics in Global Studies 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 48 credits

GST T380 Special Topics in Global Studies 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 108 credits

Graphic Design

Courses

VSCM 100 Computer Imaging I 3.0 Credits

This course explores current potentials, limitations, and issues related to use of computer software for design applications. Projects include graphics creation and manipulation; image acquisition, creation and manipulation; text creation and manipulation; typography; input and output options and control; hardware/software/system fundamentals; and troubleshooting.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

VSCM 140 Calligraphy 3.0 Credits

Covers the skills and understanding of letterforms as geometry and type, development of hand/eye skill in letter-forming, investigation of solids and voids, and use of traditional and modern tools and materials. Studio.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 110 [Min Grade: D]

VSCM 200 Computer Imaging II 3.0 Credits

Provides continued study of electronic imaging with emphasis on Graphic Design process for print and screen design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSCM 100 [Min Grade: D]

VSCM 230 Visual Communication I 4.0 Credits

Provides an overview of graphic design as an applied art. Covers the given, the formal, and the psychological aspects of graphic design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]

VSCM 231 Visual Communication II 4.0 Credits

Continues VSCM 230. Covers corporate identity and explores logo development using the pictorial mark, typographic solution, and abstract interpretation as symbols of identity.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSCM 230 [Min Grade: D]

VSCM 232 Visual Communication III 4.0 Credits

Examines problems in graphic design on the relationship between designer and client, including solving specific situations of image-making with emphasis on the total identity of an organization, firm, or publication. Involves extensive exploration of color and imagery. Studio.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSCM 231 [Min Grade: D]

VSCM 240 Typography I 3.0 Credits

Uses the history of type as the backdrop for the introduction to the art and craft of conventional through state-of-the-art typesetting as well as the creative and extraordinary use of type. Focuses on the letter, word, and sentence. Studio/lecture.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Prerequisites: VSST 101 [Min Grade: D] or VSST 104 [Min Grade: D] or VSST 108 [Min Grade: D]

VSCM 241 Production 3.0 Credits

Covers traditional and electronic means of print production. Explores alternate means of production and various printing and output methods. Studio.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Prerequisites: VSCM 240 [Min Grade: D]

VSCM 242 Typography II 3.0 Credits

Continues VSCM 240. Broadens the scope to deal with the paragraph and the typeset page, with increased attention to the importance of subtleties and refinements. Explores the differing requirements of type in relationship to pictorial images.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Prerequisites: VSCM 240 [Min Grade: D]

VSCM 247 On Screen Typography 3.0 Credits

This course develops a visual sensitivity to typographical compositions on screen while expanding knowledge of current technologies.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM or major is GRDS.

VSCM 330 Visual Communication IV 4.0 Credits

Examines problems in information graphics, including signage, environmental graphic design, and exhibit design. Studio.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Prerequisites: VSCM 232 [Min Grade: D]

VSCM 331 Visual Communication V 4.0 Credits

Focuses on techniques and methods of advanced problem solving. Through a series of three projects, the student learns to analyze conceptual and contextual relationships pertinent to any visual communication assignment. Studio.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Prerequisites: VSCM 330 [Min Grade: D]

VSCM 340 Typography III 3.0 Credits

Typography III concentrates on the exploration and management of large blocks of text in specific design problems. Special emphasis will be placed on the style and readability of typographic treatments.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Prerequisites: VSCM 242 [Min Grade: D]

VSCM 350 [WI] Graphic Design: 20th Century and Beyond 3.0 Credits

Concentrates on impact and significance of the graphic design profession in society through the history and movements of the profession and the work of 20th-century masters of visual communication. Students will analyze conceptual and contextual relationships and develop greater awareness of stylistic content and its relevance to the culture. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

VSCM 360 Design on Site 3.0 Credits

Weekly visits to studios of various design disciplines such as small graphic design offices, environmental graphic design firms, advertising agencies, book and magazine publishers, and website developers. A written report is due at the end of the term.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: VSCM 232 [Min Grade: D]

VSCM 370 Experimental Publication Design 3.0 Credits

This course concentrates on exploring alternative formats and unique delivery systems for the transfer of information. Special emphasis is placed on developing appropriate imagery for the defined readership, formatting, the use of a comprehensive grid system and the development of a wayfinding system for the publication. The course will build a greater awareness of proportion, readability and information transfer, and will reinforce the use of color as a visual communication tool.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

VSCM 399 Independent Study in Graphic Design 0.5-12.0 Credits

Provides individualized study in graphic design in a specialized area of study. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is GRDS and classification is Junior or Senior.

VSCM 430 Visual Communication VI 4.0 Credits

Continues VSCM 331. Explores three-dimensional graphic design processes and techniques for communication, including problems of scale, material, form, and function. Emphasizes package design. Includes point-of-purchase design. Studio.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Prerequisites: VSCM 331 [Min Grade: D]

VSCM 440 Book Design 4.0 Credits

Investigates design of books, from their pre-Gutenberg origins to contemporary technology of design, binding, paper, and finishing. Includes multiple page formats, production grids, and sequential images. Lecture/studio.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Prerequisites: VSCM 331 [Min Grade: D] or ADGD 310 [Min Grade: D] or EVGD 220 [Min Grade: D] or WMGD 220 [Min Grade: D]

VSCM 450 Professional Portfolio 3.0 Credits

Focuses on the preparation of a professional Graphic Design portfolio. A critical process that includes the screening of completed projects, reworking or expanding projects, and reconstructing/creating final portfolio components. A formal interview presentation of the portfolio is also explored and refined.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: VSCM 430 [Min Grade: D] or ADGD 320 [Min Grade: D] or EVGD 320 [Min Grade: D]

VSCM 455 Electronic Portfolio 3.0 Credits

Focuses on the design and production of a web based Graphic Design portfolio using web graphics and imagery through visuals, motion and sound within the software programs of Dreamweaver & Flash.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: VSCM 232 [Min Grade: D]

VSCM 460 Professional Practice 3.0 Credits

Covers running a design office, including basic contracts, fee structures, and the design process. Explores types of design offices; working with suppliers, printers, photographers, and illustrators; scheduling; resumes and portfolios; taxes; and marketing of graphic design services. Lecture/field work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSCM 430 [Min Grade: D]

VSCM 465 Special Topics in Graphic Design 3.0-12.0 Credits

Provides study in graphic design on a special topic or on an experimental basis. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSCM 477 Graphic Design Seminar 3.0 Credits

Provides a forum for discussion of current ideas in design, with a focus on print and broadcast advertising graphics. Includes presentations by invited professionals. Requires board presentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is GRDS and classification is Junior or Senior.

VSCM 478 Graphic Design Seminar: Advanced Techniques 3.0 Credits

An exploration for the subtleties that distinguish excellence in graphic design print, web and motion venues. Selections include: Advanced Typography and Electronic Portfolio.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Prerequisites: VSCM 340 [Min Grade: D]

VSCM 479 Graphic Design Seminar: Advanced Media 3.0 Credits

An exploration of advanced media development in Graphic Design as relevancy and currency demands. Selections include: Illustration I and II and Bookmaking.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is GRDS.

VSCM 480 [WI] Graphic Design Seminar: Design Perceptions 3.0 Credits

An exploration of how graphic designers use visual communications tools and how audiences perceive them. Selections include: History of Visual Propaganda and Deconstruction Advertising. May be repeated for credit if topic varies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

VSCM 482 Graphic Design for Cultural Organizations 3.0 Credits

Students experience firsthand how design can enhance the mission of cultural organizations, what it takes to develop innovative outreach programs, and how to apply for grants to achieve their creative endeavors. Projects assigned will be live, and will be conducted in and outside of the classroom.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: VSCM 430 [Min Grade: D] or ADGD 320 [Min Grade: D] or EVGD 320 [Min Grade: D] or WMGD 421 [Min Grade: D]

VSCM 485 Annual Report Design 3.0 Credits

Development and analysis of the corporate annual report as a graphic design concept and as a developed marketing tool.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSCM 340 [Min Grade: D]

VSCM 496 Senior Thesis Graphic Design 3.0 Credits

Requires each student to define a problem and set a goal and strategies, develop a concept, and carry out a solution. Divides time among research, design, thematic development, and final presentation. Requires instructor approval of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSCM 430 [Min Grade: D]

VSCM I199 Independent Study in Graphic Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSCM I299 Independent Study in Graphic Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSCM I399 Independent Study in Graphic Design 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSCM I499 Independent Study in Graphic Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSCM T180 Special Topics in Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSCM T280 Special Topics in Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSCM T380 Special Topics in Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSCM T480 Special Topics in Graphic Design 3.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Greek

Courses

GREC 101 Modern Elementary Greek I 4.0 Credits

The goal of this course is to provide a thorough foundation in Greek language with emphasis on communication. Small class size provides intensive practice in speaking, writing and listening comprehension.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GREC 102 Modern Elementary Greek II 4.0 Credits

The goal of this course is to provide a thorough foundation in Greek language with emphasis on communication. Small class size provides intensive practice in speaking, writing and listening comprehension. Builds on Greek 101.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GREC 101 [Min Grade: D]

GREC 103 Modern Elementary Greek III 4.0 Credits

The goal of this course is to provide a thorough foundation in Greek language with emphasis on communication. Small class size provides intensive practice in speaking, writing and listening comprehension. Builds on Greek 102.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GREC 102 [Min Grade: D]

GREC 201 Intermediate Modern Greek I 4.0 Credits

Emphasizes complex grammatical and syntactical phenomena of the Modern Greek language through oral communication and texts. Students examine idiomatic nuances and special features of the language. Skills in speech, reading comprehension and writing are further developed at this level. This course counts toward the completion of a Minor in Greek Studies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: GREC 103 [Min Grade: D]

GREC 212 Introduction to Greek Folklore 3.0 Credits

Greek folklore developed when the Greek nation was born. Using folklore, Greeks try to preserve their traditions and define their cultural identity. The class explores major folklore topics and interpretive techniques. It provides examples and analyses of particular folklore forms, events and expressions of the Greek culture.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GREC 225 Introduction to Greek Music & Dance 3.0 Credits

This course studies Greek music and dance historically by a) exploring performance events and b) focusing on certain music and dance genres and music groups/musicians. How does music and dance help Greeks express who they are? Formal music training and the ability to read Western staff notation is not required.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GREC 280 Communicate in Greek: Philoxenia 3.0 Credits

The Greek word for hospitality is philoxenia, which literally means "love for the foreigners". The goal of this course is a) to provide a foundation in Greek language with emphasis on communication and b) the construction of a basic vocabulary and useful phrases students need in order to effectively communicate in simple, everyday life situations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

GREC 313 Greek History, Economy & Society 3.0 Credits

Greece's geographic location is strategic as a connecting link between East and West and a crossroads amongst three continents that embraces various influences. Crete holds a significant tourist, economic and social role. Our goal is to understand the challenges that historically have been rising in relation to today's global world.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

GREC 380 Special Topics in Greek Studies 1.0-4.0 Credit

Provides topics that cover various subjects in Greek time and space, such as geography, history, economy, civilization, culture and the arts.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

GREC I199 Independent Study in GREC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GREC I299 Independent Study in GREC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GREC I399 Independent Study in GREC 1.0-3.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for NaN credits

GREC I499 Independent Study in GREC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GREC T180 Special Topics in Greek Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GREC T280 Special Topics in Greek Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

GREC T380 Special Topics in Greek Studies 1.0-4.0 Credit

Provides topics that cover various subjects in Greek time and space, such as geography, history, economy, civilization, culture and the arts.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

GREC T480 Special Topics in Greek Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Health & Society

Courses

HLSO 101 Intro to Health & Society 1.0 Credit

Designed as an introduction to health and health care beyond the clinical environment, this course introduces students to the intersection of health and society by means of weekly lectures on various aspects of health and health care in relation to societal concerns and needs.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HLSO 301 Rhetoric and Reality of Health Care 3.0 Credits

The dissemination of information on health care and the language involved in the information are key factors in determining how the individual responds to health-care issues and treatment. This course will examine the nature of rhetoric as it influences health-care decisions at a societal and at an individual level.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 302 Consumer-Driven Health Care 3.0 Credits

This course focuses on how market economics and personal responsibility combine to drastically change health-care insurance saving, utilization, and satisfaction. Effects on employers, health-care providers, hospitals, and insurers are examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 303 Urban Health Care 3.0 Credits

Using an ecological model to analyze the special needs and issues in urban health care, students will examine the people, place, and politics of an urban area to assess the delivery and quality of health care and will complete an analysis of a real and current urban health care delivery problem, including solutions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 304 Health Care and Quality Improvement 3.0 Credits

Quality Improvement (QI) is a critical component of the health-care delivery system in the United States. Because errors and reliability issues have major implications, standards and measures are imperative to ensure consistency and safety. As such, this course examines existing program in place and best-industry practices.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 305 Health Promotion and Wellness 3.0 Credits

Students will study the seminal international and U.S. documents that founded the health-promotion and wellness movement and will examine the use of health promotion in improving the health of individuals, groups, communities, and populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 306 Human Services & Health Systems 3.0 Credits

This course introduces existing health-care systems in the United States and globally in terms of the human services that support and are supported by those systems and the effect of human services on those systems and vice versa.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 307 Disaster Planning and Health Care 3.0 Credits

This course examines the unique challenges to managers of health-care institutions, in-patient populations, providers of care, and the public health and safety systems during a disaster, as well as the complex relationships between and among government officials, first responders, and the public regarding disaster planning and during a crisis.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 308 Concepts of Injury Prevention 3.0 Credits

This course focuses on the epidemiology of injury prevention and control in the public sector. Mechanisms of injury and risk factors for accidental injury and death are examined. Various prevention strategies are reviewed, as is a look to the future of injury prevention.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 309 Health Fads, Trends & Myths 3.0 Credits

We are part of a society bombarded with fads, trends, and myths of all types, and health care is no exception. Distinguishing one from the other is a tricky business. This course will help separate fads from both trends and myths and all three from evidence-based therapies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 310 Children & Health Care 3.0 Credits

This course will focus on a range of issues facing the health-services industry in providing care to children with the goal of better understanding and meeting the special needs and challenges from both a direct care and systematic point of view.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 313 AIDS, Society & Health Care 3.0 Credits

This course will look at the impact of HIV/AIDS on health care from a patient, provider, societal, and systems perspective. We will address how this local and national global pandemic affects societies and health services throughout the world.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HLSO 314 Human Sexuality & Health Care 3.0 Credits

This course explores human sexuality in relation to individual and societal attitudes and examines the role of health care in effectively dealing with and treating issues arising from human sexual dysfunctions, diseases, myths, phobias, and other concerns.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 319 Health Care Legislation 3.0 Credits

This course will examine the major roles played by local, state, and federal governments in the funding, delivery, oversight, and evaluation of health care services. The rationale, history, and current examples of how localities protect the public health are given.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 320 Individual and Health Care Politics 3.0 Credits

Health care policy can easily become questions of statistics and spreadsheets that obscure their origins in individual experience. Drawing upon a series of personal essays, this course will discuss the power of first-hand experience in shaping health care discourse.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 321 Health Issues and the Environment 3.0 Credits

This course provides a general review of the leading environmental health issues of today by identifying historical, political, societal, and medical approaches to safeguarding population health from the environmental, while protecting and preserving the environment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 322 Ideologies & Health Care 3.0 Credits

This course will examine the role of political, religious, cultural, and philosophical ideologies on societies -- past and present -- in terms of the nature and delivery of health care, as well as the effects of these ideologies on the health and well-being of the societies as a whole and of the individuals comprising the societies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 327 Health & Illness in Film 3.0 Credits

This course analyzes various films with themes and stories related to health and illness in view of conceptual theories on health and illness and copetual elements of film as a representational medium.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HLSO 329 Grief & the Healing Arts 3.0 Credits

Grief is a typical response to loss as, for example, in the loss of a human life, a body part, a former state of existence, or a valued pet. This course will examine grief and the role of the arts as a therapeutic means of dealing with grief and loss both in terms of professional health care giver and the grieving individual.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] and ENGL 102 [Min Grade: D] and ENGL 103 [Min Grade: D]

HLSO 370 Spec Topics in Health & Society 3.0 Credits

This course covers topics of particular interest in health and society. In different terms, a variety of topics will be presented to the students. Students may repeat the same course, but not the same topic. Students majoring in health and society will have first preference.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Sophomore or Senior.

Prerequisites: ENGL 101 [Min Grade: D] and ENGL 102 [Min Grade: D]

HLSO 470 Readings in Health & Society 1.0-6.0 Credit

This course is designed to allow approved junior and senior students with cumulative GPA's of at least 3.0 to pursue specialized interests in specific topics in health and society under the supervision of an appropriate faculty member. This course, but not the same topic, may be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 12 credits

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: ENGL 101 [Min Grade: D] and ENGL 102 [Min Grade: D] and ENGL 103 [Min Grade: D]

HLSO 490 Senior Research Project 3.0 Credits

Designed for seniors in Health and Society, the student, in conjunction with a faculty member, selects a topic for a term project integrating knowledge acquired in the curriculum. The student develops objectives relevant to the project, critiques the literature, presents a plan for implementation, and completes the project.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HLSC and classification is Senior.

Prerequisites: ENGL 101 [Min Grade: D] and ENGL 102 [Min Grade: D] and ENGL 103 [Min Grade: D]

Health Sciences

Courses

HSCI 125 Medical Terminology 3.0 Credits

This course is an introduction to the language of medicine intended as foundational for future study and professional practice. Students will study the basic vocabulary of medicine as well as the structure underlying that vocabulary in order to enhance future study and education.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HSCI 201 Health Assessment through the Lifespan 4.0 Credits

Course focuses on health assessment across the lifespan. The focus is on the development of interviewing skills, assessment of health status, and physical examination skills for the beginning health professional student.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 103 [Min Grade: D]

HSCI 204 Clinical Health Informatics 3.0 Credits

This course examines technology and the tools of the Internet, with a focus on the use of cyber-technology and select computer applications. The automation of data management through information systems, expert systems, and telecommunication, and the impact of technology on health care education and research are addressed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CS 161 [Min Grade: C]

HSCI 205 Strategies for Academic Success 1.0 Credit

This course helps students to explore the learning process, to gain essential skills needed to achieve academic success and to develop the ability to make effective use of university resources. Discussion, personal reflection, and relevant electronic resources are used to foster students' development as self-directed learners. Specific attention will be given to the following topics: study skills, learning strategies, time management, academic planning, test-taking techniques, and goal-setting. The goal of this course is to help improve students' efficacy in the areas of academic self-management, self-direction, and resource utilization.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HSCI 301 Pharmacology I 3.0 Credits

This course introduces health professional students to the principles of pharmacology and drug therapies, pharmacologic-therapeutic classes of drugs and important drug information resources.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 103 [Min Grade: D]

HSCI 302 Pharmacology II 3.0 Credits

This course focuses on common drugs used in the treatment of disorders of cardiovascular, renal, respiratory and gastrointestinal systems, anti-infective and anti-inflammatory agents, immune and biologic modifiers and chemotherapeutic agents, and miscellaneous hematologic, dermatologic, ophthalmic, and otic agents.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HSCI 301 [Min Grade: D]

HSCI 310 Introduction to Clinical Research 4.0 Credits

This course provides a comprehensive introduction to the principals and practices underlying clinical research. Topics to be covered include: the protection of human subjects, scientific misconduct, asking clinical research questions, conducting literature searches, critical appraisal of the health literature, and evidence based practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HSCI 313 Clinical Trials Protocols 4.0 Credits

Students learn to design and implement a clinical trial protocol. Topics include experimental design, research team member roles and management of clinical trials. Special research techniques for special populations are considered. Means of preventing scientific misconduct through proper monitoring are discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HSCI 310 [Min Grade: D] and STS 350 [Min Grade: D] and COM 320 [Min Grade: D]

HSCI 315 Current Issues in Clinical Research 3.0 Credits

This course is designed to discuss current issues and controversies impacting clinical research. There will be a focus on critical appraisal of health-related studies attracting media attention. Other topics may include: ethical dilemmas when performing clinical research; how clinical research informs healthcare policy; and how clinical research impacts healthcare practice of in a culture of evidence-based medicine.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HSCI 325 Exercise Physiology 4.0 Credits

This course examines the acute and chronic effects of exercise on human physiology. Topical areas include neuromuscular physiology, cardiopulmonary, energy metabolism, nutrition, exercise evaluation, body composition, exercise prescription, and influence of environmental factors and clinical conditions on response to exercise.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 101 [Min Grade: D] and ANAT 102 [Min Grade: D] and ANAT 103 [Min Grade: D]

HSCI 326 Applied Anatomy and Kinesiology 4.0 Credits

This course applies the foundations of anatomy and physiology to the study of human movement, with emphasis on normal motions of the musculoskeletal system. Topical areas include musculoskeletal anatomy, neuroanatomy, biomechanics, lever systems, and the influence of musculoskeletal disease and injury in normal movement.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 101 [Min Grade: D] and ANAT 102 [Min Grade: D] and ANAT 103 [Min Grade: D]

HSCI 337 Genetics and Health 3.0 Credits

This course covers the fundamentals of human genetics from a healthcare perspective. The course presents concepts of classical genetics, outlines molecular mechanisms of heredity, and explores the evolving technological advances in DNA modifications and analysis. The course emphasizes the importance of the health professional in enhancing patient understanding of the impact of genetic technology in healthcare decisions. Additional topics include genetic counseling, assisted reproductive technologies and personal genomics.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: BIO 122 [Min Grade: D]

HSCI 375 Fundamentals of Toxicology 4.0 Credits

Toxicology is an applied science that studies the adverse effects of toxins on the human body. This course is an upper level elective that introduces students to the basic principles of toxicology. The concepts covered in the course include toxicokinetics (toxin absorption, distribution, metabolism and excretion), toxicodynamics (toxin site and mechanism of action), carcinogenesis, and environmental toxicology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 101 [Min Grade: D] and ANAT 102 [Min Grade: D] and ANAT 103 [Min Grade: D]

HSCI 415 Musculoskeletal Pathophysiology 4.0 Credits

Introduction to the study of diseases, disorders and injuries of the musculoskeletal system. The biomechanics of connective tissue and basic science of inflammation, repair, regeneration and fibrosis are discussed. Students learn the pathogenesis, pathophysiology and clinical presentation of selected musculoskeletal disorders. The concepts of epidemiology and risk factors are considered.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 101 [Min Grade: D] and ANAT 102 [Min Grade: D] and ANAT 103 [Min Grade: D]

HSCI 430 Developmental Anatomy 4.0 Credits

This course expands upon the student's knowledge of anatomy by describing the events involved in the formation of organ systems in the developing human. The laboratory portion of the course examines congenital defects of the systems and discusses possible causes and treatments from a clinical perspective.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 101 [Min Grade: D] and ANAT 102 [Min Grade: D] and ANAT 103 [Min Grade: D]

HSCI 440 Emerging Technologies in Healthcare 3.0 Credits

This course explores recent developments in the emerging fields of regenerative medicine, genomics and nanomedicine. Through lectures and assigned readings students will be introduced to fundamental concepts of stem cell biology, tissue engineering, genomic testing, and nanobiotechnology. Emphasis will be placed on clinical applications of these technologies, as well as their impact on the changing role of healthcare providers.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HSCI 470 Readings in Health Sciences 1.0-6.0 Credit

This course is designed to allow upper-class student to pursue specialized interests in specific topics in the health sciences. May be repeated twice for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 12 credits

Restrictions: Can enroll if classification is Junior or Senior.

HSCI 490 Senior Research Project 3.0 Credits

In this course, the student, with faculty supervision, selects a topic for a term project that integrates the academic and practical knowledge the student has acquired in his/her curriculum. The student develops objectives relevant to the project, critiques the literature, presents a plan for implementation, and completes the term project.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

HSCI T180 Special Topics in Health Sciences 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSCI T280 Special Topics in Health Sciences 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSCI T380 Special Topics in Health Sciences 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSCI T480 Special Topics in Health Sciences 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 4 times for 24 credits

Health Services Administration

Courses

HSAD 205 Strategies for Academic Success 1.0-3.0 Credit

This course helps students to explore the learning process, to gain essential skills needed to achieve academic success and to develop the ability to make effective use of university resources. Discussion, personal reflection, and relevant electronic resources are used to foster students' development as self-directed learners. Specific attention will be given to the following topics: study skills, learning strategies, time management, academic planning, test-taking techniques, and goal-setting. The goal of this course is to help improve students' efficacy in the areas of academic self-management, self-direction, and resource utilization.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HSAD 210 Health-Care Ethics I 3.0 Credits

This course addresses introductory concepts and basic issues in health-care ethics. The topics include but are not limited to decision-making, professionalism and advocacy, confidentiality, truth-telling and informed consent.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: C] or ENGL 102 [Min Grade: C] or ENGL 103 [Min Grade: C]

HSAD 309 Advanced Health-Care Ethics 3.0 Credits

This course builds on the foundation provided in Health Care Ethics and discusses such issues as chronic care, end of life, beginning of life, distributive justice and the right to health care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HSAD 210 [Min Grade: C]

HSAD 310 Introduction to Health-Systems Administration 3.0 Credits

The course is designed to assist the student in understanding and preparing for the unique challenges presented to managers in a health services administration career. History and current milieu of U.S. health care are considered, as well as the ever changing infrastructure of the health-services industry.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: C] or ENGL 102 [Min Grade: C] or ENGL 103 [Min Grade: C]

HSAD 312 Development of World Health Care 3.0 Credits

This course examines a broad overview of the ongoing development of health-care policies, availability, and philosophy in a cross-section of countries by means of detailed case studies to examine both common and unique challenges and solutions, as well as global responses, to crises, such as plagues, epidemics, and natural disasters.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 313 Evolution of Health Care in the United States 3.0 Credits

This course will cover the evolution of health care in the U.S. from pre-colonial times to the present by discussing improvements in treatment institutions, modalities, philosophies and access to care, as well as the impact of major events in history on health-care discoveries on the delivery and administration of health services in the United States.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HSAD 315 Interdisciplinary Health Services 3.0 Credits

This course focuses on the role, responsibilities, scope of practice, and special concerns of health-care providers and their disciplines. The concept of interdisciplinary health-care practice is examined, along with basic concepts of teamwork and team formation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 316 Health Care across Cultures 3.0 Credits

Living in a pluralistic society poses many challenges and opportunities. This course examines the impact of cultural upon health-care decision. Concepts such as "health," "illness," "culture," "ethnicity," will be analyzed. Traditional and alternative approaches to the delivery of health care will be addressed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 317 Religious Views on Health Care 3.0 Credits

Addresses the impact of a person's religious beliefs on the need for and delivery of health care. Specific issues will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or HUM 101 [Min Grade: D]

HSAD 318 Health and Vulnerable Populations 3.0 Credits

Vulnerable populations, those with special needs for or barriers to care, have a significant impact upon health care, both in terms of meaning and delivery. This course looks at the meaning of health through the eyes of various distinct vulnerable populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 319 Women and the Health Professions 3.0 Credits

This course explores women's early and controversial roles as health-care providers, the influence of government and the church on women, and key contributions by women in the health professions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or HUM 101 [Min Grade: D]

HSAD 320 Managed Health Care 3.0 Credits

This course provides the student an opportunity to survey the major concepts and operational considerations of the provision of health-care services in a managed-care environment. The regulatory landscape as well as the physician/patient relationship is considered as a key to understanding the managed health care environment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 321 Health-Care Human Resources 3.0 Credits

An introduction to the basic principles of human-resource management and their practical application in today's complex health-care organization. This course examines the role of human resources as a strategic partner within the organization.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HSAD 310 [Min Grade: C] and HSAD 334 [Min Grade: C]

HSAD 322 Health-Care Law 3.0 Credits

Provides an overview of the major laws affecting health-care professionals and examines the current legal climate in health care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: C] or ENGL 102 [Min Grade: C] or ENGL 103 [Min Grade: C]

HSAD 323 Health Services and the Elderly 3.0 Credits

This course covers a broad spectrum of health-care issues and concerns facing today's elderly, such as health-care coverage, living arrangements, acute and long-term-illness management, enhanced quality of life issues, and gender-specific health concerns.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 324 Health Technology and Ethical Responsibility 3.0 Credits

Developments in health care technology challenge many of our common assumptions about basic concepts such as health, disease, and normality. This course encourages students to consider some of the issues raised by changing health technology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HSAD 210 [Min Grade: C] or PHIL 321 [Min Grade: C]

HSAD 325 Issues in Health Care System 3.0 Credits

This course provides the student with the opportunity to analyze management problems that are of current importance in today's health-care industry on a national and international level.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 326 Holism and Health Care 3.0 Credits

Details the development of medicine from the late nineteenth century to the present in view of the corresponding rise of interest in a holistic approach to health care by means of alternative and complementary medicine in relation to traditional medical practices.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 327 Partnerships in Health Care 3.0 Credits

Addresses health service as a collaborative venture identifying the primary stakeholders and partners in the administration of health care including clinicians, administrators, institutions, industry, private and governmental agencies, and the patient. In addition, practical strategies for developing effective partnerships are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 328 Health Care for Diverse Groups 3.0 Credits

Examines the administration of health services and special needs to different subpopulations classified according to gender, ethnicity, race, weight (the obese), and sexual orientation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D] or HUM 106 [Min Grade: D]

HSAD 329 Health Care and the Media 3.0 Credits

Much of the public's perception of issues in health care comes from the media (newspapers, magazines, television, film, advertising, the internet). The course explores the interactive relationship between health care and the media in presenting information to the public.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A] or HUM 108 [Min Grade: D]

HSAD 330 Financial Management in Health Care 3.0 Credits

Emphasizes basic financial management theory related to the health-care industry, as well as accounting practices for health-care organizations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 115 [Min Grade: D] or ACCT 110 [Min Grade: D]

HSAD 331 [WI] Non-profits and Health Care 3.0 Credits

Provides an overview of the not-for-profit and advocacy sector of health care, explores business fundamentals and current models, selects a health topic, assesses the market, and assists students in developing their own not-for-profit and/or advocacy business.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HSAD 310 [Min Grade: C]

HSAD 332 [WI] Health-Care Marketing 3.0 Credits

Provides a comprehensive review of marketing's role in the health-care field by examining the history of health-care marketing, the contributions of marketing to the strategic objectives of health-care organizations, and the effects of marketing on public relations and the consumer.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HSAD 310 [Min Grade: C]

HSAD 333 Health, Illness, and the Arts 3.0 Credits

This course provides the opportunity to examine topics relevant to health and illness as depicted in the arts - primarily literature, film, and painting as well as other arts forms where appropriate.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] and ENGL 102 [Min Grade: D] and ENGL 103 [Min Grade: D]

HSAD 334 Management of Health Services 3.0 Credits

In this course, students will learn forms and uses of traditional management functions - plan, direct, monitor, evaluate - as well as contemporary functions that are used in an array of health care services organizations. Students match skills and competencies within the respective domains of health services management.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HSAD 310 [Min Grade: C]

HSAD 335 [WI] Health-Care Policy 3.0 Credits

This course provides an introduction to the development and implications of U.S. health-care policy, including key governmental and non-governmental participants and the political process.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HSAD 310 [Min Grade: C] and PSCI 110 [Min Grade: D]

HSAD 336 Urban Health Care 3.0 Credits

Using an ecological model to analyze the special needs and issues in urban health care, students will examine the people, place, and politics of an urban area to assess the delivery and quality of health care and will complete an analysis of a real and current urban health-care-delivery problem, including solutions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HSAD 337 Health Care/Quality Improvement 3.0 Credits

Quality Improvement (QI) is a critical component of the health-care-delivery system in the United States. Because errors and reliability issues have major implications, standards and measures are imperative to ensure consistency and safety. As such, this course examines existing programs in place and best-industry practices.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HSAD 338 Human Services & Health Systems 3.0 Credits

This course introduces existing health-care systems in the United States and globally in terms of the human services that support and are supported by those systems and the effect of human services on those systems and vice versa.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HSAD 339 Health Care Legislation 3.0 Credits

This course will examine the major roles played by local, state, and federal governments in the funding, delivery, oversight, and evaluation of health-care services. The rationale, history, and current examples of how localities protect the public health are given.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HSAD 340 Leadership in Health Services Administration 3.0 Credits

This course discusses issues in management and leadership in a health-care-administration setting by focusing on alternative organizational structures and the managerial role in these structures, as well as exploring managerial and leadership roles in specific health organizations and project management.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HSAD 310 [Min Grade: C] and HSAD 334 [Min Grade: C]

HSAD 341 Risk Management in Healthcare Organizations 3.0 Credits

This course is an introduction to risk management in health care. It describes the roles of a risk manager and the risks associated with various health care settings. Regulatory, contractual and medical malpractice exposures are discussed and techniques for controlling and preventing loss are evaluated. Students prepare a risk management plan for a healthcare organization.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HSAD 342 Children and Health Care 3.0 Credits

This course will focus on a range of issue facing the health-services industry in providing care to children with the goal of better understanding and meeting the special needs and challenges from both a direct care and systematic point of view.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HSAD 343 Health and Illness in Film 3.0 Credits

This course analyzes various films with themes and stories related to health and illness in view of conceptual theories on health and illness and conceptual elements of film as a representational medium.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D] and ENGL 102 [Min Grade: D]

HSAD 344 The Individual and Health Care Politics 3.0 Credits

Health-care policy can easily become questions of statistics and spreadsheets that obscure their origins in individual experience. Drawing upon a series of personal essays published in the journal *Health Affairs* and collected into the volume *Narrative Matters*, this course will discuss the power of first-hand experience in shaping health-care discourse.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 101 [Min Grade: D]

HSAD 345 Ethics in Health Care Management 3.0 Credits

This course focuses on one aspect of the role of health care management professionals: the ethical dimension. The course combines an understanding of ethical theory with the practical application of ethical principles to management issues that arise in the health care arena. Discussions will be guided by cases drawn from real work experiences.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HSAD 210 [Min Grade: C] or PHIL 321 [Min Grade: C]

HSAD 346 Mental Illness in the Media and Arts 3.0 Credits

The mentally ill and those who treat them are continually concerned about the portrayals of mental illness in the media and arts. Its often sensationalized and stigmatized image places an extra societal burden on the mentally ill and can lead to attempts to hide their illness rather than seek treatment. This course examines mental illness's social constructs, their sources, and effects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HSAD 351 Ethical Issues in Reproduction 3.0 Credits

This course discusses ethical issues concerning human reproduction. The issues span contraception, abortion, assisted reproductive technologies, parenthood, and balancing fetal and maternal interests. Focus is placed on the variety of perspectives on these issues and underlying values.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HSAD 210 [Min Grade: C] or PHIL 321 [Min Grade: C]

HSAD 352 Ethics in Health Care Research 3.0 Credits

This course is designed to familiarize students with some of the ethical issues involved in health-care research. These issues include, but are not limited to, responsible authorship, use of human subjects, use of animals, defining and handling scientific misconduct, confidentiality, and conflicts of interest.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HSAD 210 [Min Grade: C] or PHIL 321 [Min Grade: C]

HSAD 353 Public Health Ethics 3.0 Credits

This course will address ethical issues in public health. Students will be exposed to a variety of views on topics including, but not limited to, human rights, the balancing of individual rights with public interests, managing disasters, epidemics, risky behaviors, and the meaning of health from a population standpoint.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HSAD 210 [Min Grade: C] or PHIL 321 [Min Grade: C]

HSAD 470 Readings in Health-Services Administration 1.0-6.0 Credit

This course is designed to allow juniors and seniors majoring in health-services administration and carrying minimum cum GPAs of 3.0 to pursue specialized interests in specific topics in health-services administration on an independent basis, yet under the direction of program faculty members. Faculty permission is required. May be repeated twice for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 12 credits

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A] or HUM 108 [Min Grade: D]

HSAD 490 Senior Research Project 3.0 Credits

Designed for the senior in health-services administration, the student, in conjunction with a faculty member, selects a topic for a term project integrating knowledge acquired in the curriculum. The student develops objectives relevant to the project, critiques the literature, presents a plan for implementation, and completes the project.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A] or HUM 108 [Min Grade: D]

HSAD I199 Independent Study in Health Services Administration 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSAD I299 Independent Study in Health Services Administration 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSAD I399 Independent Study in Health Services Administration 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSAD I499 Independent Study in Health Services Administration 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSAD T180 Special Topics in Health Services Administration 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSAD T280 Special Topics in Health Services Administration 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSAD T380 Special Topics in Health Services Administration 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

HSAD T480 Special Topics in Health Services Administration 3.0 Credits

This course covers topics of particular interest to students majoring in health-services administration. In different terms, a variety of topics are presented to the students. May be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A] or ENGL 108 [Min Grade: D]

Hebrew

Courses

HBRW 101 Introduction to Hebrew I 4.0 Credits

The goal of this course is to provide a thorough foundation in the Hebrew language. Small class size provides intensive practice in speaking, writing and listening comprehension.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HBRW 102 Introduction to Hebrew II 4.0 Credits

The goal of this course is to provide a thorough foundation in the Hebrew language. Small class size provides intensive practice in speaking, writing and listening comprehension. Continues HBRW 101.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: HBRW 101 [Min Grade: D]

HBRW 103 Introduction to Hebrew III 4.0 Credits

The goal of this course is to provide a thorough foundation in the Hebrew language. Small class size provides intensive practice in speaking, writing and listening comprehension. Continues HBRW 102.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: HBRW 102 [Min Grade: D]

HBRW 201 Hebrew IV 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on HBRW 103.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: HBRW 103 [Min Grade: C]

HBRW 202 Hebrew V 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on HBRW 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: HBRW 201 [Min Grade: C]

HBRW 203 Hebrew VI 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on HBRW 202.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: HBRW 202 [Min Grade: C]

HBRW I199 Independent Study in HBRW 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HBRW I299 Independent Study in HBRW 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HBRW I399 Independent Study in HBRW 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HBRW I499 Independent Study in HBRW 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HBRW T180 Special Topics in Hebrew 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HBRW T280 Special Topics in Hebrew 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HBRW T380 Special Topics in Hebrew 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HBRW T480 Special Topics in HBRW 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

History

Courses

HIST 101 Introductory Seminar in History I 4.0 Credits

This course introduces freshmen history majors to the study and practice of historical inquiry. The course offers an overview of major themes related to historical practice: methodology, ethics, and professional development. It also introduces students to the history program, inviting them to meet and interact with the faculty of the department and their work.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HIST.

HIST 102 Introductory Seminar in History II 4.0 Credits

This course introduces freshmen history majors to the study and practice of historical inquiry. Introductory Seminar in History II works specifically on historical research and writing skills development; students will learn key debates and concerns in historical methodology and engage in close reading of primary and secondary sources.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HIST.

HIST 161 Themes in World Civilization I 4.0 Credits

We examine development of civilizations from antiquity to the 12th century and view patterns of historical change through key themes and interpretive debates, including political structures, land tenure and social systems, commercial and trade relations, the development of cities, science, and technology, and religions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 162 Themes in World Civilization II 4.0 Credits

Provides an analysis of civilizations from the 12th century to 1815 viewed through key themes and interpretive debates, including the development of the nation-state, interaction between civilizations, the concept of cultural unity, religious upheaval, disease and science, the relationship between culture and politics, and the nature of revolutions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 163 Themes in World Civilization III 4.0 Credits

Explores the emergence of modern civilization through key themes and interpretive debates, including industrialization, imperialism, science and technology, ideological debate, the nature of modern warfare, the relationship between nationalism and the state, and the emergence of state-sponsored racism.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 201 United States History to 1815 4.0 Credits

Examines the political, economic, and social forces that shaped America in the era of its founding.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 202 United States History, 1815-1900 4.0 Credits

Examines the emergence of modern America to the close of the Spanish-American War.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 203 United States History since 1900 4.0 Credits

Examines America as economic giant, world political power, and scene of social change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 208 Women in American History 4.0 Credits

Covers the history of American women from the 1890s to the present, with emphasis on women's rights, women and technology, women's role in war, and women in the labor force in the 20th century.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 212 Themes in African-American History 4.0 Credits

Explores the major issues in the development of African-American history through the 19th century, beginning with an overview of West and Central African societies in the 15th and 16th centuries and including the family, religion, forms of resistance, aesthetics, and patterns of white-black relationships.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 214 United States Civil Rights Movement 4.0 Credits

Examines the origins, objectives, successes and failures of the Civil Rights movement in the United States between 1954 and 1972.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 215 American Slavery 4.0 Credits

This course is a rigorous examination of slavery and its representation in the United States. Using primary and secondary resources, art, literature and film clips, the course explores the relationship between history and memory and the impact of the social, political, and gendered imagination.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 216 Freedom in America 4.0 Credits

This course examines African-American history, 1865 to the present, including the impact of gender and sexuality in history. The course compares primary and secondary sources to critique how history itself is manufactured and to investigate the role that sexuality and gender play in that process.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 218 Race and Film in United States History 4.0 Credits

This course examines the interplay between history, film, and African Americans' pursuit of social justice and equality. We study films as cultural artifacts or prisms through which to understand the dynamics of race and racial inscription in America.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 222 History of Work & Workers in America 4.0 Credits

Examines the changing nature of work and the lives of American workers, from the origins of wage labor in the 19th century to the transformations of the workplace in the 20th and 21st centuries.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 230 United States Military History I (before 1900) 4.0 Credits

Covers the origins and development of military institutions, traditions, and practices in the United States from the Revolution to the Spanish-American War, and the operational, intellectual, diplomatic, and social aspects of military history.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 231 US Military History II (since 1900) 4.0 Credits

Examines the emergence of the United States as a major military power, including military/civil relationships and the impact of technological change; the course covers World War I, World War II, Korean War, and Vietnam War.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 234 The United States Civil War 4.0 Credits

Examines the causes, course, and results of the American Civil War.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 235 The Great War, 1914-1918 4.0 Credits

Examines the global causes, conduct, and consequences of World War I, which fundamentally altered the next century's political, social, economic, and cultural institutions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 236 World War II 4.0 Credits

Provides an in-depth study of World War II, with emphasis on Europe but also including the war in North Africa, Asia, and the Pacific. Discusses major military events in a broad political framework, with lectures on economic, social, and scientific developments.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 245 England to Elizabeth, to 1558 4.0 Credits

A survey of the formation of the English people and their growth to national independence and maturity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 246 England from Elizabeth to Waterloo, 1558-1815 4.0 Credits

Covers the crisis of the English constitution, the beginnings of modern society and the Industrial Revolution, and the formation of the British Empire.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 247 Modern England, 1815 - present 4.0 Credits

Examines Victorian England as the first industrial society, the course of empire through two world wars, and the challenge of the present.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 249 Modern Jewish History 4.0 Credits

Explores the social, cultural, political and religious forces that have shaped world Jewry from the 18th to the 20th centuries.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 250 European Revolutionary Movements and Ideology, 1815-1914 4.0 Credits

Provides a comprehensive analysis of the development and influence of the principal revolutionary movements and ideologies that challenged the European status quo from 1815 to 1914.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 251 Fascism 4.0 Credits

Provides a chronological/topical study of fascist movements and regimes in Europe between 1919 and 1945, with emphasis on Italian Fascism and German Nazism.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 253 Jewish Life and Culture in the Middle Ages 4.0 Credits

This course is an introductory survey of the history of the Jewish people, their civilization, religion, and contacts with other cultures in medieval times. Topics will include the rise of Christianity and Islam, the Talmud, Jewish mysticism, and the growth of Ashkenazic and Sephardic Jewry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 254 Russian History Before 1900 4.0 Credits

Survey of Russian history from its origins to the end of the Tsarist period. This course covers both Russia's role in Western European history, and its interactions with Eastern Eurasian civilizations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 255 Twentieth Century Russia & the USSR 4.0 Credits

Examines the last years of imperial Russia, showing the background to the revolutions of 1917, followed by a study of the institutions and personalities of the USSR.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 256 Germany & the World of Hitler 4.0 Credits

The course explores Germany's history from 1914 to 1945 through the historical figure of Hitler. This most notorious character will take students from gas warfare in the trenches of the First World War to the radical right wing circles of Munich; from Weimar culture to the Nazi seizure of power in 1933; from mass party rallies to the network of German highways; from the invasion of Poland to the occupation of the Soviet Union; from Auschwitz to Berlin ravaged by bombs and hunger. While placing Hitler in the wider context of European contemporary history students will enquire about the importance of individual figures in general historical dynamics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 257 The Reformation Age 4.0 Credits

The course covers the general background to the Reformation, both religious and secular, the growth of reform movements, including the big names (Luther and Calvin) but also other sects, the Catholic reform and counter-Reformation efforts, and the legacies of reform and the Reformation in Europe and beyond.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 258 History of Europe in the 19th Century 4.0 Credits

Analysis of the forces and events that define European civilization in the 19th century, from the Congress of Vienna to the origins of WWI.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 259 History of Europe in the 20th Century 4.0 Credits

Analysis of the forces and events that define European civilization in the 20th century, from the outbreak of WWI to the present.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 261 Making of Modern South Asia 4.0 Credits

This introductory course is designed to familiarize students with the critical aspects of the colonial encounter and the transformation of power and authority in a vast region that has become modern-day India, Pakistan, Sri Lanka, Nepal and Bangladesh.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 263 The World and China 4.0 Credits

Examines China from its origins to the present day, with emphasis on social, political, and economic institutions. Describes the influences Chinese civilization has had on other societies of the world and the influences other societies have had on China.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 264 East Asia in Modern Times 4.0 Credits

Deals primarily with China and Japan, including a description of their traditional societies and the changes they have undergone during the 20th century.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 267 Twentieth Century World I 4.0 Credits

Examines movements, institutions, and personalities in the major regions of the world, from 1890 through 1939.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 268 Twentieth Century World II 4.0 Credits

Studies events in the major regions of the world since 1945 in historical perspective.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 270 [WI] Introduction to Latin American History 4.0 Credits

Takes a thematic approach to Latin American history, examining modernization and tradition, sex roles and family honor, love and lust, dictatorship and human rights abuses, poverty and crime, terrorism and revolutionary violence. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 271 History of Mexico 4.0 Credits

Surveys themes in Mexican history from the ancient civilizations of the Mayans and Aztecs to the present, including Spanish conquest, Hapsburg and Bourbon colonial systems, independence wars, social conflict and political protest, the Reform, Maximilian's empire, economic expansion, the revolution of 1910, and revolutionary Mexico.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 275 History of Pennsylvania 3.0 Credits

This course introduces students to the history and culture of the Commonwealth of Pennsylvania. Major topics include: the geography of Pennsylvania, Native-American culture before the Colonial Era, the Colonial Era and the governance of the Penn family, the development of the state's economy throughout the 18th, 19th, and 20th centuries, the role of urban centers such as Philadelphia and Pittsburgh, and the role of immigration and diversity in the history of the state.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 276 The History of Philadelphia 4.0 Credits

This course surveys the history of Philadelphia through pre-colonial, colonial, and industrial eras to the present day. Philadelphia is investigated as an economic, social, cultural, and political center. Students read primary and secondary sources and conduct original research into Philadelphia's history. Lectures and discussions are complemented by on-site historical investigations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 283 Technology and Identity 4.0 Credits

In this course, we'll use the lens of identities--historical and contemporary experiences of race, class, gender, LGBTQ identities, physical and mental "ability/disability" divisions, age, and many other taxonomies of personhood--to understand science, technology, medicine, public health, and other bodies of knowledge.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 285 Technology in Historical Perspective 4.0 Credits

Examines the causal interrelations between technological developments and economic, social, intellectual, and political aspects of Western civilization from the 18th century to the present.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 287 History of Science: Ancient to Medieval 4.0 Credits

Explores the history of Western science from the Ancient to Medieval period. Surveys the intellectual content of natural philosophy (science) especially Babylonian, Greek, Roman sciences and medicine, in broader political, economic, social, and cultural context.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 288 History of Science: Medieval to Enlightenment 4.0 Credits

Explores the history of Western science (broadly understood) from the end of the Middle Ages to the Enlightenment. Connects the changes in the content, methodology, and meaning of natural knowledge to the broader political, economic, social, cultural, and intellectual trends of the time.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 289 History of Science: Enlightenment to Modernity 4.0 Credits

Explores the history of science in the modern period from Newton to late 20th century. Surveys the major developments in the history of science, including Newtonianism, chemical revolution, Darwinian evolution, laboratory revolution, modern genetics, ecology, and environmentalism in broader historical context.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 290 Technology and the World Community 4.0 Credits

Examines the effect on international relations of rapid technological change in the modern era and technology as a tool of modernization, political integration, and national security among advanced and developing states.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 291 Global History of Engineering 4.0 Credits

The course examines the development of the profession of engineering since the 18th century by focusing on the different approaches to engineering and engineering professionalism in several countries and empires from across the world, paying attention to their distinctive technological styles, ideologies, and roles in industrialization and state building.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 292 Technology in American Life 4.0 Credits

Examines the role of technology as means of production, social force, and ideology in modern U.S. history.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 296 Research Methods in History I 4.0 Credits

Designed for history majors in their sophomore year, this course introduces students to the fundamentals of historical research. The course focuses on methods, particularly in teaching students to locate and analyze evidence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HIST.

Prerequisites: HIST 102 [Min Grade: D]

HIST 301 The Study of History 4.0 Credits

This course is for history majors in their pre-junior or junior year; it explores conventions and historiographical conversations in the discipline of history. Students will examine philosophies of history, great historical debates, and the nature of historical evidence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HIST.

Cannot enroll if classification is Freshman

Prerequisites: HIST 296 [Min Grade: D]

HIST 302 The Study of Science, Technology, and Environment in History 4.0 Credits

This course offers an introduction to historiographies of science, technology and the environment (STE), investigating which questions and methodologies about STE have dominated historical scholarship. We'll explore issues of identity, geopolitics, and cultures by following historians' changing understandings of the patterns of knowledge production, dissemination, uptake, and resistance across STE. This course provides an introduction to the critical historiographies in the "science, technology, and environment" concentration within the history B.A.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HIST.

Cannot enroll if classification is Freshman

HIST 303 The Study of Global History 4.0 Credits

This course explores modern global history from the 17th to 21st century, familiarizing students with theories of global history (Annales School, world systems theory) while insisting on bottom up approaches. Taking a transnational perspective, students will follow things, ideas, and people on the move and delve into the spaces enabling such moves (ports, slave markets, caravans, cafes, technological infrastructures, scientific institutions). This course provides an introduction to the critical historiographies in the "global history" concentration within the history B.A.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HIST.

Cannot enroll if classification is Freshman

HIST 315 History of Capitalism 4.0 Credits

This course covers capitalism since 1500, taking a broad view of the development of this economic system in historical context. A complex set of cultural, political, and economic factors shaped capitalism over time and place, and students will consider variations and the explanations for its development. Among other things, the course will include a discussion of trade, firms, politics, and finance.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 316 History of American Business 4.0 Credits

This course explores the history of American business, broadly defined, including the evolving structure of business enterprise, business/government relations, business in an international context, and business and American culture since 1800.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 320 Disaster in Global History 4.0 Credits

This course engages students in critical debates and methods of analysis in the history of science, technology, and the environment through the consideration of disasters across geographical and historical boundaries.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 321 Themes in Global Environmental History 4.0 Credits

This course covers global history of the environment, with a special emphasis on environmental factors in urban, political, economic, and social development and change. Faculty may tailor the course to fit specific themes of expertise and interest. Themes may focus more specifically on particular time periods or sub-questions (migration, demography, politics and mass movements) but the approach will also be a transnational/global analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 322 Empire and Environment 4.0 Credits

This course will deal with how colonial rule altered the environment including agrarian societies, rivers, forests, cities, human-animal and human-insect relations in India through the nineteenth and twentieth century. Students will learn about the colonial improvement missions of producing the tropical landscapes, productive agriculture, irrigation canals, dammed rivers and the creation of new environmental subjects in the empire.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 331 The American Revolution 4.0 Credits

The course examines the secession of the British colonies from the empire, including the causes of secession, conflicts among the colonists, the Revolutionary War, international relations during the war, and how the war transformed the colonies and their peoples.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 333 U.S.-Mexican War 4.0 Credits

The war between the United States and the Mexico Republic was one of the most important moments in the national history of each country. Using scholarship that explores the war from both sides of the border, this course encourages students to think critically about historical evidence, particularly as it reflects different ethical and cultural perspectives.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 334 American Empire in the Nineteenth Century 4.0 Credits

In this course, students study American territorial acquisition and settlement during the nineteenth century from the Louisiana Purchase to the Philippine-American War. Students will draw on perspectives from a variety of approaches to history, including cultural, political, and social history.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 338 The Vietnam War 4.0 Credits

The course focuses on the Second Indochina War between the United States and North Vietnam but also includes the origins of the Vietnam War in French imperialism, World War II, the Cold War, and the First Indochina War. Students also look at the consequences of the war for Vietnam, America, and the Cold War.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 340 History of Bodies in Science, Technology, and Medicine 4.0 Credits

We consider bodies as “vessels” of human experience and a category for historical study, exploring what human bodies meant to different cultures in different eras. In examining the ways in which science, technology, and medicine have investigated, depicted and intervened in human bodies in the late-modern era (since about 1700), this class tries to shed a bright light on culture more broadly: on modern ideas of human difference and commonalities, of mortality and morbidity, normalcy and deviance, pleasure and pain, ability and disability.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 341 Disabilities in History 4.0 Credits

This class considers histories of so-called abled and disabled bodies and the cultural persistence of that binary. It includes examples from many eras and global settings, and it touches on what have conventionally been categorized as both physical and intellectual disabilities. We will consider how historical landscapes, economies, technologies, sciences, arts, skills, and ideas of prestige and stigma all reflect shifting beliefs about ability and disability.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 355 Venice and the Mediterranean from the Middle Ages to Napoleon 4.0 Credits

Venice was one of the most important states in the Mediterranean for centuries during the Middle Ages and Early Modern periods of European history. It occupied a key place (both physically and metaphorically) between West and East, between Europe and the Byzantine and later Ottoman empires. Venice provides a vantage point from which to observe the history of the broader Mediterranean region.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 365 Science and State Power: Colonialism 4.0 Credits

This course will introduce students to the history of how science was practiced in colonial India and its relation to state power. Students will learn how developments in natural and social sciences were related to civilizing mission, how bodies became sites of governance in the colony, and the lasting legacy of scientific research in the postcolonial atomic state of India.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 370 Conquest of Mexico 4.0 Credits

Students will analyze interpretations of “the conquest” and compare the roles of technology and culture. They will also examine carefully the variety of primary sources (including the letters written by Cortes, recollections by other conquistadors, and records of the Aztecs) that historians have used to support their contrasting conclusions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HIST 380 Advanced History Seminar 0.5-12.0 Credits

An advanced special topics course. May be repeated for credit. History majors are required to take at least one HIST 380.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 10 times for 132 credits

Restrictions: Cannot enroll if classification is Freshman

HIST 385 Transnational History of Science, Technology and Environment 4.0 Credits

Drawing on methods from environmental history, history of science, and history of technology, this course explores historical connections around the globe. Focusing on concrete things that form part of the material culture of modernity, such as plants, commodities, infrastructure, diseases, energy resources, or climate, we examine climate, imperialism, and global governance structures, among other things.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HIST 396 Research Methods in History II 4.0 Credits

Building on skills from HIST 296, this course for history majors will focus on advanced research skills more tightly aligned with the senior seminar capstone project and introduce students to ethnographic, oral history, and quantitative methods. This second history methods course, taken at the junior level, also expands the majors’ familiarity with questions of critical historiography.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HIST.

Cannot enroll if classification is Freshman

Prerequisites: HIST 301 [Min Grade: D]

HIST 490 [WI] Senior Seminar I 4.0 Credits

In this senior capstone course, students conduct original research and produce an in-depth research project supervised by a historian. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HIST and classification is Senior.

Prerequisites: HIST 301 [Min Grade: D] and HIST 396 [Min Grade: D]

HIST 491 [WI] Senior Seminar II 4.0 Credits

Requires completion of the project begun in HIST 490. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HIST and classification is Senior.

Prerequisites: HIST 490 [Min Grade: D]

HIST I199 Independent Study in HIST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HIST I299 Independent Study in HIST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HIST I399 Independent Study in HIST 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HIST I499 Independent Study in HIST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HIST T180 Special Topics in History 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HIST T280 Special Topics in History 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HIST T380 Special Topics in History 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HIST T480 Special Topics in History 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Homeland Security Management

Courses

HSM 380 Special Topics in Homeland Security Management 0.5-12.0 Credits

Special topics of interest in homeland security management. This course may be repeated for credit.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 4 times for 12 credits

Honors Program

Courses

HNRS 200 Introduction to Honors Program 1.0 Credit

Offers intensive discussion of a subject of significant intellectual interest. Subjects vary from section to section and are meant to engage entering Honors students with one another under the guidance of Drexel's best faculty. Different sections may be taken for credit.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 201 Colloquium I 3.0 Credits

Explores some of the tensions between individualism and community. Recently offered topic: Exploring the State of Humanity: Assessing Contradictory Evidence, Weighing Intriguing Options.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 202 Sophomore Colloquium II 3.0 Credits

Explores the interdependencies among these humanly constructed institutions. Recently offered topics: Implications of the Internet; Experts and Expertise.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 301 Colloquium II 3.0 Credits

Explores the relationship of representation to reality in literature, film, other arts, philosophy, the media, science, or some combination of these. Recently offered topics: Creative Writing Workshop; Game Theory; Representations of the Holocaust.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 302 Honors Colloquium 3.0 Credits

Provides comparative explorations of the intellectual and expressive products of diverse cultures. Focuses on one or more of the following cultural productions: literature, the arts, religion, philosophy, architecture, and politics.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 303 Honors Colloquium 3.0 Credits

An interdisciplinary honors colloquium drawing upon literature, literary theory, and other cultural studies including the writings of scientists and engineers. Students will explore relations among science, technology and literature from the eighteenth to the twentieth centuries by reading primary critical texts produced during this period.

College/Department: Pennoni Honors College

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 304 Honors Colloquium 3.0 Credits

This course is organized around the idea that, in order for a human society or a social system to exist, certain features of the environment or environmental system must be maintained. The preservation and maintenance of these features requires us to regulate or restrict some of our social uses of these systems.

College/Department: Pennoni Honors College

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 305 Honors Colloquium 3.0 Credits

Students will participate in an archaeology dig in the Philadelphia area. Details will depend on digs active at the time, but the course may include historical documentation, survey, excavation techniques and process, preservation of artifacts, cleaning, cataloging, recording, record-keeping documentation, reporting interpretation, restoration and reconstruction, as appropriate to the work on the site.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 306 Honors Colloquium 3.0 Credits

Students will engage in an intensive study of the literary and artistic manifestations of the "Gothic". To that end, the class will read some of the major texts associated with the form from the second half of the eighteenth century to its appearance in the twentieth century literature and film. In support of the major texts critical secondary essays will also be read.

College/Department: Pennoni Honors College

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 307 Honors Colloquium 3.0 Credits

Students will examine the context and meaning of "popular" as a product of the mass society and its technologies. They will examine and develop the ideas of the post-structural society and the socioeconomic impact of music, the organizing and communicative power of music in everyday life, and the role music plays in socio emotional development.

College/Department: Pennoni Honors College

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS 450 Honors Directed Study 12.0 Credits

Provides independent study for honors students.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

HNRS 499 Honors Senior Thesis 0.5-12.0 Credits

Available to students whose major does not include a senior research project.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

HNRS I199 Independent Study in HNRS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

HNRS I299 Independent Study in HNRS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

HNRS I399 Independent Study in HNRS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

HNRS I499 Independent Study in HNRS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

HNRS T180 Special Topics in HNRS 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

HNRS T280 Special Topics in HNRS 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

HNRS T380 Special Topics in HNRS 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

HNRS T480 Special Topics in HNRS 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated 20 times for 60 credits

Hotel & Restaurant Management

Courses

HRM 110 Introduction to the Hospitality Industry 3.0 Credits

This course focuses on the diverse segments of the hospitality industry: hotel, event planning, travel and tourism, restaurants, and the casino industry. Topics include an overview of the field, the careers in the industry, and current issues and topics.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CULA or major is HOSP or major is HRM.

HRM 120 Principles of Food-Service Management 3.0 Credits

Examines the food and beverage industry from a managerial perspective focusing on labor and cost control, menu planning, and managerial issues. This course is an in-depth real world focus on current food service and its relation to other segments of the hospitality industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 110 [Min Grade: D]

HRM 125 Hotel Operations Management 3.0 Credits

This course studies front-office management and control, including pricing, occupancy rates, audits, reservations, revenue management and other special functions. Interaction between the rooms division and other divisions within the hotel setting will be discussed. Customer service and guest needs will be emphasized.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM 130 Introduction to Tourism 3.0 Credits

The course reviews the basic concepts and techniques in the field of tourism and tourism management. It is an introduction to the tourism industry, cost and benefits of tourism, effects on the host communities, impacts on travelers and host communities, and promotion of tourism.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM 131 Tourism Geography 3.0 Credits

Students will become conversant in global geography and acquainted with significant world-class tourism destinations around the globe, with an emphasis on the top five world tourism destination countries of France, Italy, Spain, the United States and China.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 130 [Min Grade: D]

HRM 150 Food & Beverage Customer Service 3.0 Credits

This course focuses on customer service within the food and beverage aspects of the hospitality industry, how service relates to the customer's needs, how to create this transference, and how the fundamental aspects are applied in the setting of the professional dining room.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CAS or major is CLSC or major is CULA or major is HOSP and classification is Freshman.

HRM 155 Hotel Customer Service 3.0 Credits

This course will examine the role that customer service plays in dictating a hotel employee's performance in order to exceed guest expectations. Student will explore certification areas that relate to hospitality and gain hands-on exposure through a series of field studies, reflections, and role playing scenarios.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 110 [Min Grade: D]

HRM 160 Laws of the Hospitality Industry 3.0 Credits

Examines legal subjects relative to the foodservice and lodging industries including government regulations and foodservice operators, foodservice contracts, liability, patron civil rights, franchising, and bankruptcy and reorganization. Includes analysis of case studies and relevant court decisions.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 110 [Min Grade: D]

HRM 190 Industry Hours I 1.0 Credit

This course provides students an opportunity to gain professional networking experience in the hospitality industry. Students will participate in industry events, pursue professional society memberships, do volunteer hours, and conduct informational interviews with professionals in the industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM 215 Commercial Food Production 4.0 Credits

A practical based examination of back of the house food service practices. This course focuses on quantity and quality production of food for restaurant and event services, managerial elements of running a kitchen, and daily food service operations.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 115 [Min Grade: D] or CULA 120 [Min Grade: D]

HRM 220 Purchasing for the Hospitality Industry 3.0 Credits

Covers principles and techniques of quantity-foods purchasing and hospitality furnishings. Emphasizes channels of distribution, determination of specifications, mechanics of buying, and the purchasing function in food-service facilities.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRM 110 [Min Grade: D] or HRM 120 [Min Grade: D]

HRM 225 Equipment Design and Layout 3.0 Credits

Covers principles of selection, operation, and maintenance of food-service equipment. Emphasizes requirements for various hospitality facilities and the supporting design, construction, and renovation of such.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRM 120 [Min Grade: D]

HRM 250 Contract Foodservice Management 3.0 Credits

Introduces students to the dynamics of a commercial foodservice operation.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRM 120 [Min Grade: D]

HRM 290 Industry Hours II 1.0 Credit

This course provides students an opportunity to gain professional networking experience in the hospitality industry. Students will participate in industry events, pursue professional society memberships, do volunteer hours, and conduct informational interviews with professionals in the industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM 305 Food Blogging 3.0 Credits

A practical introduction to writing for the online space using multi-media skills, creative independence, and social media. This class also includes ethical discussions that are particular to the ever-changing digital landscape.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HRM 310 Hospitality Accounting Systems 3.0 Credits

Studies accounting systems for hotels, restaurants, and institutions, including analysis of business transaction flow and the preparation and interpretation of financial statements. Includes consideration of the Uniform System of Accounts for Restaurants, computer-assisted processing, reports generation, and data analysis.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRM 110 [Min Grade: D]

HRM 315 Continental, Ethnic, and Regional Cuisine 3.0 Credits

The course explores the origins of what we now call Mediterranean Cuisine (in its widest definition) from the fall of the Roman Empire in the 6th century to the Age of Reason in the 17th and through to its contemporary definition. We visit Asia, the sub continent, the Maghreb, Middle East and other Mediterranean destinations defining their historic, cultural and contemporary contributions and cooking a wide variety of indigenous dishes. This is the most influential of all cultures on contemporary western cooking and diet.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 115 [Min Grade: D] or CULA 120 [Min Grade: D]

HRM 320 Hospitality Management Information Systems 3.0 Credits

Studies computer applications in the hospitality industry, including inventory control, restaurant systems, bar and beverage systems, and telephone and security-management systems. Emphasizes guest tracking, electronic cash registers, and point-of-sale devices.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: HRM 110 [Min Grade: D]

HRM 326 Hotel Rooms Division Management II 3.0 Credits

Studies front-office management and control, including pricing and associated structures, occupancy rates and patterns, audits and income, and special functions.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HOSP or major is HRM.

Cannot enroll if classification is Freshman or Sophomore

Prerequisites: HRM 325 [Min Grade: D]

HRM 330 Hospitality Marketing and Branding 3.0 Credits

This course explores marketing and public relations industry concepts and applications unique to the various segments of the hospitality industry.

The course focuses on basic marketing and public relations principles and services, advertising and sales in conjunction with the information needs of hospitality managers.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRM 110 [Min Grade: D]

HRM 335 Beverage Management 3.0 Credits

Provides a comprehensive study of wines, spirits, and beers and the role they play in the success of the hospitality industry. Covers topics including history, marketing and sales, channels of distribution, manufacturing processes, mixology, and service and control systems, with concentration in American and European wines and international beers. Gears application to computerized and accounting system. tips certification.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 120 [Min Grade: D]

HRM 340 Catering Management 3.0 Credits

Examines techniques of catering management and their application in the professional food-service environment, with emphasis on menu planning, controls, and budget preparation.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: HRM 120 [Min Grade: D]

HRM 345 Convention Management 3.0 Credits

Provides an in-depth study of convention, corporate, and group segments of the hospitality industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRM 110 [Min Grade: D]

HRM 347 Sport Tourism 3.0 Credits

Students will investigate international sport tourism organizations and their services, and analyze issues including: Sport tourism facility and event financing, sport tourism impacts, and globalization and sport tourism.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRM 130 [Min Grade: D]

HRM 350 Cost Controls in Hospitality 3.0 Credits

Course deals with theory and technique basic to managing costs and maximizing profits in relevant area within restaurant, hotel, and tourism segments of hospitality.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 110 [Min Grade: D]

HRM 355 Resort Management 3.0 Credits

This course studies the unique aspects of managing a full service destination resort in contrast to a traditional hotel operation. Students will study varied aspects of resort management including guest profiles, resort operations, report marketing and program development among other topics.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 325 [Min Grade: D]

HRM 360 Hospitality Industry Public Relations 3.0 Credits

This course provides students with an understanding of the process and effective use of public relations as applied to the hospitality industry with a focus on restaurants. A variety of marketing communication media including advertising, sales promotions, and development of a press kit and press releases will be examined. During the course students will develop a public relations campaign for a specific restaurant.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 110 [Min Grade: D]

HRM 365 Heritage Tourism 3.0 Credits

Using the historic city of Philadelphia and its main background, this course reviews the significance and role of culture and heritage related tourist attractions. Students deal with the main issues in current research on heritage tourism while having hands-on exposure to the managements and marketing of some of Philadelphia's landmarks.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 130 [Min Grade: D]

HRM 370 Gaming and Casino Management I 3.0 Credits

Examines theories pertinent to casino games including the organizational management, staffing, regulations, internal control, and reporting requirements of gaming operations.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 110 [Min Grade: D]

HRM 371 Gaming and Casino Management II 3.0 Credits

This course studies advanced casino management topics such as game statistics, casino marketing and profitability. Students will study the probability and mathematics of casino games and review in depth casino marketing concepts and techniques that are unique to gaming. Race and sports book operations will also be studied.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 370 [Min Grade: D]

HRM 375 Security and Loss Prevention 3.0 Credits

This course studies the unique aspects of managing security in the hospitality industry. Students will study various aspects of security and loss prevention including security equipment, guest concerns, departmental responsibilities, protection of fund, emergency management, risk management and insurance. This course will include a site visit and guest lectures.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 370 [Min Grade: D]

HRM 385 Tourism Guest Lecture Series 3.0 Credits

This course provides contact with prominent industry professionals who visit class weekly to convey their experiences and facilitate discussions.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM 390 Industry Hours III 1.0 Credit

This course provides students an opportunity to gain professional networking experience in the hospitality industry. Students will participate in industry events, pursue professional society memberships, do volunteer hours, and conduct informational interviews with professionals in the industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM 395 Economics of Tourism 3.0 Credits

This course introduces participants to economic and government policy issues that impact the tourism industry. The course provides a strategic framework for understanding the macroeconomic and policy environment that is shaped by multilateral institutions, government and the tourism industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM 399 Hospitality Practicum Experience 3.0 Credits

This course provides students an opportunity to gain additional short-term professional experience in the hospitality industry. Students secure their own position relevant to their area of interest and will work with a faculty member to reflect on their experiences. This guided, supported reflection will allow students to identify their strengths and weaknesses and to take steps to address concerns.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM 405 Current Issues in Travel and Tourism 3.0 Credits

Covers current issues in the management of travel and tourism services. Environmental trends, planning and development, policy formation, social and economic impact and marketing of travel and tourism are included.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 135 [Min Grade: D] and HRM 365 [Min Grade: D]

HRM 415 Fine Dining and Services 4.0 Credits

HRM senior capstone hospitality class. Requires students to design, produce, and market a weekly dinner to the public. With the participation of guest chefs from some of the area's finest hotels and restaurants, students produce food comparable to that served in the finest restaurants in the city.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 215 [Min Grade: D]

HRM 420 Hospitality Design 3.0 Credits

Provides a historical, spatial, and aesthetic study of the great hotels and restaurants of the late 19th and the 20th century. Emphasizes the architectural quality of the spaces and the functions they imply in services to the users, management, and client. Field trip.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRM 325 [Min Grade: D]

HRM 425 Hospitality Industry Administration 3.0 Credits

This course provides students the opportunity to conduct an in-depth study of various managerial strategies with a hospitality executive. The course will examine the application of the tools of strategic management in hospitality settings and introduce models, methods, and techniques which can be used to identify strategic issues and generate future-oriented action plans to inform tactics that are designed to implement change.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CULA or major is HOSP or major is HRM and classification is Junior or Senior.

Prerequisites: HRM 355 [Min Grade: D]

HRM 435 Wine and Spirits 3.0 Credits

Provides a detailed study of the classification, production, identification, and service of alcoholic beverages, with a major emphasis on wines. Uses a systematic approach to tasting and evaluation.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

HRM 450 Hospitality Leadership Seminar 3.0 Credits

This course integrates material covered in multiple disciplines related to the hospitality industry. Examines the development of innovative management in all segments of the industry. Identification and development of a personal leadership philosophy and style.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CULA or major is HOSP or major is HRM and classification is Senior.

HRM 455 Hospitality Human Resources Management 3.0 Credits

This course examines the specific function of human resources in the hospitality industry by examining careers in hospitality and through real-world practical application. Topics examined include the importance of recruitment and selection, training, compensation programs, and performance management in all segments of the hospitality industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CULA or major is HOSP or major is HRM and classification is Junior or Senior.

HRM 470 Gaming Legislation, Policy and Law 3.0 Credits

This course provides an overview of federal and state laws governing legalized gaming in the United States with emphasis on gaming in Pennsylvania. The powers of the state regulatory agencies will be examined with discussion concerning the underlying reasons used in regulating to ensure the integrity of the gaming industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 370 [Min Grade: D]

HRM 472 Gaming Information Systems 3.0 Credits

This course studies computer information systems that are unique to the Gaming Industry. Students will study each system from a business perspective learning function and process. They will perform case studies, view produce demonstration and observe new technology trends that impact casino operations.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 371 [Min Grade: D]

HRM 475 Current Issues in Gaming 3.0 Credits

Current issues in the management of casino and gaming operations. Environmental trends, planning and development, policy formulation, social and economic impact and marketing of casinos and gaming operations are potential topics for discussion.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: HRM 371 [Min Grade: D]

HRM 490 Industry Hours IV 1.0 Credit

This course provides students an opportunity to gain professional networking experience in the hospitality industry. Students will participate in industry events, pursue professional society memberships, do volunteer hours, and conduct informational interviews with professionals in the industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM 495 Industry Hours V 1.0 Credit

This course provides students an opportunity to gain professional networking experience in the hospitality industry. Students will participate in industry events, pursue professional society memberships, do volunteer hours, and conduct informational interviews with professionals in the industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

HRM I199 Independent Study in HRM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

HRM I299 Independent Study in HRM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

HRM I399 Independent Study in HRM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CULA or major is HOSP or major is HRM.

Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

HRM I499 Independent Study in HRM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

HRM T180 Special topics in HRM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

HRM T280 Special topics in HRM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

HRM T380 Special topics in HRM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

HRM T480 Special topics in HRM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

Human Resource Management

Courses

HRMT 321 Staffing in Organizations 4.0 Credits

This course provides an overview of the process by which managers make decisions about staffing. It is intended to be useful for line managers and for persons who seek professional careers in HR. The focus is on theories, research, policies, and practices concerning selection for effective utilization of human resources.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRMT 323 [Min Grade: D]

HRMT 323 Principles of Human Resource Administration 4.0 Credits

Covers the underlying principles of personnel administration used in organizations by personnel departments and often by line managers. Uses case studies and exercises to illustrate the practical implications of various principles.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ORGB 300 [Min Grade: D]

HRMT 330 Collective Bargaining 4.0 Credits

Provides a socioeconomic analysis of the process of collective bargaining, from representation elections through contract negotiations, grievance handling and labor arbitration. Uses cases, texts, and readings.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HRMT 323 [Min Grade: D]

HRMT 345 Seminar In Human Resource Management 4.0 Credits

Presents an integrated approach to human resource management. Examines a wide range of human resource issues faced by employers and employees in contemporary society.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ORGB 300 [Min Grade: D] and HRMT 323 [Min Grade: D] and HRMT 321 [Min Grade: D]

HRMT I199 Independent Study in HRMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

HRMT I299 Independent Study in HRMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

HRMT I399 Independent Study in HRMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

HRMT I499 Independent Study in HRMT 1.0-4.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

HRMT T180 Special Topics in HRMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

HRMT T280 Special Topics in HRMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

HRMT T380 Special Topics in HRMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

HRMT T480 Special Topics in HRMT 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Humanities, General

Courses

HUM 006 Oral Communication Skills for Non-Native Speakers 0.0 Credits

Designed to help international members of the Drexel community improve their listening comprehension and oral communication skills in English.

Provides participants with opportunities to make presentations and receive constructive feedback, with particular attention to grammar, pronunciation, and fluency problems. Especially recommended for international teaching assistants.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

HUM 107 Humanities and Communications II 3.0 Credits

Covers the research process. Continues work with critical analysis begun in hum 106. Requires students to apply research methodology as they write a critical review and a chemistry synthesis paper, and develop group proposals for their design projects. Also requires students to continue the study of literature begun in hum 106 and continue keeping journals.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HUM 108 Humanities and Communications III 3.0 Credits

Requires students to write a literary analysis of a play in production locally and discuss visual arts. Includes written and oral presentations of students' final engineering design projects. Coordinates readings in non-fiction with the course science component. Requires students to write a synthesis paper for biology and continue using journals as a means for reflection.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

HUM 315 Perspectives in Medical Humanities 3.0 Credits

This course introduces a multidisciplinary approach to health related topics rooted in literary, philosophical, social, scientific/technological, and psychological perspectives and methodologies. Discussion format and student participation in choosing readings enhance a sense of community among the participants.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CMDH.

Cannot enroll if classification is Freshman

Industrial Engineering

Courses

INDE 240 Technology Economics 3.0 Credits

Techniques for project decisions: benefit cost, present worth and annual worth analysis, rate of return, minimum attractive rate of return, capital budgeting, risk analysis, and depreciation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

INDE 300 Quality Management 3.0 Credits

This is a course about managing quality. It will introduce quality concepts necessary for an organization to remain competitive in today's economy. Discussion will focus on the tools and techniques necessary to manage quality processes within an organization.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: MATH 122 [Min Grade: D]

INDE 301 Health Systems Introduction 3.0 Credits

Emphasis on the application of industrial engineering methodologies to analyze and solve health systems challenges. Critical evaluation of the utility of key industrial engineering concepts and tools for assessing and modeling health care problems and challenges in health care delivery.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

INDE 331 Lean Manufacturing 3.0 Credits

This course introduces the fundamental Lean Manufacturing principles that underlay modern continuous improvement approaches for industry, government and other organizations. The course will provide the student with an introduction to lean manufacturing describing the background behind its development and how evaluations and assessments of production systems are performed. Lean production tools and techniques such as flow, just-in-time, poka-yoke, inventory turns, standardized work, pull system, value streams, quick changeover, workplace organization, and visual controls will be described and in some cases demonstrated in simulation exercises.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

INDE 340 Introduction to Decision Analysis 3.0 Credits

Overview of modeling techniques and methods used in decision analysis, including multiattribute utility models, decision trees, and Bayesian models. Psychological components of decision making are discussed. Elicitation techniques for model building are emphasized. Practical applications through real world model building are described and conducted.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

Prerequisites: STAT 262 [Min Grade: D] and MATH 122 [Min Grade: D]

INDE 350 Industrial Engineering Simulation 3.0 Credits

Covers techniques and application of computer simulation of existing or proposed real world systems and processes. Models of such systems or processes are often complex, precluding traditional analytical techniques. Students will build simulation models and do simulations with commercial simulation software, analyze and interpret the results, and to plan simulation studies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: STAT 261 [Min Grade: D]

INDE 351 Intelligent Manufacturing Systems 3.0 Credits

Design and simulation of intelligent manufacturing systems with special emphasis on sensor-integrated robotic assembly tasks. Fundamentals of artificial intelligence, application of robotics, sensors, vision, network integration, and flexible assembly work cells. Industry based case studies and working examples.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INDE 361 Quality Control 3.0 Credits

Covers theory and methods for design and analysis of quality control systems, including solutions to problems of product specifications, process control, acceptance inspection, and other means of quality assurance. Fall. Alternate years.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: STAT 261 [Min Grade: D]

INDE 362 Operations Research for Engineering I 3.0 Credits

Introduces systems sciences, including linear programming and other linear optimization methods, simplex method, primal-dual solution methods, the transportation method, pert-cpm and other network techniques, and dynamic programming. Requires development and presentation of simulation term-project proposals. Winter.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 261 [Min Grade: D]

Corequisite: MATH 261

INDE 363 Operations Research for Engineering II 3.0 Credits

Covers single and multi-episode probabilistic inventory models, queuing theory, single and multichannel systems, production scheduling and other assignment methods, Markov processes, Poisson processes and other stochastic systems, and replacement theory. Includes selected case studies. Applications: queuing, reliability, inventory, and finance. Requires development and presentation of term-project simulation models.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INDE 362 [Min Grade: D]

INDE 365 Systems Analysis Methods I 3.0 Credits

Provides an introduction to the concepts and techniques used in analysis of complex systems. Covers the origins and structure of modern systems and the step-wise development of complex systems and the organizations of system development projects. Systems Development Lifecycle (SDLC) from concept development, engineering development, post-development.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

INDE 366 Systems Analysis Methods II 3.0 Credits

OO (Object Oriented) Methodology and UML (Universal Modeling Language) modeling, within the SDLC (System Development Life Cycle) framework, are covered in this class. There are two components to OO systems Analysis and Design; The ORM (Object- Relationship Model) is a way to describe or represent objects, classes of objects, relationships between objects and classes, and memberships of the real world. The OBM (Object-Behavior Model) is a means of describing the behavior of objects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INDE 365 [Min Grade: D]

INDE 367 Data Processing 3.0 Credits

Covers the information ?based skills necessary for Industrial Engineers. It is a project based course. Particular attention is paid to real world database problems. This course explains data acquisition and database systems. The course focuses on designing databases for given problems. Students will use different database techniques. Introduction to SQL.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INDE 370 Industrial Project Management 3.0 Credits

Provides an overview of the roles, responsibilities, and management methods of technology in project management. Emphasizes scheduling of various projects, monitoring, control and learning from projects. Three interrelated objectives of budget, schedule, and specifications are also introduced. The course assumes no prior knowledge in management techniques and is intended to teach students how to develop approaches and styles of management for service and manufacturing industry projects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INDE 375 Quality Improvement by Experimental Design 4.0 Credits

Methods for Design and analyzing industrial experiments. Blocking; randomization; multiple regression; factorial and fractional experiments; response surface methodology; Taguchi's robust design; split plot experimentation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: STAT 261 [Min Grade: D] or STAT 201 [Min Grade: D]

INDE 400 Designs of Program Evaluation Systems 3.0 Credits

Focus on evaluation broadly conceived to include evaluation of programs as well as within business organizations. The context of the class is evaluation in the health care sector, particularly long term care. Emphasis placed on the development of valid and practical models, and the identification and measurement of short-term and long-term intervention outcomes. Covers principles of research design, evaluation, and measurement issues.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: STAT 261 [Min Grade: D] or STAT 201 [Min Grade: D] or STAT 211 [Min Grade: D]

INDE 461 Methods of Engineering and Measurement 3.0 Credits

Covers fundamentals for developing methods improvements and measurement of these improvements through time study and standard data. Includes analysis and design of man-and-machine work systems and application to typical problems in work measurements. Fall. Alternate years.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: POM 311 [Min Grade: D]

INDE 462 Industrial Plant Design 3.0 Credits

Covers design of a product-oriented facility, including process design, materials handling, work area design, storage and warehousing, and service-area planning. Includes complete final plant layout and presentation of term project. Winter. Alternate years.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INDE 461 [Min Grade: D]

INDE 463 Production Management 3.0 Credits

Covers production planning and control systems, including materials, equipment, and manpower requirements; manufacturing planning and control, including production scheduling, inventory, and quality control; analytical methods for inventory control; and production planning and methods. Spring. Alternate years.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INDE 462 [Min Grade: D]

INDE 467 Decision Processes 3.0 Credits

Covers advanced methods of analyzing decision-making under uncertainty, including expected value concepts and criteria, decision tree analysis, preference theory concepts, probabilistic risk assessment, risk analysis using simulation techniques, and decisions to purchase imperfect information. Uses case studies relating to facility siting, resource exploration and development, and new technology deployment and market penetration. Fall. Alternate years.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 261 [Min Grade: D]

INDE 468 Analysis of Experimental Data 3.0 Credits

Covers use of linear and non-linear models to identify cause and estimate effect. Includes randomization and blocking with paired comparisons, significance testing and confidence intervals, factorial designs, least squares regression analysis, response surface methods, analysis of variance, and Box-Jenkins and other time series forecasting methods. Fall.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 261 [Min Grade: D]

INDE 469 Organization Planning and Control 3.0 Credits

Analyzes human, capital, and physical resource planning, allocation, and control, including human factors and man-machine interface, technological innovation, concepts of behavioral science, and structure and dynamics of industrial organizations. Uses a case study approach to situational analysis. Spring. Alternate years.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: POM E311 [Min Grade: D] and POM 461 [Min Grade: D]

INDE 470 Engineering Quality Methods 3.0 Credits

Methods for controlling and improving industrial processes. Control charts; process capability; multifactor experiments; screening experiments; robust designs. Understanding of the continuous quality improvement tied to a real life project improvement.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INDE 490 Senior Project Design 4.0 Credits

Design methodology and engineering principles applied to open-ended design problems with inherent breadth and innovation. This course integrates the knowledge acquired in the various courses of the undergraduate curriculum to an open-ended design effort and applies the knowledge gained to the solution of contemporary engineering problem. Requires written and oral final reports, including oral presentations by each design team at a formal design conference open to the public and conducted in the style of a professional conference. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: INDE 470 [Min Grade: D] (Can be taken Concurrently)

INDE I199 Independent Study in INDE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

INDE I299 Independent Study in INDE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

INDE I399 Independent Study in INDE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

INDE I499 Independent Study in INDE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

INDE T180 Special Topics in INDE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

INDE T280 Special Topics in INDE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

INDE T380 Special Topics in INDE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

INDE T480 Special Topics in INDE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Information Science & Systems

Courses

INFO 101 Introduction to Information Technology 3.0 Credits

Introduces the basic knowledge and techniques required to use computing effectively in organizations. Explores information systems, information technology and software concepts with an emphasis on how computing can be used to help organizations meet their goals.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 105 Introduction to Informatics 3.0 Credits

Considers the field of informatics as the application of information and computer sciences to a specific domain. Focuses on the three components on informatics: information, users, and information and communication technologies. Topics include information needs, user groups, social media, technology evolution and diffusion of innovation.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 108 Foundations of Software 3.0 Credits

Provides students with fundamental concepts about software and software representation. Topics include software and database representation, development environments, and techniques for designing, coding, testing and deploying software systems. Introduces programming concepts and activities using pair programming activities.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 110 Human-Computer Interaction I 3.0 Credits

This course introduces the student to the study of computer-based user interfaces. It presents a user-interface layout and design, types and usage of interaction techniques, building a consistent look and feel throughout the interface and how to evaluate designs with users. Centered focus in evaluation of computer interfaces. It teaches the basic principles of user analysis and interface evaluation and gives a practical introduction to ergonomics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 111 Informatics Design Workshop I 3.0 Credits

Provides students with an opportunity to explore design practice through hands on experiences with contemporary prototyping platforms and methods. Introduces students to design as a component of informatics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 110 [Min Grade: D]

INFO 112 Informatics Design Workshop II 3.0 Credits

Builds on INFO 111 by providing students with an opportunity for open-ended exploration of human-centered systems design practice through a freshman design project. Design groups work with their instructor to develop an initial concept into a design deliverable.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 111 [Min Grade: D]

INFO 120 IST Seminar for Transfer Students 2.0 Credits

Introduces students to academic and co-curricular aspects of university life. Includes academic functions such as writing, reading, and studying skills and co-curricular functions such as campus resources, activities, and social programs. Aids in the transition to student life and is designed to help each student achieve academic and personal success.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 140 Information Systems Laboratory I 1.0 Credit

Provides hands-on experience with a variety of software products basic to current information systems. Covers products that support personal productivity in organizing, analyzing and presenting information. Addresses both local processing on personal computers and creation and use of information on the Internet.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 101 [Min Grade: D]

INFO 150 Ubiquitous Information Technologies 3.0 Credits

Introduces students to computing as an integral part of life. Includes topics such as mobile computing, smart devices, sensors, location awareness, and the internet of things. Provides concepts and terminology combined with hands-on experiences constructing applications on mobile or other small computing devices.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 108 [Min Grade: D] or CS 164 [Min Grade: D] or CS 131 [Min Grade: D] or SE 101 [Min Grade: D]

INFO 151 Web Systems and Services I 3.0 Credits

Introduces technologies used to build leading-edge application systems and services on the World Wide Web. Coverage includes a selection of Web components such as mark-up and scripting languages and frameworks for building systems. Introduces Web programming using pair or small team programming activities.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 108 [Min Grade: D]

INFO 152 Web Systems and Services II 3.0 Credits

Explores techniques used to build leading-edge application systems on the World Wide Web. Topics include Web server components of Web applications, and basic database processing. Includes Web programming using pair or small team programming activities.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 151 [Min Grade: D]

INFO 153 Applied Data Management 3.0 Credits

Explores technologies used to gather, organize, store, and retrieve data in various forms. Focuses on using databases and other information management components in software systems. Topics include database servers, data management for Web applications, and data structures. Includes data management software development using pair or small team programming activities.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 108 [Min Grade: D]

INFO 154 Software System Construction 3.0 Credits

Introduces considerations that make large software systems challenging to design, build, and maintain. Topics include coding standards and documentation, program architecture, verification, software evolution, and managing large software systems. Includes software modification and development using pair and team programming.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 152 [Min Grade: D]

INFO 200 Systems Analysis I 3.0 Credits

Study of the principles, practices and tools of information systems analysis and design. Emphasis on learning pragmatic aspects of working as a systems analyst and employing the tools of systems analysis and design.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 101 [Min Grade: D]

INFO 203 Information Technology for Engineers 3.0 Credits

Provides an introduction to relational system analysis and design and computer networking for engineering students. Covers requirements gathering, development of data flow diagrams and entity-relationship diagrams, and fundamental protocols for TCP/IP networking and routing.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 204 Nursing Informatics 3.0 Credits

This course is designed to examine technology and tools of the Internet and World Wide Web with a focus on the use of cyber technology and selected computer applications. The automation of data management through information systems, expert systems, and telecommunication, and the impact of these technologies on nursing administration, education, practice and research are addressed in the context of nursing informatics. Actual problem-solving and mini-design projects on how computerization and automation can improve the efficiency of nursing care delivery will be emphasized.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 100 [Min Grade: D] and NURS 102 [Min Grade: D] and CS 161 [Min Grade: D]

Corequisites: NURS 200, NURS 201

INFO 205 [WI] Strategic Uses of Information Systems 3.0 Credits

Familiarizes students with basic business problems and operations and provides an understanding of how information systems can be used to benefit organizations. Also introduces students to the pitfalls of developing and implementing information systems in organizations and helps students improve critical thinking skills.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INFO 101 [Min Grade: D]

INFO 210 Database Management Systems 3.0 Credits

Focuses on how to design databases for given problems, and how to use database systems effectively. Topics include database design techniques using the entity-relationship approach, techniques of translating the entity-relationship diagram into a relational schema, relational algebra, commercial query languages, and normalization techniques.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 101 [Min Grade: D] or SE 210 [Min Grade: D]

INFO 215 Social Aspects of Information Systems 3.0 Credits

Introduces social issues involved in information systems design and use, e.g., personal computing, telecommuting, computers in education, the privacy and security of stored and transmitted information, and information ownership. Explores the interaction of high technology, employment, and class structure.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 105 [Min Grade: D]

INFO 216 Issues in Information Policy 3.0 Credits

Introduces students to the fundamentals of information policy, through examination of particular issues such as: privacy, intellectual property, access, and security. Students will gain an understanding of the historical foundations of information policy, read and evaluate information policies, discuss key components of information policies, and create an information policy for an organization or government entity.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INFO 220 Geographic Information Science 3.0 Credits

Explores the creation, distribution and growth of geospatial data, highlighting their uses and misuses. Structured as an applications-based course where students learn how geospatial technologies are used to turn data into maps, tables and imagery through hands-on exercises and laboratory work.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INFO 240 Introduction to Data Science 3.0 Credits

"Data Science" encompasses skills required for data intensive work. Students will deliver data science products and services through analysis, data transformation and data access techniques. The assignments will involve web programming, statistics, and the ability to manipulate data sets with code, following examples provided.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INFO 250 Information Visualization 3.0 Credits

Introduces the foundation and the state of the art of information visualization. Explores and reflects on the design, application, and evaluation of a diverse range of information systems. Demonstrates how a number of common types of information can be visually, intuitively and interactively represented. Provides a first-hand experience of visualizing a variety of realistic data types.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 300 Information Retrieval Systems 3.0 Credits

The theoretical underpinnings of information retrieval are covered to give the student a solid base for further work with retrieval systems. Emphasis is given to the process of textual information for machine indexing and retrieval. Aspects of information retrieval covered include document description, query formulation, retrieval algorithms, query matching, and system evaluation.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 105 [Min Grade: D] and INFO 110 [Min Grade: D] and (CS 260 [Min Grade: D] or CS 133 [Min Grade: D] or INFO 153 [Min Grade: D] or SE 103 [Min Grade: D])

INFO 310 Human-Computer Interaction II 3.0 Credits

Introduces the student to interactive computer system design. Teaches some of the basic approaches to task analysis, design, and evaluation of interactive computer systems. Applies these design principles in the development of the interface to an interactive computer system.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 152 [Min Grade: D] or SE 210 [Min Grade: D] or CS 265 [Min Grade: D]

INFO 320 Server Technology I 4.0 Credits

Addresses information systems that have server-based architectures. Introduces students to basic concepts of servers and server-based architectures. Discusses dependence on features and capabilities of the underlying operating system. Reviews concepts of operating system, their architectures, and services. Discusses the client-server and various client-server architectures.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (INFO 101 [Min Grade: D] or CS 265 [Min Grade: D]) and (CS 164 [Min Grade: D] or CS 171 [Min Grade: D] or SE 101 [Min Grade: D] or INFO 151 [Min Grade: D] or CS 175 [Min Grade: D])

INFO 321 Server Technology II 4.0 Credits

Presents details of specific server platforms used to provide services to information systems applications. Prepares students to apply server technologies to information systems problems.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INFO 320 [Min Grade: D]

INFO 322 Server Technology III 4.0 Credits

Continues the study of server platform technologies for information systems applications. Prepares students to apply a wide range of server technologies to information systems problems.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 321 [Min Grade: D]

INFO 324 Team Process and Product 3.0 Credits

Provides hands-on experience with working in small teams to apply processes and produce products typical of current best practices in computing and information technology organizations. Allows students to develop an integrated understanding of project life cycle phases. Examines issues of team organization and operation, problem solving, and communication.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 153 [Min Grade: D] and INFO 200 [Min Grade: D]

INFO 330 Computer Networking Technology I 4.0 Credits

Presents the fundamentals of data communications and networking technologies. Focuses on the broad foundational coverall of key technologies and key concepts in network planning, design, and management. Major topics include network models, data and voice communications, local-area and wide-area technologies, IP networks and their applications and internetworking emphasizing the Internet.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 171 [Min Grade: D] or CS 132 [Min Grade: D] or SE 102 [Min Grade: D] or INFO 152 [Min Grade: D]

INFO 331 Computer Networking Technology II 4.0 Credits

Focuses on design, construction and use of modern networks and internetworks. Prepares students to successfully create and operate modern secure networks. Major topics include LAN design and construction, internetwork architecture, WAN connectivity, security, virtual private networks and network operation in real-world environments.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 330 [Min Grade: D]

INFO 333 Introduction to Information Security 3.0 Credits

Introduction to information security in modern organizations. Examines what information security is, and what motivates organizations to consider information security as a high priority. Introduces legal, ethical and professional issues, risk management, security planning, security technologies, and security implementation and maintenance.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 336 Distributed Systems Security 3.0 Credits

Study of the principles, practices, and techniques to secure distributed applications, information and the infrastructure of distributed information systems. Topics include security planning, policies and models, threats and attacks, and the use and integration of distributed system security mechanisms for confidentiality, authentication, access control, and intrusion detection.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 330 [Min Grade: D]

INFO 340 Programming Internet Information Systems I 3.0 Credits

This is a hands-on course on programming Internet information systems with an object-oriented programming language, currently Java. The course emphasizes programming practice. It covers fundamental concepts such as object-oriented programming, client-server programming, multi-threaded programming, graphical user interface design, and application development.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 171 [Min Grade: D] or CS 132 [Min Grade: D] or INFO 152 [Min Grade: D] or SE 102 [Min Grade: D]

INFO 341 Programming Internet Information Systems II 3.0 Credits

Continues to develop design and programming skills for the development of Internet information systems. Studies and compares various web servers, applications servers, and different server-side programming languages. Emphasizes issues related to object-oriented design and server-side programming.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 340 [Min Grade: D]

INFO 350 Visual Analytics 3.0 Credits

Introduces the aims, principles, and practical tools of visual analytics for analytic reasoning and decision making. Characterizes key issues concerning with uncertainty, incomplete and conflict information. Examines the role of interactive visual analytic reasoning processes. Provides opportunities to use advanced interactive visual analytic tools.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INFO 250 [Min Grade: D]

INFO 355 Systems Analysis II 3.0 Credits

A project-oriented course that discusses software engineering and advanced techniques of requirements modeling, prototyping and software design, particularly utilizing object-oriented techniques. The course builds upon Systems Analysis I, requiring students to apply their knowledge of systems analysis tools and techniques.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 210 [Min Grade: D] and INFO 200 [Min Grade: D]

INFO 360 Language Processing 3.0 Credits

Study of the problems and techniques of processing natural language. Introduces theory of spoken language and how it differs from theories of computer-generated natural language. Includes language pattern recognition and syntactic inference, and semantic networks.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 210 [Min Grade: D] and INFO 200 [Min Grade: D]

INFO 365 Database Administration I 3.0 Credits

Database Administration is a continuation of Database Management Systems, and includes the following: advanced ERD techniques, database management system internals and advanced elements of the SQL language, as well as stored procedures and triggers, specifically as demonstrated in the Oracle implementation.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 210 [Min Grade: D] and (CS 171 [Min Grade: D] or CS 175 [Min Grade: D] or INFO 152 [Min Grade: D] or SE 102 [Min Grade: D])

INFO 366 Database Administration II 3.0 Credits

Introduces the principles and practices of database administration, particularly as they apply to commercial-grade relational database management systems. The course will include, but not be limited to, installation, systems tuning, application tuning, security, user management, backup and recovery. To this end, internals of RDBMSs will be discussed, using major commercial RDBMSs as examples. Distributed database issues will also be discussed. As time permits, other advanced issues will be addressed, such as issues of object and object-relational databases.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 365 [Min Grade: D]

INFO 370 Artificial Intelligence for Information Systems 3.0 Credits

Introduction to the field of artificial intelligence (AI). Basic concepts, principles, and techniques used to achieve the goals of AI are studied. Examples and applications are specific to information systems.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 108 [Min Grade: D]

INFO 371 Data Mining with Machine Learning 3.0 Credits

Introduces students to basic data mining approaches using machine learning tools. Focuses on machine learning algorithms for information inference and knowledge discovery from data. Covers major applications in data/text/web processing, analysis and mining.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: STAT 201 [Min Grade: D]

INFO 373 Digital Forensics 3.0 Credits

Provides an introduction to the collection, analysis, presentation, and preservation of digital evidence according to methodologies defined by forensic science to fulfill the needs of the legal and law enforcement communities. Introduces systems understanding as an important tool for digital forensic investigation of crimes that use information technology.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 210 [Min Grade: D] and INFO 355 [Min Grade: D]

INFO 375 Introduction to Information Systems Assurance 3.0 Credits

Introduction to the problem of security for modern information systems. Provides an overview of threats, both human and computer, to the security of an organization's data and information resources. Explores how systems may be made less vulnerable and how to respond. Examines issues of personal security in an electronic world.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 200 [Min Grade: D] and INFO 330 [Min Grade: D]

INFO 404 Nursing Informatics for the Bachelor of Science in Nursing Completion 3.0 Credits

Designed for registered nurses in the RN-BSN completion program. Examines computer applications, technology, internet tools, and focuses on health care informatics context for data management, information systems and telecommunications in nursing administration, education and practice. Problem solving and mini-design projects related to increased efficiency in nursing care delivery.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUOL.

INFO 405 Social and Collaborative Computing 3.0 Credits

Examines selected human, social and technical issues and concepts of computer-supported cooperative work, computer-supported collaborative learning and social networking. Topics include: the way that groups work in the networked organization; analysis and design of groupware; social networking and community-learning technologies; and future directions of these technologies.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 310 [Min Grade: D]

INFO 410 Information Technology Infrastructure 3.0 Credits

Presents methods for evaluating and selecting information technologies and planning technology implementation. Emphasizes consideration of needs and issues of the organization and individuals served by the technology. Also addresses issues in management of served by the technology. Also addresses issues in management of technology after initial installation including service planning, maintenance, and evolution.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

INFO 415 Information Technology Services 3.0 Credits

Introduces issues in management and delivery of IT services. Addresses needs and approaches to operational support including providing services, help desks, online support, documentation, and user training. Examines approached to defining, measuring, and analyzing service and support quality.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

INFO 420 Software Project Management 3.0 Credits

The objective of this course is to study project management in the context of software systems development. The course will cover the processes, contexts, metrics, planning and management concerns of managing projects for modern software systems. This is a writing intensive course.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: (INFO 200 [Min Grade: D] or SE 210 [Min Grade: D]) and (CS 172 [Min Grade: D] or CS 265 [Min Grade: D] or INFO 152 [Min Grade: D] or SE 103 [Min Grade: D] or CS 176 [Min Grade: D])

INFO 435 Information Services 3.0 Credits

Examines electronic services that deliver "published" information to an organization from external sources. Relates these services to functions such as planning, marketing, and research. Shows ways of monitoring the organization's larger environments, such as the economy, government, competitors, and new technologies. This course introduces students to the core concepts of information services as they apply to the essential techniques for retrieving, analyzing, organizing and presenting information. The skills learned in this course are transferable to any information seeking activity whether it is in a large research and development lab, or a small start-up company. The overall goal of this course is that upon completion, each student can produce a systematic and accurate method for recovering, analyzing, and disseminating needed information in any setting.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: INFO 105 [Min Grade: D]

INFO 440 Social Media Trend Spotting 3.0 Credits

Explores social trend spotting to analyze, understand, visualize and present information from social media feeds, which reflect emerging social, organizational and cultural trends. Students will analyze traces from social media, bespoke discussion forums and virtual organization portals to discern the relationship between online behavior and underlying social phenomena.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 240 [Min Grade: D]

INFO 450 Expert Consultant Systems 3.0 Credits

Introduces the basic concepts, techniques, and tools involved in the development of information systems based on human expertise. The course discusses the identification of expert system projects, knowledge acquisition, architectures of expert systems, inference, database and procedural considerations, verification and validation of expert systems. Provides hands-on experience in developing expert systems using an expert system programming language.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 370 [Min Grade: D]

INFO 480 Special Topics in Information Systems 4.0 Credits

Selected topics of interest to students in information systems. May be repeated for credit if topic varies.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

INFO 1199 Independent Study in INFO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

INFO 1299 Independent Study in INFO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

INFO 1399 Independent Study 2.0-12.0 Credits

Requires approval of advisor, supervising faculty member and college.

BSIS majors may take a maximum of 6 credits of independent study.

Any exception to this maximum must be approved in advance by the student's advisor. Independent study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study developed by the student in a term prior to the term in which the independent study is pursued.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

INFO 1499 Independent Study in INFO 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

Interactive Digital Media

Courses

IDM 100 Introduction to Web Development 3.0 Credits

This is an entry level course for non-interactive digital media majors that introduces students to the process of managing online content as well as how to define the presentation styles and interaction modes for the user through the use of a content management system.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

IDM 101 History of Web Development 3.0 Credits

This course explores all aspects of web development including the foundations of web technologies, formulation of web standards and how the individual web surfer's wants and needs have changed over time. Also discussed will be ground-breaking websites and the evolution of interface design for the web.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

IDM 211 User Interface Design I 3.0 Credits

This course covers the design, prototyping, and evaluation of graphical user interfaces by exploring topics like human capabilities, input technologies, heuristic evaluation, and design methods, principles and rules. We will learn how to design aesthetically pleasing user interfaces, covering important design principles (learnability, visibility, error prevention, efficiency, and visual design) and the human capabilities that motivate them (including perception, motor skills, color vision, attention, and human error).

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 100 [Min Grade: D]

IDM 212 User Interface Design II 3.0 Credits

This course builds upon the topics covered in User Interface Design I by exploring advanced topics of graphical user interface design for desktop, mobile, and touch screen devices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 211 [Min Grade: D]

IDM 215 User Experience Design 3.0 Credits

In this course, students learn to identify and implement the elements required to create incredible digital experiences. Through the application of user-centered design practices, students will develop predictive and enjoyable designs based on a holistic consideration of users' experience. Topics covered in this course include brand personality, research strategies, content strategy, information architecture, and usability.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 212 [Min Grade: D] and IDM 231 [Min Grade: D]

IDM 221 Web Design I 3.0 Credits

This course is a comprehensive overview of the design, creation, delivery and maintenance of functional, standards-based content on the Internet. Students will learn the aesthetics of web design alongside the underlying markup languages. They will critically evaluate web design quality, learn how to create and maintain quality web sites, and learn about accessibility and web design standards, and why they are important.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 100 [Min Grade: D]

IDM 222 Web Design II 3.0 Credits

This course builds upon the topics covered in Web Authoring I by exploring advanced web development topics and current industry best practices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 221 [Min Grade: D]

IDM 231 Scripting for Interactive Digital Media I 3.0 Credits

This course explores modern client-side scripting languages that interact with the user, control the browser, communicate asynchronously, and alter document content and functionality.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 221 [Min Grade: D]

IDM 232 Scripting for Interactive Digital Media II 3.0 Credits

This course explores modern server-side technologies for Internet based delivery of dynamic content that connect to and manipulate database content. Students learn how to build interactive, data-driven products.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 231 [Min Grade: D]

IDM 240 Interactive Graphics 3.0 Credits

In this course, students learn how to use modern development techniques to create responsive and scalable two-dimensional graphics with support for interactivity and dynamic animation. Topics include styling and transforming vector graphics, raster graphics, and text where the implementation takes future growth into consideration.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 222 [Min Grade: D] and (IDM 231 [Min Grade: D] or INFO 151 [Min Grade: D])

IDM 245 Web Game Design 3.0 Credits

Examines multimedia-authoring tools used to create interactive games. Students learn real world production techniques as they master advanced game design concepts.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 240 [Min Grade: D]

IDM 250 Content Management Systems 3.0 Credits

Students set up a content management system and develop a custom theme. Includes project planning, organizing and maintaining a quality code base.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 222 [Min Grade: D] and (IDM 232 [Min Grade: D] or INFO 152 [Min Grade: D])

IDM 361 Interactive App Design I 3.0 Credits

Focuses on creating user experiences optimized for mobile devices. Students learn to build unique web applications that take advantage modern mobile capabilities. Special consideration is given to limited screen real estate, low bandwidth Internet access, no Internet access, and touch screen devices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 240 [Min Grade: D]

IDM 362 Interactive App Design II 3.0 Credits

This course builds upon the topics covered in Mobile Interactive Design I by exploring how to convert web-based applications into cross-platform native applications for mobile devices. Special consideration is given to incorporating functionality that is currently unavailable in web-based applications.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (IDM 232 [Min Grade: D] or INFO 152 [Min Grade: D]) and IDM 361 [Min Grade: D]

IDM 371 Interactive Digital Media Workshop I 3.0 Credits

This course explores the developing or redesigning a successful interactive digital experience. Students work in team environments to analyze project requirements, develop a strategy for development, and utilize their design skills to present their findings to the client.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 215 [Min Grade: D] and IDM 250 [Min Grade: D]

IDM 372 Interactive Digital Media Workshop II 3.0 Credits

This course builds upon the topics covered in Interactive Digital Media Workshop I by continuing to work in a team environment to building a high-fidelity interactive digital media prototype with a focus on usability testing.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 371 [Min Grade: D]

IDM 380 Special Topics in Interactive Digital Media 0.5-6.0 Credits

Addresses current topics in a rapidly changing field. Possible offerings include; multimedia databases, virtual and augmented reality, 3-D XML, interactive art in virtual space, and multi-threaded narrative, etc... May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

IDM 381 Experimental Interactive Technologies 3.0 Credits

This course focuses on researching new innovations in experimental digital media technologies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: IDM 211 [Min Grade: D] and IDM 250 [Min Grade: D]

IDM 399 Independent Project in Interactive Digital Media 0.5-6.0 Credits

Supervised planning and execution of a project in the area of Interactive Digital Media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Interior Design

Courses

INTR 150 Issues of the Interior Environment 3.0 Credits

Introduces the interior design discipline. Uses lectures, guest speakers, discussions, and assignments to examine topical issues of the profession, teach professional responsibilities, and develop an understanding of the history and organization of the interior design profession.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR 160 Visualization I: Computer Imaging 3.0 Credits

An introductory course that explores the use of proprietary computer applications for communications and the preparation of visual materials in Interior Design. The course introduces and reinforces classic design principles for expert visual communication of ideas through digital techniques from an Interior Design perspective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is INTR.

INTR 200 History of Modern Architecture and Interiors 3.0 Credits

Covers development of modern architecture and interiors in the 19th and 20th centuries. Develops a vocabulary for discussing architecture; an understanding of how various factors affect design; and a familiarity with names, movements, and buildings that are part of historical development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR 211 Textiles for Interiors 3.0 Credits

This course is a comprehensive introduction to textiles and their use in the interior design profession.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INTR 220 Visualization II: Orthographic 3.0 Credits

This course explores design communication skills through hand drawing and model building exercises. Orthographic drawing skills are developed through investigation of plan, section, elevation and three dimensional drawings.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is INTR.

INTR 225 Environmental Design Theory 3.0 Credits

This course introduces design students to the relationship between people and the build environment. Understanding how people perceive, interact with, and are affected by their surroundings through readings and design exercises make evident the significance of the psychological, pyshicological, social and cultural concepts of environmental behavior as an integral part of the designed environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INTR 231 Structure 4.0 Credits

Investigates structure as an organizing principle in design by man and nature. Explores the basic objective and subjective relationships between form and function. Includes professionally juried presentations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 103 [Min Grade: C-] or VSST 106 [Min Grade: C-]

INTR 232 Interior Studio I 4.0 Credits

Primary spatial course. Involves conscious recognition of the manipulability of space or spaces within a given volume and small-scale environmental orientation. Includes professionally juried presentations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INTR 231 [Min Grade: C-]

INTR 233 Interior Studio II 4.0 Credits

Covers diagramming program requirements, designing for complex spatial requirements with an awareness of building systems (e.g., partitions, heating/ventilating/cooling, lighting), and furniture. Includes professionally juried presentations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INTR 232 [Min Grade: C-]

INTR 241 Visualization III: Digital 3.0 Credits

An intensive introduction to two and three dimensional drawing and visualization through the computer. This course explores orthographic and perspective drawing conventions and techniques from a digital perspective.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INTR 231 [Min Grade: C-]

INTR 245 Visualization IV: 3D Modeling 3.0 Credits

An intensive introduction to advanced modeling and rendering software. Students will explore lighting, materiality, advanced form and spatial experience through realistic three-dimensional digital models.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INTR 241 [Min Grade: D]

INTR 250 Interior Materials 3.0 Credits

Introduces basic construction materials and how they may be used successfully by the interior designer. Includes sample materials, visual aids, and guest speakers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INTR 300 [WI] Visual Culture: Interiors 3.0 Credits

Visual Culture: Interiors addresses the interior environment by studying the role history, economics, culture, materials and technological developments, impact decisions made by designers on interior spaces. While comparing historical context with specific knowledge, this course will enable the student to be a more articulate designer by a comprehensive examination of the interiors. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INTR 305 [WI] Visual Culture: Furniture 3.0 Credits

An overview of furniture in relationship to interiors, and its influences reaching from the roots of antiquity to the impact of technology in today's products. It is the study of artifacts from various time periods and cultures in relation to social and political developments, life and work styles, visual arts, and economic influences.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR 310 Sustainability: History, Theory and Critic 3.0 Credits

Course examines the meaning and implications of sustainable design to develop an informed interpretation and working assessment of this movement. Concepts and methodologies are explored through assigned readings, class discussion, field trips and team research.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

INTR 331 Residential Design Studio 4.0 Credits

Provides experience with extensive real space. Emphasizes recognizing its aesthetic quality and maximizing its potential to meet the requirements of the inhabitants, by stylistic quality and elaboration in the selection and application of furniture finishes and accessories. Includes professionally juried presentations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INTR 233 [Min Grade: C-]

INTR 341 Visualization V: Methods 3.0 Credits

An advanced course in visualization for Interior Design. Hybrid representation strategies and specialized topics in digital and hand rendering will be covered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 245 [Min Grade: D]

INTR 350 Interior Detailing 3.0 Credits

Covers basic considerations of interior construction and detailing and their application.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 250 [Min Grade: D] and INTR 233 [Min Grade: C-]

INTR 351 Interior Lighting 3.0 Credits

This course analyzes human needs and the perceptual responses of both general and special populations. It introduces the lighting design theory and principles and explores methods of creating mood and atmosphere with light. It develops vocabulary, documentation methods and understanding of energy conservation, lighting standards, and safety.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 350 [Min Grade: D]

INTR 399 Independent Study In Interior Design 0.5-12.0 Credits

Provides individualized study in interior design in a specialized area. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

INTR 410 Collaborative Research in Sustainability 3.0 Credits

This cumulative course is the advanced students' opportunity to participate in a collaborative, interdisciplinary team in which the students will be applying sustainable technical and conceptual education in the context of 3rd party competitions, internally defined design challenges or applied research.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: ARCH 320 [Min Grade: C-]

INTR 430 Commercial Design Studio 4.0 Credits

Covers design of institutional-commercial interiors, including space planning, selection of materials and furnishings toward a synthesized environment, and development of specifications. Includes professionally juried presentations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: INTR 331 [Min Grade: C-]

INTR 435 Topical Issues Studio 4.0 Credits

Investigates topical issues reflective of physical, social, cultural, and psychological needs, addressing special user groups or purposes. Studio.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: INTR 331 [Min Grade: C-]

INTR 441 Furniture Design 4.0 Credits

Covers design of environmental elements, simultaneous concerns with craftsmanship and the application of materials to ideas, and development of prototypes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: VSST 203 [Min Grade: D]

INTR 442 Hospitality Design Studio 4.0 Credits

Covers design of commercial hospitality interiors, including spatial layout, custom furnishings, lighting, selection of materials, and code requirements. Includes professionally juried presentations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is INTR.

Prerequisites: INTR 430 [Min Grade: C-]

INTR 445 Contract Documentation for Interior Design 3.0 Credits

Provides an understanding of the basic procedures and techniques for the development of construction drawings and furniture documentation. Requires students to use case studies to produce a set of drawings representative of current interior design industry standards.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: INTR 245 [Min Grade: D] and INTR 430 [Min Grade: C-]

INTR 450 [WI] Professional Practice 3.0 Credits

Surveys contemporary business methods, practices, and procedures in the operation of a design firm, including legal and ethical implications. Examines these practices through case studies and lectures by design professionals. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: INTR 331 [Min Grade: C-]

INTR 451 Interior Systems 3.0 Credits

Introduces building systems, mechanical, electrical, ceiling and furniture systems, and their effect on the interior environment. Includes visual aids and guest speakers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: INTR 350 [Min Grade: D]

Corequisite: INTR 430

INTR 465 Special Topics in Interior Design 1.0-12.0 Credit

Provides study in interior design on a special topic or on an experimental basis. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

INTR 470 Competition Studio 3.0 Credits

Competition opportunities from regional to international from professional to philanthropic allow for investigations of diverse contemporary issues surrounding the built environment. Students work under direction of a faculty member(s) to discuss, explore and develop solutions for entry into noteworthy competitions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if classification is Junior or Senior.

INTR 491 Senior Project I 3.0 Credits

Part one of the 3-term senior project where students develop a capstone independent design project from concept, research and programming to complete design development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is INTR.

Prerequisites: INTR 430 [Min Grade: C-]

INTR 492 Senior Project II 3.0 Credits

Part two of the 3-term senior project where students develop a capstone independent design project from concept, research and programming to complete design development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is INTR.

Prerequisites: INTR 491 [Min Grade: C-]

INTR 493 Senior Project III 3.0 Credits

Part three of the 3-term senior project where students develop a capstone independent design project from concept, research and programming to complete design development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is INTR.

Prerequisites: INTR 492 [Min Grade: C-]

INTR I199 Independent Study in Interior Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

INTR I299 Independent Study in Interior Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

INTR I399 Independent Study in Interior Design 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

INTR I499 Independent Study in Interior Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

INTR T180 Special Topics in Interior Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

INTR T280 Special Topics in Interior Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

INTR T380 Special Topics in Interior Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

INTR T480 Special Topics in Interior Design 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

International Business

Courses

INTB 200 International Business 4.0 Credits

This course examines economic, political, legal, and social factors affecting formulation of international business strategy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

INTB 332 Multinational Corporations 4.0 Credits

Discusses the role and function of multinational corporations in the global economy, reasons for their existence, and the impact of market structures on the operations of multinationals. Considers the interactions between multinationals and national authorities, and the international transfer of technology.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

INTB 334 International Trade 4.0 Credits

Examines major issues in international trade and commercial policy. Uses real-world applications to derive and illustrate models of international trade. Covers rationales and benefits of international trade, protectionism, the political economy of commercial policy, international trade and development, and economic integration and world trade.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

INTB 336 International Money and Finance 4.0 Credits

Examines major issues in international finance and open-economy macroeconomics. Develops models of international monetary interdependence and applies them to real-world examples. Covers determinants of interest rates, balance of payments, international macro policy, restructuring the international monetary system, and globalization of financial markets.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

INTB 338 Regional Studies in Economic Policies and International Business 4.0 Credits

Study of the industry, trade and macroeconomic trends of a major world region, such as East Asia, Latin America, Europe or the Near East.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 201 [Min Grade: C] and ECON 202 [Min Grade: C]

INTB 440 Seminar in International Business 4.0 Credits

Writing and discussion on advanced topics relevant to International Business. Content is determined mainly by the interests of the students enrolled at a particular term.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: INTB 200 [Min Grade: C]

INTB 482 International Business and Emerging Markets 1.0 Credit

The course is required for INTB students participating in the LeBow College of Business undergraduate international residency. It is structured as an independent study course with no lectures. A term research paper is a requirement.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

INTB I199 Independent Study in INTB 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

INTB I299 Independent Study in INTB 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

INTB I399 Independent Study in INTB 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

INTB I499 Independent Study in INTB 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

INTB T180 Special Topics in INTB 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

INTB T280 Special Topics in INTB 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

INTB T380 Special Topics in INTB 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

INTB T480 Special Topics in INTB 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

International Studies

Courses

IST 398 International Research Project and Study Abroad 0.5-20.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

International Studies Abroad

Courses

AS-A 351 Study Abroad Literature/Civics/Arts 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

AS-A 352 Study Abroad-Psychology and Sociology 20.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

AS-A 353 Study Abroad-History/Political Science 20.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

AS-A 354 Study Abroad-European Union 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

AS-A 398 Independent Research Project - Study Abroad 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

AS-A I199 Independent Study in AS-A 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-A I299 Independent Study in AS-A 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-A I399 Independent Study in AS-A 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-A I499 Independent Study in AS-A 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-A T180 Special Topics in International Studies Abroad 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-A T280 Special Topics in International Studies Abroad 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-A T380 Special Topics in International Studies Abroad 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

AS-A T480 Special Topics in International Studies Abroad 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Invasive Cardiovascular Technology

Courses

ICVT 300 Introduction to Cardiology 3.0 Credits

This course is designed to provide an introduction to the cardiology environment. It includes medical terminology, confidentiality, professionalism, patient's rights, medical ethics, universal precautions, and communications skills in cardiology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ICVT 302 Cardiovascular System 2.0 Credits

This course will review basic information about the functioning of the heart and lungs as it is applied to clinical practice. A complete description of the cardiovascular system to include blood circulations, embryological development and the pulmonary system will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 103 [Min Grade: C]

ICVT 303 Patient Assessment I 3.0 Credits

This course will allow the student to gain experience in recognizing and evaluating laboratory blood gases, hematology, coagulation and acid base disturbance as they relate to the needs of the cardiovascular patient. It will focus on "normal" and "abnormal" values associated with the diagnosis, treatment and prevention of cardiac episodes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 302 [Min Grade: C]

ICVT 304 Cardiac Laboratory Procedures 3.0 Credits

Introduction to the diagnostic procedures used in the Cardiac Catheterization Laboratory. Prior didactic instruction in cardiac anatomy and physiology and medical instrumentation will be applied.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 302 [Min Grade: C]

ICVT 305 Coronary Anatomy & Imaging 2.0 Credits

Discusses the anatomy of coronary arteries. It will review radiation production, x-ray beam characteristics, film-screen characteristics, film processing and imaging system performance.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 302 [Min Grade: C]

ICVT 306 ECG & Special Topics 4.0 Credits

This course presents the electrocardiography theory and principles necessary to recognize and evaluate ECG data from a real-time monitor, 12 lead electrocardiogram. Included is a detailed examination of the hearts cellular mechanisms, conduction pathology and the disease process responsible for irregularities of heart rhythm.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 302 [Min Grade: C]

ICVT 308 Cardiovascular Angiography 3.0 Credits

This course will expand on information learned in Cardiac Laboratory Procedures. It will emphasize advanced cardiovascular diagnostic and therapeutic procedures to include injection techniques, Intra-aortic balloon pumping, and Percutaneous Transluminal Coronary Angioplasty (PTCA) and patient closure devices.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 304 [Min Grade: C] and ICVT 305 [Min Grade: C] and ICVT 306 [Min Grade: C]

ICVT 309 Hemodynamic Data I 4.0 Credits

Students are introduced to the primary hemodynamic formula's associate with monitoring and evaluation of the cardiovascular patient. Hemodynamic monitoring skills, basic hemodynamic calculations, arrhythmia recognition and reports generated on a variety of physiological monitoring systems are presented in detail.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 306 [Min Grade: C] and ICVT 304 [Min Grade: C]

ICVT 310 Radiation Safety & Equipment 3.0 Credits

This course enables student radiographers to strengthen their competencies with issues related to radiation protection. The student will continue to evaluate such topics as radiobiology, radiation quantities, units and standards for radiation protection.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ICVT 311 Patient Assessment II 2.0 Credits

A continuation of patient assessments I, providing a solid theory base for the delivery of safe patient care in potentially unstable or unpredictable situations is the focus of this course. Documentation within the catheterization laboratory will be revisited along with continued discussion of procedures, protocols and patient education.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 303 [Min Grade: C]

ICVT 312 Clinical Practicum I 8.0 Credits

This clinical course is designed to allow the student to gradually gain experience in assisting the cardiologist to perform diagnostic cardiac catheterization procedures and hemodynamic calculations. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 309 [Min Grade: C] (Can be taken Concurrently) ICVT 303 [Min Grade: C] and ICVT 304 [Min Grade: C] and ICVT 305 [Min Grade: C] and ICVT 306 [Min Grade: C]

ICVT 406 Disease & Medical Emergencies 3.0 Credits

This course explains etiology, pathophysiology, and clinical findings associate with myocardial infarction, coronary artery, valvular and aortic diseases, and presents a detailed examination of congenital heart defects and hereditary disease process.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 412 [Min Grade: C] and HSCI 301 [Min Grade: C]

ICVT 407 Cardiovascular Review I 4.0 Credits

In this course, students will evaluate and review certification requirements. Student's will gain insight into their strengths and weaknesses associated with the certification requirement. Students will also form a directed plan of study to prepare for the CCI/RCIS or ARRT/CI examination.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 409 [Min Grade: C] and ICVT 412 [Min Grade: C] and HSCI 301 [Min Grade: C]

ICVT 409 Hemodynamic Data II 3.0 Credits

This is a continuation of hemodynamic data I. The student will have further development in hemodynamics monitoring and calculations. This course will expand on student's knowledge of ventricular function, thermodilution methods, ejection fraction, regurgitant fraction and other formulas utilized within the catheterization.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 309 [Min Grade: C] and ICVT 312 [Min Grade: C]

ICVT 410 Cardiovascular Review II 5.0 Credits

This course is a continuation of ICVT 407 with emphasis on additional evaluate and review certification requirements.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Corequisites: HSCI 302, ICVT 432

ICVT 411 Special Topics in Cardiology 2.0 Credits

This course covers topics of particular interest to students in cardiovascular health science. In different terms, a variety of topics will be presented to the students.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ICVT 412 Clinical Practicum II 8.0 Credits

A continuation of Clinical Practicum I, with emphasis and understanding of all clinical duties involved within the cardiovascular area to include additional knowledge of aseptic techniques.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 309 [Min Grade: C] and ICVT 312 [Min Grade: C]

ICVT 422 Clinical Practicum III 10.0 Credits

A continuation of Clinical Practicum II, with emphasis and understanding of all clinical duties involved within the cardiovascular area to include additional knowledge of aseptic techniques.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 412 [Min Grade: C] and ICVT 409 [Min Grade: C]

ICVT 432 Clinical Practicum IV 8.0 Credits

A continuation of Clinical Practicum III, students will continue to develop skill by active participation in a cardiac catheterization laboratory.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ICVT 407 [Min Grade: C] and ICVT 422 [Min Grade: C]

Corequisites: HSCI 302, ICVT 410

Italian

Courses

ITAL 101 Italian I 4.0 Credits

Introductory Italian. Includes listening, speaking, reading, and writing. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ITAL 102 Italian II 4.0 Credits

Continues ITAL 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 101 [Min Grade: C]

ITAL 103 Italian III 4.0 Credits

Continues ITAL 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 102 [Min Grade: C]

ITAL 201 Italian IV 4.0 Credits

Intermediate Italian. Includes grammar review, listening, speaking, and reading. Recommended for students who wish to attain oral competence based on standard usage. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 103 [Min Grade: C]

ITAL 202 Italian V 4.0 Credits

Continues ITAL 201. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 201 [Min Grade: C]

ITAL 203 Italian VI: Conversation and Composition 4.0 Credits

Provides intensive practice in comprehension and written and oral communication. Emphasizes development of writing skills and increased oral competence in everyday situations. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 202 [Min Grade: C]

ITAL 310 Advanced Grammar and Translation 4.0 Credits

Provides advanced practice in written and oral communication, including journalistic, professional, and creative writing. Examines contemporary cultural contexts through media and news. Taught in Italian.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 202 [Min Grade: C]

ITAL 311 [WI] Introduction to Italian Stylistics 3.0 Credits

Provides advanced practice in comprehension and written and oral communication, based primarily on periodicals and contemporary media. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 203 [Min Grade: C]

ITAL 312 [WI] Italian Stylistics 3.0 Credits

Continues ITAL 311. Provides extensive study of the techniques of translation and communication. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 311 [Min Grade: C]

ITAL 313 [WI] Advanced Italian Stylistics 3.0 Credits

Continues ITAL 312. Provides advanced training in oral and written communication in Italian. Particularly recommended for students who have pre-proficiency status, Italian minors and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 331 Introduction to Italian Literature Studies 3.0 Credits

Advanced Italian. Reading, writing, and extensive conversational practice, based on masterpieces of Italian literature.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 333 Advanced Italian Literature 3.0 Credits

Continues ITAL 332. Provides advanced study of Italian literature. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 351 Introduction to Business and Professional Italian 3.0 Credits

Provides intensive oral practice and written work in business, professional, and commercial Italian. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 352 Business and Professional Italian 3.0 Credits

Advanced business and professional Italian. Advanced practice in oral and written Italian for business and the professions. Based on advanced texts, periodicals, and technical journals.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 371 Special Studies in Italian Civilization and Culture 3.0 Credits

Presents an integrated approach in Italian to the civilization, culture, history, and literature specific to the areas in which the language is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 411 [WI] Special Studies in Advanced Italian Stylistics 3.0 Credits

Continues ITAL 313. Particularly recommended for students who have proficiency status, Italian minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 431 [WI] Special Studies in Advanced Italian Literature 3.0 Credits

Continues ITAL 333. Particularly recommended for students who have proficiency status, Italian minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 451 Special Studies in Advanced Business and Professional Italian 3.0 Credits

Continues ITAL 353, with emphasis on the structure and protocols of the European Union. Particularly recommended for students who have proficiency status, Italian minors, and students interested in graduate study and/or international careers. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 471 [WI] Special Studies in Italian Civilization 3.0 Credits

Presents an integrated approach, at the advanced level, to the civilization, culture, history, and literature of a given period specific to the areas in which Italian is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ITAL 312 [Min Grade: C]

ITAL 480 Italian Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ITAL I199 Independent Study in ITAL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL I299 Independent Study in ITAL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL I399 Independent Study in ITAL 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL I499 Independent Study in ITAL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL T180 Special Topics in Italian 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL T280 Special Topics in ITAL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL T380 Special Topics in Italian 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ITAL T480 Special Topics in Italian 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 96 credits

Japanese

Courses

JAPN 101 Japanese I 4.0 Credits

Introductory Japanese. Includes listening and speaking, with individual audiolingual practice. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JAPN 102 Japanese II 4.0 Credits

Continues JAPN 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 101 [Min Grade: C]

JAPN 103 Japanese III 4.0 Credits

Continues JAPN 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 102 [Min Grade: C]

JAPN 104 Japanese Writing I 3.0 Credits

This course focuses on reading and writing in the Japanese language.

The course introduces the basic elements of the Japanese writing systems, which include Katakana, Hiragana and Kanji.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 101 [Min Grade: C] and JAPN 102 [Min Grade: C]

JAPN 105 Japanese Writing II 3.0 Credits

This course focuses on reading and writing in the Japanese language.

The course builds on lessons from Japanese Writing I.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 104 [Min Grade: C]

JAPN 201 Japanese IV 3.0 Credits

This courses includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on Japanese 103.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 103 [Min Grade: C]

JAPN 202 Japanese V 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on JAPN 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 201 [Min Grade: C]

JAPN 203 Japanese VI 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on JAPN 202.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 202 [Min Grade: C]

JAPN 204 Japanese Writing III 3.0 Credits

This course focuses on reading and writing in the Japanese language. The course builds on lessons from Japanese Writing I and II.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 105 [Min Grade: C]

JAPN 301 Japanese VII 3.0 Credits

Advanced Japanese. Provides reading, writing, and extensive conversational practice. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 203 [Min Grade: C]

JAPN 302 Japanese VIII 3.0 Credits

Provides advanced practice in translation, comprehension, and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 301 [Min Grade: C]

JAPN 303 Japanese IX 3.0 Credits

Continues JAPN 302. Offered as needed and with sufficient enrollment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: JAPN 302 [Min Grade: C]

JAPN 411 Introduction to Japanese Stylistics 3.0 Credits

Fourth year of Japanese. Provides advanced practice in comprehension and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: JAPN 303 [Min Grade: C]

JAPN 451 Introduction to Business and Professional Japanese 3.0 Credits

Fourth year of Japanese. Provides intensive oral practice and written work in business, professional, and commercial Japanese. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: JAPN 303 [Min Grade: C]

JAPN 480 Japanese Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JAPN I199 Independent Study in JAPN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN I299 Independent Study in JAPN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN I399 Independent Study in JAPN 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN I499 Independent Study in JAPN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN T180 Special Topics in Japanese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JAPN T280 Special Topics in Japanese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JAPN T380 Special Topics in Japanese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JAPN T480 Special Topics in JAPN 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Judiac Studies

Courses

JUDA 201 Jewish Literature and Civilization 3.0 Credits

This course explores the origins of the Jewish people and their core narratives and beliefs that have become the foundations of Jewish civilization and religion, introducing the first five books of the Torah, the Jewish Bible and analyzing its influence. Major events of the Jewish lifecycle and calendar are examined.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 202 Jewish Life and Culture in the Middle Ages 4.0 Credits

This course is an introductory survey of the history of the Jewish people, their civilization, religion and contacts with other cultures in medieval times. Topics will include the rise of Christianity and Islam, the Talmud, Jewish mysticism and the growth of Ashkenazic and Sephardic Jewry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 203 Modern Jewish History 4.0 Credits

This course is an exploration of the social, cultural, political and religious forces that have shaped Jewry the world over from the 18th to the 20th centuries. Topics will include Emancipation and Enlightenment, modern religious movements, socialism, Hebrew and Yiddish literature, the Holocaust, Zionism and the state of Israel.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 211 American Jewish Experience 3.0 Credits

The course explores communal organization of Jews in America from colonial times until today. Topics include westward expansion, urban neighborhoods, American Jewish religion and culture, and Jewish contributions to American culture. The study of this ethno-religious group elucidates historical issues, such as the immigration legacy, minority rights, discrimination, and intermarriage.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 212 [WI] Contemporary Jewish Life 3.0 Credits

The course will analyze Jewish social, cultural, and religious activities since the 1970s through four ethnographic community studies and documentary films, aiming to understand the meaning that Jews derive from their beliefs, rituals, and institutions. We will stress identity development over the lifespan and historical issues since the Holocaust and the establishment of the State of Israel.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 213 Jewish Cultural Tapestry 3.0 Credits

The course examines the different customs and traditions of Jews in various parts of the world throughout history. How do minorities develop and maintain their group identity? How have the Jews evolved both diversity and uniformity of practice and ideology? The focus will be on the geography and history of folk traditions: language, religious practice, foodways, dress, and music. The class will examine the phenomenon of diaspora, the dispersion of a people from its homeland, and will analyze the shared religious culture and the parallel, local specific culture.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 214 Language and Cultural Diversity in the USA 3.0 Credits

Starting with research on communication patterns of men and women, moving on to the language diversity of African Americans, and then emphasizing the cultural production of various immigrant groups, the predominance of a rich array of languages and cultures will be shown to pertain to most periods of American history. The Yiddish language-based immigrant culture of American Jews will be treated as a case study, dwelling on the rich Yiddish literature created, as well as language-based cultural institutions, such as the press, theater, radio, klezmer music, and film.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 215 Reconstructing History After Genocide 3.0 Credits

The course explores educational restitution to peoples who are victims of genocide. After conceptualizing the world's responsibility to maintain its cultures and help victims of genocide to recover their history, the class will compare educational efforts to document life before the destruction in places such as Rwanda, the former Yugoslavia and among Native Americans. Our main focus will be the politics of teaching about Polish Jewry, the largest community of Jews before WW II that was destroyed by the Nazis in the Holocaust. Students will evaluate sources that describe Jewish life in one city, Lublin, Poland.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 216 Yiddish Literature & Culture 3.0 Credits

The course describes the major Jewish culture during the past thousand years. In a lively course stressing the arts and everyday family life, students will be introduced to the multi-faceted Yiddish language and culture. Through study and meetings with community members, students learn how Yiddish both reflects and gives meaning to life. Texts will include English translations of proverbs, folktales, folksongs, prayers, epics, personal diaries, memoirs, drama, films, memorial literature, modern fiction and poetry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

JUDA 280 Special Topics in Judaic Studies 3.0 Credits

In this course, students will explore specific areas not covered in the regularly offered Judaic Studies courses. The course will be taught by teaching faculty members of the Judaic Studies Program, Drexel professors who are members of the Judaic Studies Faculty Committee, or by visiting professors. This is a three-credit elective course for the Louis Stein Judaic Studies Minor. It may also be used as a free elective course for a variety of students.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

JUDA 298 Field Work in Judaic Studies 3.0 Credits

In this course, students will do independent fieldwork within a Jewish communal organization in the USA or abroad, or ethnographic or archeological fieldwork. The plan of the work, weekly time commitment, and periodic reports will be agreed upon in advance by the student and Professor Peltz, Director of Judaic Studies, or another Drexel Judaic Studies faculty member. This is a three-credit elective course for the Louis Stein Judaic Studies Minor. It may also be used as a free elective course for a variety of students.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

JUDA I199 Independent Study in JUDA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA I299 Independent Study in JUDA 3.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

JUDA I399 Independent Study in JUDA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA I499 Independent Study in JUDA 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA T180 Special Topics in Judaic Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA T280 Special Topics in Judaic Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA T380 Special Topics in Judaic Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

JUDA T480 Special Topics in Judaic Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Korean

Courses

KOR 101 Korean I 4.0 Credits

Introductory Korean. Includes listening, speaking and writing, with individual audio-video practice.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

KOR 102 Korean II 4.0 Credits

Introductory Korean. Includes listening, speaking and writing, with individual audio-video practice. Builds on Korean 101.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: KOR 101 [Min Grade: C]

KOR 103 Korean III 4.0 Credits

Introductory Korean. Includes listening, speaking and writing, with individual audio-video practice. Builds on Korean 102.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: KOR 102 [Min Grade: C]

KOR 201 Korean IV 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on KOR 103.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: KOR 103 [Min Grade: C]

KOR 202 Korean V 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on KOR 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: KOR 201 [Min Grade: C]

KOR 203 Korean VI 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on KOR 202.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: KOR 202 [Min Grade: C]

KOR 301 Korean VII 3.0 Credits

Advanced Korean. Focuses on reading, writing and conversational practices.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: KOR 203 [Min Grade: C]

KOR 302 Korean VIII 3.0 Credits

Advanced Korean. Focuses on reading, writing and conversational practices. Builds on Korean 301.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: KOR 301 [Min Grade: C]

KOR 303 Korean IX 3.0 Credits

Advanced Korean. Focuses on reading, writing and conversational practices. Builds on Korean 302.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: KOR 302 [Min Grade: C]

KOR 480 Korean Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.
College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

KOR I199 Independent Study in KOR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

KOR I299 Independent Study in KOR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

KOR I399 Independent Study in KOR 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

KOR I499 Independent Study in KOR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

KOR T180 Special Topics in Korean 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

KOR T280 Special Topics in Korean 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

KOR T380 Special Topics in Korean 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

KOR T480 Special Topics in Korean 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

Language

Courses

LANG 200 Crossing the Bridge 3.0 Credits

This course is designed for students who are experiencing the "otherness" of culturally diverse groups through living, studying or working abroad. Students will integrate and build on their intercultural experiences through a self-reflective process, and will become aware of the impact the students' own culture has on these experiences.
College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

LANG T180 Special Topics in Languages 0.5-12.0 Credits

Provides opportunities in language study commonly not taught in the Modern Language Program. Course offers intensive language training and study of the historical, social and cultural imperatives of the country where the language is spoken. May be repeated for credit.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

LANG T280 Special Topics in Languages 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

LANG T380 Special Topics in Languages 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

LANG T480 Special Topics in Languages 12.0 Credits

Topics decided upon by faculty will vary within the area of study.
College/Department: College of Arts and Sciences
Repeat Status: Can be repeated multiple times for credit

Leadership

Courses

LEAD 100 Introduction To Leadership Development: Theory and Practice 2.0 Credits

A study of effective leadership roles and processes, including the leader, the followers, and the situations; models of leadership in various organizations.
College/Department: Pennoni Honors College
Repeat Status: Not repeatable for credit

LEAD 200 Leadership Issues at Work 1.0 Credit

Leadership problems and possibilities in the workplace. Focus is on power relationship, conflicts, problems of race and gender and the role of the leader as organizer, teacher ethicist in guiding positive change.
College/Department: Pennoni Honors College
Repeat Status: Not repeatable for credit
Prerequisites: LEAD 100 [Min Grade: D]

LEAD 300 College and School-based Courses 1.0 Credit

Leadership cases, models and approaches as related to particular disciplines: e.g. leader in history; issues in engineering leadership, change in engineering; leaders, film and literature; the psychology of leadership, and others.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: LEAD 200 [Min Grade: D]

LEAD 400 Relating Community and Classroom 1.0 Credit

For students with extensive community service, this course formalizes reflection on the experience through presentations, discussion and preparation of leadership portfolio.

College/Department: Pennoni Honors College

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

LEAD I199 Independent Study in LEAD 0.5-4.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

LEAD I299 Independent Study in LEAD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

LEAD I399 Independent Study in LEAD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

LEAD I499 Independent Study in LEAD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

Legal Studies

Courses

BLAW 201 Business Law I 4.0 Credits

Covers scope and classification of business law and the field of contracts.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 202 Business Law II 4.0 Credits

Covers sales, negotiable instruments, personal property, and bailments.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 321 Law of Business Organizations 4.0 Credits

Covers agencies, partnerships, corporations, and limited-liability companies.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 330 Real Estate 4.0 Credits

Studies real property laws and the various rights, obligations, and limitations pertaining to land ownership. Analyzes the problems, procedures, and documents involved in the acquisition, mortgaging, and transfer of real property.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 334 Labor Law 4.0 Credits

Examines state and federal law regulating labor relations. Analyzes employment law and its impact on employment practices.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 338 Government Regulation and Business 4.0 Credits

Examines constitutional questions regarding relationship between business and various levels of government in the United States.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 340 International Business Law 4.0 Credits

Examines the law of international commercial transactions, trade, licensing, investments, and dispute resolution.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 342 Criminal Law 4.0 Credits

Surveys state and federal criminal codes and procedures.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 346 Entrepreneurial Law 4.0 Credits

This course is intended to address the various legal and ethical issues that confront individuals and companies in starting up new ventures, either within an existing company or a new start-up company.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BLAW 348 White Collar Crime 4.0 Credits

Examines the current federal and local criminal codes as they apply specifically to managers and businesses and the enforcement process.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BLAW 350 Life Insurance 3.0 Credits

Covers basic principles and practices in the field of life insurance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 354 Property and Liability Insurance 3.0 Credits

Covers principles involved in and the protection provided by property and liability insurance, including multiple line and all risk insurance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

BLAW 356 Legal Issues in Corporate Governance 4.0 Credits

This course examines the legal and regulatory environment of corporate governance by reviewing legislation such as Sarbane/Oxley and other regulations. The course examines not only the compliance requirement and penalties imposed by such regulations, but also analysis the impact it has on director and managers in the management of business.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BLAW 201 [Min Grade: D]

BLAW 358 Employment Law 4.0 Credits

Examines and analyzes legal aspects of employment as governed by law and judicial decision, including labor standards, workers' compensation, employment law and employment practices, and employer and employee rights.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BLAW 201 [Min Grade: D]

BLAW 360 Intellectual Property and Cyber Law 4.0 Credits

This course presents an overview of the Law of Intellectual Property. It examines patents, copyrights, trademarks and trade secrets together with public policy issues including the Constitution and legislation. It also reviews current regulation and legislation relating to the Internet, including privacy and tort issues.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BLAW 201 [Min Grade: D]

BLAW I199 Independent Study in BLAW 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BLAW I299 Independent Study in BLAW 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BLAW I399 Independent Study in BLAW 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BLAW I499 Independent Study in BLAW 1.0-4.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BLAW T180 Special Topics in BLAW 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BLAW T280 Special Topics in BLAW 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BLAW T380 Special Topics in BLAW 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

BLAW T480 Special Topics in BLAW 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Linguistics

Courses

LING 101 Introduction to Linguistics 3.0 Credits

Introduces major topics in the study of language, including language acquisition, language change, the social use of language, and the analysis of discourse, and teaches basic techniques in linguistic analysis through the use of a wide variety of language data.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

LING 102 Language and Society 3.0 Credits

Develops understanding of how language is involved with relations of class, ethnicity, gender and aesthetics in society. The course covers the social investigation of language use, politeness in languages, different varieties of English dialects, slang, and rap, bilingualism and languages in immigrant communities, and language planning.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

LING T180 Special Topics in Linguistics 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

LING T280 Special Topics in Linguistics 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

LING T380 Special Topics in Linguistics 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

LING T480 Special Topics in Linguistics 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Management

Courses

MGMT 201 Introduction to Technology Innovation Management 4.0 Credits

This course discusses the basics every manager needs to organize successful technology-driven innovation in both entrepreneurial and established firms. We start by examining innovation-based strategies as a source of competitive advantage and then examine how to build organizations that excel at identifying, building and commercializing technological innovations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 210 Research Methods I 2.0 Credits

This course enables undergraduate students to design research in business and related disciplines. Students develop techniques in the selection and design of appropriate research methodologies in the identification of a research problem in a business environment. The course examines the research process from problem identification and setting through a review of pertinent literature as secondary sources and an examination of the descriptive research design.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 211 Research Methods II 2.0 Credits

This course introduces students to the group of approaches to social science and humanistic research known as qualitative inquiry. These approaches include ethnography, grounded theory, phenomenology, case study, and narrative research, and employ methods of interviewing, discourse/content analysis, and participation observation. Technology used includes digital analog recorders, videotape, and software such as Simstat for text 'mining' and coding. Students will explicate studies that employ these approaches; discuss assumptions of qualitative inquiry; discuss standards of sampling, ethics, and validity, and design a qualitative research proposal.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 260 Introduction to Entrepreneurship 4.0 Credits

The course focuses on entrepreneurship as a generic activity, including start-ups and corporate entrepreneurship. It explores the opportunities and challenges faced by individuals starting up new ventures and the probable paths of career development for the students pursuing entrepreneurship.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 301 Designing Innovative Organizations 4.0 Credits

Designing innovative organizations focuses on effective organizational design in technology innovative organizations, with special emphasis on innovative organizational forms that can provide strategic advantage. Topics include when to use functional, divisional, or matrix organizations, how IT creates new organizational possibilities, and examples of innovative organizational possibilities, such as democratic decision-making, crowd-based organizations, internal resource markets, and other forms of collective intelligence. Team projects include inventing new possibilities for real organizations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 302 Competing in Technology Industries 4.0 Credits

This course provides a set of concepts, tools, and frameworks that are grounded on the theories of strategic management and technological innovation that are necessary to achieve competitive advantages in the technology industries. We will accomplish this objective by using a combination of lectures, class discussions, guest lectures, case memo write-ups, a final exam and a group project that focuses on a live case analysis.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 363 Directed Study in Entrepreneurship 4.0 Credits

This course provided student with real experiences in the realm of entrepreneurship under the guidance and direction Baiada Center in Technology Entrepreneurship. This course may not be repeated for credit.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MGMT 260 [Min Grade: D]

MGMT 364 Technology Management 4.0 Credits

This course focuses on the dynamic of technological innovation and change, in particular, how new technologies create entrepreneurial opportunities. The course examines how industries and firms are transformed by new technologies and what factors affect innovation performance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 365 Business Plan for Entrepreneurs 4.0 Credits

In this course, students learn how to prepare a comprehensive strategy for launching a new business. The vehicle for achieving this is the preparation of a start-up business plan based on a selected opportunity.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MGMT 260 [Min Grade: D]

MGMT 366 Entrepreneurship Certificate Project 1.0 Credit

This is a capstone special project for the Entrepreneurship Certificate. Students would propose a topic in entrepreneurship that is related to their undergraduate area. The topic would need to be approved by the Management Department Head.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MGMT 260 [Min Grade: D] and MGMT 365 [Min Grade: D] and ACCT 120 [Min Grade: D]

MGMT 370 Business Consulting 4.0 Credits

Students act as consultants to local, national and global companies working on real business issues. Student teams, with the support of advisors and faculty, will focus their energy on helping clients achieve new insights to business challenges through data driven decisions. Projects integrate various business disciplines; students will define conceptual and theoretical issues, conduct research, and analyze data central to for-profit organizations. Students will present plans and recommendations to help resolve clients' business challenges. Clients and projects vary each term. Client team meetings may occur during business hours. Can be used as a business elective requirement. Cannot be repeated for credit. Open to juniors and seniors.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

MGMT 371 Business Consulting for Nonprofits 4.0 Credits

Students act as consultants to local and national nonprofits working on real business issues. Student teams, with the support of advisors and faculty, will focus their energy on helping clients achieve new insights to business challenges through data driven decisions. Projects integrate various business disciplines; students will define conceptual and theoretical issues, conduct research, and analyze data central to these organizations. Students will present plans and recommendations to help resolve clients' business challenges. In addition to the project, students will also learn about some of the unique aspects of the governance of non-profit organizations. Clients and projects vary each term. Client team meetings may occur during business hours. Can be used as a business elective requirement.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

MGMT 372 Startup Consulting 4.0 Credits

This course provides students with real-world consulting experiences with entrepreneurs. It is designed so that student teams work with start-up companies or with start-up projects inside established companies; topics include but are not limited to market research, feasibility assessment, business model testing, business plan development and new product launch. Students work with companies in order to gain experience with entrepreneurs and consulting, in addition to learning about the opportunities and challenges that entrepreneurs face every day in their businesses.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MGMT 260 [Min Grade: D]

MGMT 450 Strategy and Competitive Advantage 4.0 Credits

Provides an integrated approach to business planning. Develops strategic analysis and decision-making through examination of an organization's internal and external environment. Requires written and oral case reports.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: FIN 301 [Min Grade: D] and ORGB 300 [Min Grade: D] and (MKTG 301 [Min Grade: D] or MKTG 201 [Min Grade: D])

MGMT 451 Management Simulation 4.0 Credits

Requires student teams responsible for the operation of competing firms in a computer-simulated dynamic business environment to conduct top management strategic planning, analysis, and social responsibility.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: FIN 301 [Min Grade: D] and ORGB 300 [Min Grade: D] and MKTG 301 [Min Grade: D]

MGMT I199 Independent Study in MGMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MGMT I299 Independent Study in MGMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MGMT I399 Independent Study in MGMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MGMT I499 Independent Study in MGMT 4.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

MGMT T180 Special Topics in MGMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MGMT T280 Special Topics in MGMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MGMT T380 Special Topics in MGMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MGMT T480 Special Topics in MGMT 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Management Information Systems

Courses

MIS 200 Management Information Systems 4.0 Credits

Introductory course to Management of Information Systems, a core business function. The course examines how information systems (i.e., information technology, people, procedures, and data) help add value to an organization, and integrate the various functional areas of a business (e.g., accounting, marketing, etc.).

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 261 Introduction to Enterprise Application Software Using SAP - Logistics 4.0 Credits

This course introduces students to the SAP Business Suite, real-life business processes in modern companies, and the fundamental concepts of enterprise application software. A hands-on, case study approach to exploring SAP ERP (enterprise resource planning) capabilities, focusing on Logistics/Operations (procurement, production, and fulfillment) will be used. In addition, associated SAP applications such as Customer Relationship Management and Supply Chain Management, as well as touching on some related solutions such as Analytics, Cloud Computing and In-Memory Computing (SAP HANA) will be discussed. After completing this course, students will be equipped with practical skills and competencies for careers in business and IT where SAP software is universal.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 262 Intro to Enterprise Application Software Using SAP - Accounting & Analytics 4.0 Credits

This course introduces students to real-life accounting business processes in modern companies, fundamental concepts of enterprise application software like enterprise resource planning (ERP) and methods for reporting and data analysis. We will use SAP ERP and Analytics solutions, taking a hands-on, case study approach to exploring Financial Accounting, Managerial Accounting and related business processes. After completing this course, students will be equipped with practical skills and competencies for careers in business and information technology where SAP software is universal.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MIS 200 [Min Grade: D] or MIS 300 [Min Grade: D]

MIS 341 Microcomputer Technologies for Business 4.0 Credits

Builds on the introductory MIS course. Covers computer hardware, software, and networking technologies in considerable detail. Discusses client/server computing, including network operating systems, middleware, and DBMSs, as well as how these technologies can be cost-effectively and efficiently deployed in business contexts. Uses hands-on labs.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MIS 300 [Min Grade: D] or MIS 200 [Min Grade: D]

MIS 342 Systems Analysis and Design 4.0 Credits

Introduces structured and object-oriented systems analysis and design methodologies in classroom and hands-on lab settings. Discusses system life-cycle concepts and techniques such as dataflow diagrams, structure charts, and E-R diagrams. Also covers object-oriented design, prototyping, and rapid application development approaches.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MIS 300 [Min Grade: D] or MIS 200 [Min Grade: D]

MIS 343 Database Design and Implementation 4.0 Credits

Covers data and file structures, object-oriented database design, and the use of SQL for querying databases. Discusses logical and physical database design and offers hands-on experience with commercial database management systems (DBMSs).

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MIS 200 [Min Grade: D] or MIS 300 [Min Grade: D]

MIS 344 Networking Technologies for Business 4.0 Credits

Introduces networking concepts and technologies. Examines the OSI reference model, networking protocols and topologies, and networking operating systems (NOSs). Compares local, campus, metropolitan, and wide-area networks and the newest devices they use. Also includes hands-on use of a leasing NOS.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MIS 300 [Min Grade: D] or MIS 200 [Min Grade: D]

MIS 345 Client/Server Computing for Business 4.0 Credits

Examines client/server architecture and discusses how it may be successfully developed and deployed. Examines the technological infrastructure of C/S systems such as networks and middleware in hands-on lab settings.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MIS 300 [Min Grade: D] or MIS 200 [Min Grade: D]

MIS 346 Management Information Systems Strategy 4.0 Credits

To discuss Management of Information Systems, and then to elaborate on its application to organizational change, especially to reengineering.

This course will introduce the student to central aspects of MIS policy and strategy in the first part of the course and then use these concepts to understand reengineering in the latter part of the course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 347 Domestic and Global Outsourcing Management 4.0 Credits

To introduce the student to issues in managing the outsourcing of Information Systems. This will be done in a mixture of lectures and student team presentations. The lectures will introduce the students to some of the central themes of outsourcing IS by summarizing current literature. Parallel to these lectures students will form study teams to investigate other important topics of IS outsourcing through a guided literature reading.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 348 Visual Basic Database Programming for Business 4.0 Credits

To introduce Business students to the basic concepts of programming, object oriented thinking, and database programming in the context of business applications.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 349 Predictive Business Analytics with Relational Database Data 4.0 Credits

Data mining is about creating new information by examining datasets to identify patterns and unknown questions they relate to by applying data modeling and statistical tools. The objective of this course is to introduce students to data mining through Base Programming, applied statistics, and data visualization methods in SAS.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 202 [Min Grade: D], STAT 206 [Min Grade: D] (Can be taken Concurrently)(MIS 200 [Min Grade: D] or MIS 300 [Min Grade: D])

MIS 351 Introduction to Programming for Business in C# 4.0 Credits

This course is an introductory course to the process and tools necessary to build a complete information system given a specification. In this course, you will learn basic concepts and techniques in computer programming. This course selects Microsoft Visual Studio.Net and C# as the software development environment and programming language. This language and development system is a complete suite of tools for creating stand-alone applications, portions of larger systems, independent objects, complete distributed systems, and active components of the World Wide Web.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MIS 200 [Min Grade: D] or MIS 300 [Min Grade: D]

MIS 352 Advanced Business Programming with ASP.Net 4.0 Credits

This course builds on the earlier Business Programming with ASP.NET course. Microsoft's ASP.NET is the major web application framework used to develop web-based business applications. This course introduces the student more advanced topics in business application development. In the earlier course, students learned how to build basic web-based applications using web forms, this course moves on to building application logic using C# and connecting to the back-end databases that store corporate data. Students who complete both sequence courses will have to ability to participate in building all components of Web-.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MIS 200 [Min Grade: D] or MIS 300 [Min Grade: D]

MIS 361 Information System Project Management 4.0 Credits

The course is structured around the key phases of a project lifecycle – initiating a project, planning a project, executing a project, controlling a project, and closing out a project. It also pays specific attention to the nine knowledge areas of Project Management as defined by the Project Management Institute (PMI)'s Project Management Body of Knowledge (PMBOK): project scope, cost, time, integration, quality, communication, risk, human resources, and procurement management. Additionally, students will be introduced with choices in project management approaches (such as SAP Project Management and APM).

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MIS 200 [Min Grade: D] or MIS 300 [Min Grade: D]

MIS I199 Independent Study in MIS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MIS I299 Independent Study in MIS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MIS I399 Independent Study in MIS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MIS I499 Independent Study in MIS 1.0-4.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MIS T180 Special Topics in MIS 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MIS T280 Special Topics in MIS 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MIS T380 Special Topics in MIS 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MIS T480 Special Topics in MIS 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Manufacturing Engineering Technology

Courses

MET 100 Graphical Communication 3.0 Credits

Introduces engineering graphics and fundamentals of computer aided design using the interactive software package AutoCAD on a personal computer.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman.

MET 101 Engineering Materials 3.0 Credits

Study of tests used to characterize properties of ceramic, polymeric, and metallic materials and how material properties influence their use and design for engineering applications. Testing procedures demonstrations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 111 [Min Grade: D] and CHEM 113 [Min Grade: D]

MET 201 Introduction to Manufacturing Processes 3.0 Credits

Introduces manufacturing and its managed activities: research and development, production, marketing, industrial relations, and finance. Includes laboratory work in organization, staffing, and operating a model manufacturing enterprise.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: MATH 110 [Min Grade: D]

MET 202 Computer-Aided Drafting 4.0 Credits

Introduces computer design using an interactive software package on a microcomputer.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

MET 204 Applied Quality Control 3.0 Credits

Covers variables, procedures, and processes of total quality control within the manufacturing industries. Includes instrumentation for material evaluation, attribute inspection and sampling, supervising for organizational quality improvements, and statistical control. Emphasizes directed laboratory experiences.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

Prerequisites: STAT 201 [Min Grade: D]

MET 205 Robotics and Mechatronics 3.0 Credits

Provides a comprehensive technical introduction to robotics and automation in manufacturing. Topics include flow line production, material handling, group technology, and flexible and mechatronics-integrated manufacturing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 103 [Min Grade: D] and MATH 110 [Min Grade: D]

MET 209 Fluid Power 3.0 Credits

Covers the fundamentals of hydraulic systems with an emphasis on applications of Bernoulli's equation. Topics include component types and designs, hydraulic circuit analysis, and design of hydraulic systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 103 [Min Grade: D] and PHYS 104 [Min Grade: D]

MET 213 Applied Mechanics 4.0 Credits

Covers elements of statics and strength of materials with specific applications to manufacturing problems. Topics include the design of bolted connections, simple structures, centroids, moments of inertia and beam design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 103 [Min Grade: D] and MET 101 [Min Grade: D] and MATH 122 [Min Grade: D]

MET 301 Advanced Design Graphics 3.0 Credits

Covers the theory and practice of industry's parts and assembly drawings with a specialization in tolerance and geometric dimensioning. Discusses industrial procedures and standards.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 100 [Min Grade: D]

MET 307 HazMat for Manufacturing 3.0 Credits

Covers the characteristics of hazardous substances and wastes, medical surveillance for plant personnel, toxicology, respirators and protective clothing, environmental direct reading indicators, decontamination procedures, and safe working practices.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: BIO 161 [Min Grade: D] and CHEM 162 [Min Grade: D] and CHEM 164 [Min Grade: D]

MET 308 Maritime Manufacturing 3.0 Credits

Provides an overview of the key engineering standards, laws, and regulations governing the construction of commercial vessels in the United States and methods of complying with these requirements. Focuses on the ship manufacturing process and the installation and testing of ship systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

MET 310 Advanced Robotics and Mechatronics 3.0 Credits

Covers applied topics related to the integration of computer, robotics, and internet-based automation technologies in modern manufacturing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 205 [Min Grade: D]

MET 316 Computer Numerical Control 3.0 Credits

Discusses theory and application of computer numerical control machines in the manufacturing environment. The laboratory focuses on the programming and operation of CNC machine tools.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 110 [Min Grade: D] and MET 100 [Min Grade: D]

MET 402 Manufacturing Design with CAD 3.0 Credits

Covers design of tools and fixtures for manufacturing, including general-purpose work holders, modular and dedicated fixtures, jigs, fixturing principles, degree of freedom, locating and clamping components, wire frame and solid modeling, and 3d to 2D conversion. Students design models of fixtures.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 301 [Min Grade: D]

MET 403 Three Dimensional Modeling 3.0 Credits

Covers three-dimensional design with emphasis on manufacturing and industrial standards. Includes computer-aided-manufacturing using solid, surface, and wire-frame models.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 100 [Min Grade: D]

MET 404 Digital Instrumentation 3.0 Credits

Covers digital technology and its application in manufacturing. Covers variables, procedures, and processes of total quality control.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EET 201 [Min Grade: D]

MET 407 Manufacturing Processes 3.0 Credits

Covers a systematic understanding of the operations, applications, and planning of manufacturing processes. Discusses quantitative evaluations of processing parameters influencing product quality.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 101 [Min Grade: D] and MATH 122 [Min Grade: D]

MET 408 MFG Information Management 3.0 Credits

Covers information management in manufacturing. Topics include cost estimation and control, manufacturing resources planning (MRP), just-in-time (JIT), production and inventory controls, management information systems (MIS), supply chain management (SCM), and other advanced information management technology.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 205 [Min Grade: D] and MATH 122 [Min Grade: D]

MET 409 Green Manufacturing 3.0 Credits

Covers life cycle analysis, pollution prevention, recycling, and lean manufacturing, including characteristics of hazardous substances and wastes, medical surveillance for plant personnel, toxicology, respirators and protective, environmental direct reading indicators, decontamination procedures and safe working practices for MFG.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 111 [Min Grade: D] and CHEM 113 [Min Grade: D]

MET 411 Advanced Computer Numerical Control 3.0 Credits

This course covers applied topics related to the integration of computer, CNC machines, and internet-based automation technologies in modern manufacturing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 316 [Min Grade: D]

MET 421 [WI] Senior Design Project I 3.0 Credits

This course constitutes the first course of a three-quarter course sequence. It aims to train the students in identifying projects of relevance to the society, in planning and scheduling a solution, and in entrepreneurial activities that may result from the project. The course is also intended to cover an industrial project starting from the proposal writing and conceptual design to final steps. This course is focused on proposal writing. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

MET 422 Senior Design Project II 3.0 Credits

This course constitutes the second course of a three-quarter course sequence and continues MET 421. It aims to train the students in maintaining the progress of a project on schedule, including resolving any team conflicts. It also trains them how to prepare oral, and submit written progress reports. The students supply summary reports to his/her advisor. This course is focused on following standard design steps from the conceptual to final design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 421 [Min Grade: D]

MET 423 [WI] Senior Design Project III 3.0 Credits

This is the final installment of a 3 course sequence. The course objective is to train students in a project from the initial conceptual design stage to the preliminary and the final design completion, how to conduct design reviews, and how to document and present findings, design concepts, and conclusion in both oral and written formats. Students are also required to build a working prototype of their final design concept and present it during final presentation of the project.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 422 [Min Grade: D]

MET I199 Independent Study in MET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MET I299 Independent Study in MET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MET I399 Independent Study in MET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MET I499 Independent Study in MET 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MET T180 Special Topics in MET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MET T280 Special Topics in MET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MET T380 Special Topics in MET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Senior.

MET T480 Special Topics in MET 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Marketing

Courses

MKTG 201 Introduction to Marketing Management 4.0 Credits

Provides a conceptual and applications-oriented framework for marketing decision-making in a dynamic environment. Emphasizes satisfying target customers and achieving organizational objectives through skillful blending of strategies in product development, pricing, promotion, and distribution.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

MKTG 301 Introduction to Marketing Management 4.0 Credits

Provides a conceptual and applications-oriented framework for marketing decision-making in a dynamic environment. Emphasizes satisfying target customers and achieving organizational objectives through skillful blending of strategies in product development, pricing, promotion, and distribution.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

MKTG 321 Selling and Sales Management 4.0 Credits

Covers planning, direction, and control of the personal selling activities of an organization, including recruiting, selecting, training, equipping, assigning, routing, supervising, compensating, motivating, leading, and evaluating a sales force.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 322 Advertising & Integrated Marketing Communications 4.0 Credits

Examines advertising principles, techniques, technologies, and methods; artistic and creative aspects; psychological appeals; and production.

Covers advertising and promotion management, including organization and planning, problems and strategies, media selection and evaluation, and agency-client relationships.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 324 Marketing Channels and Distribution Systems 4.0 Credits

Examines philosophies, concepts, principles, and methods that must be employed to achieve maximum effectiveness and efficient.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 326 Marketing Insights 4.0 Credits

Applies analytical tools in the investigation of marketing problems.

Emphasizes systematic research design, gathering, and interpretation of information for marketing decision-making.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 344 Professional Personal Selling 4.0 Credits

Prepares students for business-to-business personal selling careers.

Uses role-playing and experiential exercises to teach the latest strategies and tactics in prospecting and qualifying, planning sales calls, approaching prospects, making sales presentations, negotiating resistance, confirming and closing "win-win" agreements, and servicing customers to ensure satisfaction.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 347 New Product Development 4.0 Credits

Analyzes the process of discovering new product opportunities and creating new product ideas that are strategically sound. Covers demand analysis, futuristics, new product strategy, creativity techniques, product evaluation, interacting with research and development departments, and developing a marketing plan.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 348 Services Marketing 4.0 Credits

Covers marketing theory, concepts, strategy, and tactics as applied to the unique characteristics and demands of service-oriented industries such as health care, transportation, finance, law, consulting, education, training, tourism, security, entertainment, and hospitality within a global macroenvironment.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 351 Marketing for Non-Profit Organizations 4.0 Credits

Applies the marketing concepts of product, price, promotion, distribution, and benefit-cost maximization to the exchange relations of non-profit organizations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 353 Business-to-Business Marketing 4.0 Credits

Covers practices, strategies, and managerial problems in marketing and distributing industrial products and services to the industrial customer; procurement and sales practices; and cost and price analysis.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 355 Interactive Marketing 4.0 Credits

Addresses the principles, techniques, and methods of direct, interactive marketing in an era of emerging global technologies. Emphasizes field work, projects, and presentations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 356 Consumer Behavior 4.0 Credits

Applies contemporary behavioral science to consumer decision-making, including the relationship between the efforts of business firms in marketing their products and the reactions of ultimate consumers.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 357 Global Marketing 4.0 Credits

Examines international involvement of companies from exporting to the multinational enterprise stage. Covers the nature of international competition; distribution systems; pricing and credit policies; promotional methods; trade barriers and agreements; and the cultural, political, legal, ethical, and technological barriers.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 362 Brand and Reputation Management 4.0 Credits

The course focuses on the strategic management of product and organization brands, both corporate and non-profit, and how one can build brands that are highly distinguished reputationally to enhance financial value, attract and keep top talent and build relationships with customers, communities, and other key stakeholders.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 363 Brand & Reputation Management Project 1.0 Credit

Analysis of a "real world" organization's corporate brand and reputation management. Topic and scope must be approved by the Academic Director of the Center for Corporate Reputation Management. The integrative experience required for completion of the Certificate in Corporate Brand and Reputation Management.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MKTG 362 [Min Grade: D] and MKTG 322 [Min Grade: D] and COM 181 [Min Grade: D] and (MKTG 201 [Min Grade: C-] or MKTG 301 [Min Grade: C-])

MKTG 364 Marketing for New Ventures 4.0 Credits

Examines the unique marketing challenges faced by entrepreneurs launching new products and/or services. Topics include: designing new offerings, targeting customer segments, and marketing on a tight budget. The course is designed to be useful for small business owners, managers at large companies, and social entrepreneurs.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 365 New Media Marketing 4.0 Credits

Marketing practices have dramatically shifted with the rise of social media & the proliferation of devices, platforms & applications. This rapidly changing environment presents new opportunities & challenges for marketers. Through a combination of case studies, best practice examples, & the development of social & digital media marketing plans, students learn how the elements of a digital strategy work together with traditional media to attract prospective customers.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 366 Customer Analytics 4.0 Credits

Customer analytics is about applying (often simple) models to understand and predict customer behavior. Firms have access to more information about their customers than ever before. But data alone should not be confused for knowledge. The role of the model is to summarize patterns and generate predictions of customer behavior in the future. We will use simple models from probability theory and stochastic processes as a lens through which to view customer behavior.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 201 [Min Grade: C-] or STAT 205 [Min Grade: C-]

MKTG 367 Data-Driven Digital Marketing 4.0 Credits

This course will provide students with an overview of the rapidly-emerging field of digital marketing. Since digital marketing is constantly changing, students will become proficient at learning about new digital marketing platforms, how each channel is used to communicate with customers and be able to develop a list of “key questions” to ask about any new marketing medium. Because data and analytics are an important component of digital marketing, students will also become proficient at using data to evaluate a marketing campaign. One of the best ways to assess marketing strategies is through A/B testing and students will become expert at planning, analyzing and reporting A/B tests. We will also discuss strategies for integrating data-based decision making into organizations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 368 Corporate Responsibility Management 4.0 Credits

Companies increasingly think about their responsibility to have positive impact on society and the environment. In fact, some have argued that this is a sure path to business performance. In actuality, managing corporate responsibly is filled with pitfalls, contradictions, and dilemmas. This course will examine both the opportunities and dangers for leaders at companies large and small.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG 380 Seminar in Marketing Strategy 4.0 Credits

Builds upon marketing concepts learned in other courses and presents an integrated approach to marketing strategy. Uses a number of real-life cases and requires students to work in groups and make project presentations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MKTG 301 [Min Grade: C-] or MKTG 201 [Min Grade: C-]

MKTG I199 Independent Study in MKTG 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MKTG I299 Independent Study in MKTG 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MKTG I399 Independent Study in MKTG 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MKTG I499 Independent Study in MKTG 0.5-6.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MKTG T180 Special Topics in MKTG 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MKTG T280 Special Topics in MKTG 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MKTG T380 Special Topics in MKTG 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

MKTG T480 Special Topics in MKTG 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Materials Engineering

Courses

MATE 100 Materials for Emerging Technologies 2.0 Credits

Evolution of materials engineering; education and the profession; concepts, tools, and techniques; selection and design using metals, ceramics, polymers, and composites; application of materials in a technological society; and materials of the future.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 101 Fundamentals of Materials 4.0 Credits

Examines principles underlying structure, properties, and behavior of engineering materials, including metals, ceramics, and polymers. Covers topics including bonding; crystal structure; defect structure; alloying; mechanical, electronic, and magnetic properties in relation to structure; phase equilibria; phase transformations; and oxidation and corrosion. All terms.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 102 [Min Grade: D] and MATH 122 [Min Grade: D] and PHYS 101 [Min Grade: D]

MATE 120 Modern Materials in Your World 3.0 Credits

This undergraduate level introductory course in modern materials is designed as an elective course for non-engineering majors. It will introduce the field of materials science and engineering while stressing the importance of materials selection in modern day products. In addition, the course will highlight the importance of sustainable materials in product life cycle design in order to minimize environmental effects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BME

MATE 214 Introduction to Polymers 4.0 Credits

Covers polymer molecular structure, polymerization methods, semi-crystalline polymers, glass transition, polymer solution in blends, mechanical properties, and characterization methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATE 221 [Min Grade: D] and (ENGR 231 [Min Grade: D] or MATH 261 [Min Grade: D] or MATH 201 [Min Grade: D]) and CHEM 241 [Min Grade: D]

MATE 221 Introduction to Mechanical Behavior of Materials 3.0 Credits

Covers mechanics of materials, materials under load, application to materials testing, rate-dependent response to materials, fracture materials, fatigue behavior, manufacturing, and materials processing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 220 [Min Grade: D]

MATE 240 Thermodynamics of Materials 4.0 Credits

Covers the fundamental laws of thermodynamics, statistical meaning of entropy, thermodynamic functions, heat capacity, reactions in gases and condensed phases, phase diagrams, solutions, and reaction equilibria in condensed solutions.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATE 221 [Min Grade: D] and ENGR 210 [Min Grade: D]

MATE 245 Kinetics of Materials 4.0 Credits

Covers chemical reaction kinetics, thermodynamics and structure of crystal defects, diffusion equations and numerical methods of solution, kinetics in interfacial phenomena, and diffusional transformations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATE 240 [Min Grade: D]

MATE 280 Advanced Materials Laboratory 4.0 Credits

The goal of the course is to introduce students to state-of-the-art experimental techniques for analysis of structure, composition and properties of materials. Electron microscopy, Raman spectroscopy, indentation and thermal analysis will be described.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 220 [Min Grade: D] and ENGR 202 [Min Grade: D]

MATE 315 Processing Polymers 4.5 Credits

Covers polymer processing, viscous flow and melt rheology, injection molding, extrusion, mechanical behavior, and applications and design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATE 214 [Min Grade: D]

MATE 341 Defects in Solids 3.0 Credits

Main classes of crystalline defects: vacancies, dislocations, stacking faults, surfaces, grain boundaries, geometry, energy considerations, and movement of defects. Defects in specific crystallographic systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSE.

Prerequisites: MATE 355 [Min Grade: D]

MATE 345 Processing of Ceramics 4.5 Credits

Covers powder production, materials characterization, stability of powder suspensions, rheological and viscoelastic properties of slurries, green-body consolidation, drying, sintering, and structure-property relationships.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATE 355 [Min Grade: D] (Can be taken Concurrently)

MATE 351 Electronic and Photonic Properties of Materials 4.0 Credits

Electrons, principles of quantum mechanics, bonding, free electrons, and band theory solids; lattice vibrations, electronic and vibrational heat capacity; semiconductors and semiconductor devices; dielectrics, magnetic and optoelectronic materials and devices; superconductivity; applications and implications for energy-harvesting, conversion and storage.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATE 355 [Min Grade: D] (Can be taken Concurrently)

MATE 355 Structure and Characterization of Crystalline Materials 3.0 Credits

Bonding in solids; classification of metals, semiconductors, and insulators; crystal systems; crystallographic systems in specific engineering materials, relationships, X-ray generation, X-ray absorption and emission; reciprocal space; geometric representation of crystals, small and wide angle scattering, electron microscope imaging and diffraction.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSE.

Prerequisites: ENGR 220 [Min Grade: D] and MATE 221 [Min Grade: D]

MATE 366 [WI] Processing of Metallic Materials 4.5 Credits

Covers solidification processing, casting and welding, heat flow analysis, solid-state transformations, precipitation hardening, transformations in steels, martensite transformations, and industrial case studies. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATE 245 [Min Grade: D] and MATE 341 [Min Grade: D]

MATE 370 Mechanical Behavior of Solids 3.0 Credits

Covers continuum mechanics: three-dimensional stress and strain, hydrostatic and deviatoric components, and isotropic elasticity; Mises yield criterion; fracture criteria; linear elastic fracture mechanics; materials selection; defect-tolerant and defect-free fatigue design; notch effects; and statistics of variation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATE 221 [Min Grade: D] and ENGR 231 [Min Grade: D]

MATE 410 Case Studies in Materials 3.0 Credits

Covers interaction of materials processing and design, materials selection, the design-failure interface, cost and capacity in manufacturing. Taught via case studies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATE 221 [Min Grade: D]

MATE 450 The Nuclear Fuel Cycle & Materials 3.0 Credits

Nuclear fuel cycle, including extraction, enrichment, transmutation in a nuclear reactor, reprocessing, waste processing, repository performance. Materials for nuclear reactors, mechanical and thermal performance, radiation damage.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 220 [Min Grade: D] and (MEM 371 [Min Grade: D] or ECEP 404 [Min Grade: D]) and ECEP 402 [Min Grade: D]

MATE 455 Biomedical Materials 3.0 Credits

Familiarizes students with natural tissues and the implants designed to replace them, treating both components as engineering materials. Includes a review of fundamental topics of materials structure and testing, and case studies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

MATE 458 Advanced Biomaterials 3.0 Credits

Tissue Engineering, matrices, cells, scaffold, engineering properties, constitutive relations, absorbable polymers, cell seeding, cellular isolation, cell-scaffold interaction. May be repeated for credit.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Senior.

MATE 460 Engineering Computational Laboratory 4.0 Credits

Covers numerical techniques, finite differences and finite elements, convergence, and applications in engineering design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATE 221 [Min Grade: D] and ENGR 232 [Min Grade: D] and MATH 200 [Min Grade: D]

MATE 473 Electronic, Magnetic and Optical Characterization of Energy Materials 3.0 Credits

This course will examine the selection criteria for component materials in each of these applications and cover how critical properties – electronic conductivity, mobility, ionic conductivity, magnetization, optical absorption, Seebeck coefficient – are measured.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATE 351 [Min Grade: D]

MATE 476 Recycling of Materials 3.0 Credits

This course will examine the selection criteria for recycling component materials. Recycling involves both reusing materials for energy applications and reprocessing materials into new products.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATE 240 [Min Grade: D] and MATE 245 [Min Grade: D]

MATE 482 Materials for Energy Storage 3.0 Credits

The course will address principles of operation of electrochemical energy storage devices and describe materials used in those devices.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENGR 220 [Min Grade: D]

MATE 483 Environmental Effects on Materials 3.0 Credits

Environmental degradation is explored with a focus on electrochemical corrosion reactions in metals and alloys due to atmospheric, aqueous, chemical or elevated temperature exposure. In addition, high temperature degradation of ceramics and degradation of polymers due to exposure to heat, light and chemicals will be addressed. The role of these environmental effects during service and the impact on performance and reliability will be explored.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATE 245 [Min Grade: D]

MATE 491 [WI] Senior Project Design I 2.0 Credits

Introduces the design process, including information retrieval, problem definition, proposal writing, patents, and design notebooks. Includes presentations on problem areas by experts from industry, government, and education. This is a writing intensive (WI) course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

MATE 492 Senior Project Design II 3.0 Credits

Continues MATE 491. Requires written and oral progress reports.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MATE 491 [Min Grade: D]

MATE 493 [WI] Senior Project Design III 3.0 Credits

Continues MATE 492. Requires written and oral final reports, including oral presentations by each design team. This is a writing intensive (WI) course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MATE 492 [Min Grade: D]

MATE I199 Independent Study in MATE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MATE I299 Independent Study in MATE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MATE I399 Independent Study in MATE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MATE I499 Independent Study in MATE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

MATE T180 Special Topics in MATE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MATE T280 Special Topics in MATE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MATE T380 Special Topics in MATE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MATE T480 Special Topics in MATE 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Mathematics

Courses

MATH 004 Trigonometry 0.0 Credits

Required for all students who did not have high school trigonometry and for those who did not pass the placement test in trigonometry. Covers the rectangular coordinate system and distance formula, angular measure and trigonometric functions of a number, variations and graphs of the trigonometric functions, trigonometric identities and equations, inverse trigonometric functions, and solutions of triangles applications. All terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 049 Elements of College Algebra 0.0 Credits

Topics in algebra including linear, quadratic, rational, and radical expressions, properties of exponents, and introduction to functions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 050 Elements of Precalculus 0.0 Credits

This course covers topics essential for the study of calculus, including elements of algebra, geometry and trigonometry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 100 Fundamentals of Mathematics 3.0 Credits

Course covers properties of real numbers, algebraic expressions, rational expressions, linear and quadratic functions and graphs. This course is intended to give students the background needed to enroll in MATH 101.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman or Sophomore .

Corequisite: EXAM 082

MATH 101 Introduction to Analysis I 4.0 Credits

Covers linear, quadratic, exponential, and logarithmic functions; systems of linear equations; elementary linear programming; matrix algebra; inverse; and mathematics of finance.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 100 [Min Grade: C] or MATH 049 [Min Grade: CR] or APEM 070 or APC 060

Corequisite: EXAM 080

MATH 102 Introduction to Analysis II 4.0 Credits

Covers limits, continuity, derivatives, indefinite and definite integrals, and applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 101 [Min Grade: D]

Corequisite: EXAM 080

MATH 105 Algebra, Functions, and Trigonometry 6.0 Credits

Properties of real numbers, algebraic expressions, rational expressions, linear and quadratic functions and graphs, and additional topics from algebra. Topics from geometry and trigonometry essential for the study of calculus.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 082

MATH 107 Probability and Statistics for Liberal Arts 3.0 Credits

Probability and statistics in everyday life. The pitfalls of interpreting statistical data. A basic introduction to probability, chance, and gambling. Examples include coin-tossing, dice and roulette wheels.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 100 [Min Grade: D] or APEM 060

MATH 108 Mathematics for Nursing Professionals 3.0 Credits

Math foundations needed in the calculation of dosages and solutions of medications. Topics include systems of measurement and calculating dosages involving tablets, capsules, liquids, and powders.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 109 Practicum for Math 110 1.0 Credit

This supplement to MATH 110 emphasizes team-based approaches to working and learning, regular problem solving, and an appreciation for how mathematics is connected with other disciplines. Individual drills, small-group problem sets, and in-class discussion will reinforce the concepts in MATH 110 and develop learning strategies that are useful in other courses.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: MATH 110

MATH 110 Precalculus 3.0 Credits

Reviews topics from algebra, geometry, and trigonometry essential for the study of calculus. For students planning to take Calculus I.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman.

Prerequisites: MATH 049 [Min Grade: CR] or MATH 100 [Min Grade: C] or APC 060

Corequisite: EXAM 082

MATH 112 Practicum for Math 121 1.0 Credit

The purpose of MATH 112 is to improve the study habits and learning strategies that are essential for success in MATH 121 and other math courses. MATH 112 emphasizes team-based approaches to working and learning, regular problem solving, and an appreciation for how mathematics is connected with your discipline. Through individual drills, small-group problem sets, and in-class discussion we will reinforce concepts taught in your freshman mathematics sequence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: MATH 121

MATH 113 Practicum for Math 122 1.0 Credit

The purpose of MATH 113 is to improve the study habits and learning strategies that are essential for success in MATH 122 and other math courses. MATH 113 emphasizes team-based approaches to working and learning, regular problem solving, and an appreciation for how mathematics is connected with your discipline. Through individual drills, small-group problem sets, and in-class discussion we will reinforce concepts taught in your freshman mathematics sequence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: MATH 122

MATH 115 Practicum for MATH 200 1.0 Credit

The purpose of MATH 115 is to improve the study habits and learning strategies that are essential for success in MATH 200 and other math courses. MATH 115 emphasizes team-based approaches to working and learning, regular problem solving, and an appreciation for how mathematics is connected with your discipline. Through individual drills, small-group problem sets, and in-class discussion we will reinforce concepts taught in your freshman mathematics sequence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: MATH 200

MATH 116 Calculus and Functions I 4.0 Credits

This is the first course in a two-term sequence designed to introduce students to key concepts from differential calculus while reviewing essential topics from algebra, geometry, and precalculus. Material includes limits and derivatives of algebraic functions and applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 049 [Min Grade: CR] or MATH 100 [Min Grade: C] or APC 060

Corequisite: EXAM 082

MATH 117 Calculus and Functions II 4.0 Credits

This is the second course in a two-term sequence designed to introduce students to key concepts from differential calculus while reviewing essential topics from algebra, geometry, and precalculus. Material includes limits and derivatives of transcendental functions and applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 116 [Min Grade: C-]

Corequisite: EXAM 082

MATH 119 Mathematical Foundations for Design 4.0 Credits

This course serves as an introduction to the mathematical concepts and tools most useful to students majoring in the Design Arts. Topics include functions, graphs, plane and fractal geometry, trigonometry, polar coordinates, and elementary topology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman or Sophomore .

Corequisite: EXAM 080

MATH 121 Calculus I 4.0 Credits

Functions, limits and continuity, derivatives, transcendental functions, and applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman.

Prerequisites: MATH 050 [Min Grade: CR] or MATH 110 [Min Grade: C-] or MATH 105 [Min Grade: C-] or APC 070 or APC2 070

Corequisite: EXAM 080

MATH 122 Calculus II 4.0 Credits

Definite integrals, Fundamental Theorem of Calculus, integration techniques, applications of integration, numerical integration and differential equations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 121 [Min Grade: C-] or MATH 117 [Min Grade: C-]

Corequisite: EXAM 080

MATH 123 Calculus III 4.0 Credits

Differential equations, Taylor's theorem, sequence and series, convergence, power series.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 122 [Min Grade: D]

Corequisite: EXAM 080

MATH 180 Discrete Computational Structures 4.0 Credits

Covers basic concepts of discrete mathematics that are important to computing, including elementary set theory, recurrence relations, and graph theory.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 102 [Min Grade: D] or MATH 121 [Min Grade: D]

MATH 181 Mathematical Analysis I 3.0 Credits

Covers set theory, coordinate systems and graphs, functions, linear programming (geometric approach), matrices and linear systems, and linear programming (algebraic approach). Required for architecture, business administration, and construction management students. Non-credit for engineering and science students. Fall, Winter.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 182 Mathematical Analysis II 3.0 Credits

Covers counting techniques, probability, statistics, and probability applications. Non-credit for engineering and science students. All terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 181 [Min Grade: D]

MATH 183 Mathematical Analysis III 3.0 Credits

Covers limits, rates of change, derivatives, applications of differentiation, exponential and logarithmic functions, integrals, techniques of integration, applications of integration. Non-credit for engineering and science students. All terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 182 [Min Grade: D]

MATH 200 Multivariate Calculus 4.0 Credits

Vectors, curves, partial derivatives, gradient, constrained optimization, coordinate system, multiple integrals, and applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 122 [Min Grade: D]

Corequisite: EXAM 080

MATH 201 Linear Algebra 4.0 Credits

Systems of linear equations, matrix algebra, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality, diagonalization, applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 121 [Min Grade: D]

Corequisite: EXAM 081

MATH 205 Survey of Geometry 3.0 Credits

Axiomatic approach to geometry: plane geometry, transformational geometrics, and an introduction to classical non-Euclidean geometries. Includes experimental approaches using appropriate software tools.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 201 [Min Grade: D]

MATH 210 Differential Equations 4.0 Credits

Covers solution methods and properties for scalar and vector differential equations. Topics include linear and nonlinear equations, numerical methods, separation of variables, and transform methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D] and MATH 201 [Min Grade: D]

MATH 220 [WI] Introduction to Mathematical Reasoning 3.0 Credits

A transition course that develops the reasoning skills necessary for later courses. Emphasizes writing and presentation skills. Topics taken from set theory, logic, induction, relations, functions, and properties of the real number system.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

MATH 221 Discrete Mathematics 3.0 Credits

Elementary set theory, combinatorics, elementary number theory, graphs, and special topics chosen from formal language theory, graph algorithms, coding theory, and other applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 220 [Min Grade: C] or CS 270 [Min Grade: D] or ECE 200 [Min Grade: D]

Corequisite: EXAM 081

MATH 222 Combinatorics 3.0 Credits

Select combinatorial topics such as recurrence relations, generating functions, inclusion-exclusion, and graph theory. Emphasis on techniques for writing mathematical arguments and proofs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 220 [Min Grade: C]

MATH 235 Math Competition Problem Solving Seminar 0.5-4.0 Credits

Problems from math competitions (such as the Putnam exam) are solved by students in this course. This course may be repeated four times for credit as topics vary.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 4 times for NaN credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 200 [Min Grade: D]

MATH 238 History of Mathematics 3.0 Credits

This course explores the history of mathematical concepts. Both the people involved and the environment in which the developments took place will be studied. Mathematics from the time of Babylonia to the present will be discussed. The presentation will take a thematic approach, which may vary each term.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 239 Mathematics for the Life Sciences 4.0 Credits

A broad survey of mathematical topics that are fundamental for application in the life science: multivariate calculus, differential equations, elementary probability. Emphasis on application.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 102 [Min Grade: D] or MATH 122 [Min Grade: D]

MATH 250 Mathematics of Investment and Credit 3.0 Credits

Interest Rate Measurement, Valuation of Annuities, Loan Repayment, Bond Valuation Recommended for students taking actuarial exam FM2.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 123 [Min Grade: D]

MATH 261 Linear Algebra 3.0 Credits

Covers matrix arithmetic systems of linear equations, including vector spaces, coordinate systems, determinants, characteristic value problems, and Euclidean spaces, and application to quadratic forms and linear differential equations. Problems from engineering and science will be solved using applications such as MATLAB during the lab.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman.

Prerequisites: MATH 122 [Min Grade: D]

MATH 262 Differential Equations 3.0 Credits

Covers solutions of first-order equations, undetermined coefficient and variation of parameter methods of solution of higher order linear equations, systems of equations, and Laplace transform. Problems from engineering and science will be solved using applications such as MATLAB during the lab.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 261 [Min Grade: D]

MATH 285 Differential Equations II 3.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 210 [Min Grade: D]

MATH 291 Complex and Vector Analysis for Engineers 4.0 Credits

Complex and Vector Analysis for Engineers. Covers gradient, divergence, and curl; integral theorems curvilinear coordinates, complex differentiation and integration, Cauchy's Theorem, power series, residues and applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D] and PHYS 102 [Min Grade: D]

MATH 300 Numerical Analysis I 4.0 Credits

The course covers root finding and fixed points, polynomial interpolation, splines, numerical integration and numerical differentiation. The course emphasizes computational solutions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D] and MATH 201 [Min Grade: D] and (CS 171 [Min Grade: D] or CS 123 [Min Grade: D])

MATH 301 Numerical Analysis II 3.0 Credits

A continuation of MATH 300. This course focuses on time dependent problems. It includes numerical solution of ordinary differential equation, the heat and wave equations, and moving interfaces. The discussed techniques include implicit schemes or ODEs, finite differences, spectral methods and the level set method.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 300 [Min Grade: D]

MATH 305 Introduction to Optimization Theory 4.0 Credits

Provides a broad survey of mathematical techniques in optimization theory used in operations research and management science. Includes topics selected from the following categories: linear programming, integer programming, network flows, and nonlinear programming.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 201 [Min Grade: D]

MATH 310 Probability and Statistics 4.0 Credits

Not open to mathematics or computer science majors. Covers probability, probability distribution of discrete and continuous random variables, moment-generating functions, distribution of sample statistics, estimation and statistical tests, tests for goodness of fit, and regression analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is CS or major is MATH or classification is Freshman

Prerequisites: MATH 200 [Min Grade: D]

MATH 311 Probability and Statistics I 4.0 Credits

Discrete and continuous probability distributions, conditional probabilities, expected value and variance, joint probability distributions, marginal distributions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 200 [Min Grade: D]

Corequisite: EXAM 081

MATH 312 Probability and Statistics II 4.0 Credits

Covers estimation, consistency, unbiasedness, maximum likelihood, confidence intervals, hypothesis testing, Type I and Type II errors, Neyman Pearson lemma, likelihood ratio tests, and tests for means and variances.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 311 [Min Grade: D]

Corequisite: EXAM 081

MATH 316 Mathematical Applications of Symbolic Software 3.0 Credits

Mathematical Applications of Symbolic Software. Topics from calculus are investigated via complex problems requiring the use of symbolic mathematical software, primarily Maple. Numerical, graphical, and algebraic approaches are integrated. Limits, derivatives, root-finding, integration, and infinite series are explored in this context.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 123 [Min Grade: D] and MATH 200 [Min Grade: D]

MATH 318 [WI] Mathematical Applications of Statistical Software 3.0 Credits

Mathematical Applications of Statistical Software. Applications of modern statistical technologies and software, such as SAS, are used to describe and analyze data. Some topics covered are data management, collecting data, inferences for single and multiple population means, proportions count data, regression, correlation and nonparametric statistical methods. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 310 [Min Grade: D] or MATH 312 [Min Grade: D]

MATH 319 Techniques of Data Analysis 4.0 Credits

An applied course that considers the acquisition, analysis, visualization, and presentation of data. Emphasizes computation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 318 [Min Grade: D]

MATH 320 Actuarial Mathematics 3.0 Credits

Covers probability in a risk management context. Univariate probability distribution including binomial, negative binomial, Poisson, uniform, exponential, normal, lognormal, Pareto, and Weibull distributions. Multivariate distributions including conditional and marginal probability distributions, joint moment generating functions, probability and moments for linear combinations of independent random variables and related topics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 311 [Min Grade: D]

MATH 321 Vector Calculus 4.0 Credits

Covers vector algebra; gradient, divergence, curl, and curvilinear coordinates; Green's theorem, divergence theorem, and Stokes' theorem; and applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D]) and MATH 200 [Min Grade: D]

MATH 322 Complex Variables 4.0 Credits

Introduces functions of one complex variable. Topics include the basic properties of analytic functions, power series, integration, residues and poles, and conformal mapping with applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 210 [Min Grade: D]

MATH 323 Partial Differential Equations 4.0 Credits

Covers basic concepts and solution techniques for the standard partial differential equations of mathematical physics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 210 [Min Grade: D]

MATH 331 Abstract Algebra I 4.0 Credits

Covers theory of groups, homomorphism and isomorphism, theory of rings, integral domains, ideals, unique factorization, and theory of fields.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MATH 220 [Min Grade: C-] or CS 270 [Min Grade: C-]) and (MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D])

MATH 332 Abstract Algebra II 3.0 Credits

Covers further topics in abstract algebra, including canonical decomposition of linear transformation, bilinear forms, multilinear algebra and determinants, finite fields, and selected short subjects.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 331 [Min Grade: C-]

MATH 387 Linear Algebra II 3.0 Credits

Covers linear transformations, including kernel and range; eigenvalues and eigenvectors; diagonalization of symmetric matrices; and application to differential equations, quadratic forms, and Markov chains. Fall.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 261 [Min Grade: D] or MATH 201 [Min Grade: D]

MATH 401 Elements of Modern Analysis I 3.0 Credits

Covers the real number system, elementary topology, limits, infinite series, continuity, derivatives, and the Riemann integral.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MATH 220 [Min Grade: C-] or CS 270 [Min Grade: C-]) and (MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D]) and MATH 200 [Min Grade: D]

MATH 402 Elements of Modern Analysis II 3.0 Credits

Covers continuation of integration theory, improper integrals, sequences and series, power series, and uniform convergence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 401 [Min Grade: C-]

MATH 410 Scientific Data Analysis I 3.0 Credits

Fundamental principles and applications of statistics for scientific data analysis. Topics include data exploration, principles of probability distributions, Central Limit Theorem, hypothesis testing, z, t and F tests, one-way analysis of variance, linear regression, and contingency table analysis. Programming statistical applications in R will be included.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 122 [Min Grade: D] or MATH 239 [Min Grade: D]

MATH 411 Scientific Data Analysis II 3.0 Credits

Scientific data analysis and experimental design. Topics include multiple regression and model selection, nonlinear and logistic regression, analysis of covariance, multi-factor analysis of variance, nested, factorial and repeated measures experimental designs, random effects, and introduction to bootstrap methods and randomization tests. Programming statistical applications in R will be included.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 410 [Min Grade: C-]

MATH 422 Introduction to Topology 4.0 Credits

Covers topological space, metric spaces, function, continuity, compactness, and connectedness.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 220 [Min Grade: C]

MATH 449 Mathematical Finance 3.0 Credits

This course is an introduction to the mathematics of finance. The main topics include: fixed income mathematics (duration, convexity, compounding conventions, immunization of bond portfolios, yield curve stripping), foundations of the arbitrage theory (pricing of futures and forwards, swaps, put/call parity) and introduction to stochastic derivative pricing (Black-Scholes and beyond).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 311 [Min Grade: D]

MATH 450 Introduction to Graph Theory 3.0 Credits

Introduction to Graph Theory. Topics covered include paths and cycles, Eulerian graphs, Hamiltonian graphs, trees, matching, coloring, planarity, and some additional topics in special graphs such as interval graphs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 201 [Min Grade: D] and MATH 221 [Min Grade: D]

MATH 475 Cryptography 3.0 Credits

Classic cryptosystems, elementary number theory, RSA, ElGamal, discrete logarithms, digital signatures, plus a special topic selected from elliptic curves, information theory, and quantum cryptography.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 201 [Min Grade: D] and MATH 311 [Min Grade: D]

MATH 483 Discrete Event Simulation 3.0 Credits

Covers system simulation, Monte Carlo methods, discrete event modeling techniques, queuing models, programming considerations, statistical definitions and concepts, random number generation, output analysis, and design of computer experiments.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 311 [Min Grade: C]

MATH 489 Tensor Calculus 3.0 Credits

Covers tensor algebra, including coordinate transformations, fundamental quadratic form, covariant and contravariant tensors, Riemannian metric, and applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MATH 201 [Min Grade: C] or MATH 261 [Min Grade: C] or ENGR 231 [Min Grade: C]) and MATH 200 [Min Grade: C]

MATH I199 Independent Study in MATH 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

MATH I299 Independent Study in MATH 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

MATH I399 Independent Study in MATH 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

MATH I499 Independent Study in MATH 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

MATH T180 Special Topics in Mathematics 12.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

MATH T185 Special Topics 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Corequisite: EXAM 082

MATH T186 Special Topics 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Corequisite: EXAM 082

MATH T280 Special Topics in Mathematics 12.0 Credits

Covers topics in pure or applied mathematics. Different topics may be considered in different quarters.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

MATH T380 Special Topics in MATH 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

MATH T480 Special Topics in Mathematics 12.0 Credits

Covers topics in Mathematics of interest to students or faculty. Different topics may be considered during different quarters.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Mathematics Education

Courses

MTED 417 Mathematics Methods and Content: Early Childhood 3.0 Credits

Students will know and effectively deliver standards-based academic math content, based on age appropriate understanding, and individual and groups needs including a respect for the unique needs of all types of learners. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MTED 418 Mathematics Methods and Content 3.0 Credits

Course emphasizes diagnostic instruction in mathematics by allowing students to complete problems that their students will be expected to work, noting the error and correction process, as well as gaining an awareness of student difficulties in mathematics.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: MTED 417 [Min Grade: B]

MTED 419 Teaching Secondary Mathematics 3.0 Credits

This course emphasizes the major issues in learning and teaching mathematics in the secondary school. Topics will include instructional practices, learning theories, philosophies of assessment, and curriculum in the secondary school. Throughout the course, emphasis will be placed on the appropriate use of technology. Additional field-based experiences are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MTED 428 Cultural and Historical Significance of Mathematics 3.0 Credits

The course explores how mathematics reflects and influences the ideas and movements in culture, history, biography and philosophy. An emphasis on teaching methods is integrated throughout the course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Mechanical Engineering & Mechanics

Courses

MEM 201 Foundations of Computer Aided Design 3.0 Credits

Covers application of modern, computer-aided graphics techniques and the use of state-of-the-art, computer-aided design/drafting package(s). Includes topics such as principles of computer-aided design/drafting and interactions with computer-aided manufacturing, rapid prototyping, and other modern manufacturing processes; engineering graphics and graphics languages in computer-aided design and/or drafting; creation of a drawing environment; database and file management, editing, modification, displaying, dimensioning, plotting and printing; special editing techniques; 3-D modeling, solid modeling, shading, and rendering; and file transfer. Students must have Sophomore class standing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

MEM 202 Statics 3.0 Credits

Covers two-and three-dimensional vector representation of forces, moments and couples; static equilibrium of particles, rigid bodies, and engineering structures; analysis of external and internal forces in structures via methods of free body diagrams; and properties of cross-sectional areas.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 185 [Min Grade: D] or PHYS 101 [Min Grade: D]

MEM 220 Basic Fluid Mechanics 4.0 Credits

Covers general physical properties of a fluid; kinetics of fluid motion; material derivative, vorticity, strain, and dynamics of fluids; and derivation of conservation laws in control volume form with applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: TDEC 114 [Min Grade: D] or MATH 189 [Min Grade: D] or MATH 200 [Min Grade: D]

MEM 230 Mechanics of Materials I 4.0 Credits

Covers definitions of stress and strain, uniaxial loading, torsion, bending moments and shear forces in beams, bending stresses and shear stress in beams, and stress transformation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 202 [Min Grade: D]

MEM 238 Dynamics 4.0 Credits

Covers kinematics and kinetics in two and three-dimensional space, force and acceleration, linear and angular momentum, and energy methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MATH 189 [Min Grade: D] or MATH 200 [Min Grade: D]) and MEM 202 [Min Grade: D]

MEM 255 Introduction to Controls 4.0 Credits

Introduces the concepts of modeling of mechanical, electrical, electromechanical, thermal, and hydraulic systems; linearization; state-space model; time-domain analysis; transfer functions; frequency-domain analysis; analysis of systems involving automatic control of position, speed, power, flow, pressure, temperature, and other physical quantities; basic concept of feedback; basic concept of stability; computer-aided analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 238 [Min Grade: D] and (MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D]) and (MATH 210 [Min Grade: D] or MATH 262 [Min Grade: D] or ENGR 232 [Min Grade: D])

MEM 304 Introduction to Biomechanical Engineering 3.0 Credits

An overview of the application of mechanical engineering to biological systems. Covers basic anatomy and physiology; tissue, joint, cell, and protein mechanics; joint kinematics; biofluid mechanics; biothermodynamics; biotransport; biomimetic controls; and biomanufacturing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D] and PHYS 101 [Min Grade: D] and CHEM 102 [Min Grade: D] and BIO 141 [Min Grade: D]

MEM 310 Thermodynamic Analysis I 4.0 Credits

Reviews first and second laws of thermodynamics as applied to closed systems, control volumes, and thermodynamic cycles; covers thermodynamic relations and properties of real fluids, mixtures, and solutions; introduces phase and chemical equilibrium, power and refrigeration cycles, and combustion.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGR 210 [Min Grade: D] or MEM 210 [Min Grade: D]

MEM 311 Thermal Fluid Science Laboratory 2.0 Credits

Introduces modern laboratory techniques, including statistical analysis of experimental data; thermodynamic properties and equations of state; and dynamic and static temperature measurements with potentiometers, bridge circuits, and oscilloscopes. Fall.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 220 [Min Grade: D] and MEM 310 [Min Grade: D]

MEM 320 Fluid Dynamics I 3.0 Credits

Covers equation of motion for compressible flow; static, total, and stagnation concepts; one-dimensional isentropic, normal shock, including Fanno and Rayleigh flows and choked flow; two-dimensional supersonic flow, including Prandtl-Meyer flow and oblique shocks; analysis and design of compressible flow devices, including supersonic nozzles, diffusers, wind tunnels, inlets, and combustors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 220 [Min Grade: D]

MEM 330 Mechanics of Materials II 4.0 Credits

Reviews mechanics of materials, beam theory, combined loading, stress transformation, shear center, asymmetrical bending, deflection of beams, statically indeterminate beams, energy methods, inelastic bending, and beam column instability.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 230 [Min Grade: D]

MEM 331 Experimental Mechanics I 2.0 Credits

Covers static testing methods, including strain gages, extensometers, photoelasticity, and model analysis; practical applications of experimental stress analysis; and verification of standard materials tests, including tensile, shear, and buckling. Winter. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 238 [Min Grade: D] (Can be taken Concurrently)MEM 230 [Min Grade: D]

MEM 333 Mechanical Behavior of Materials 3.0 Credits

Introduces the deformation and failure of engineering materials; Emphasizes application of the fundamentals to engineering design to prevent failure; Covers material damage and failure under multi-axial stresses, yielding, fracture mechanics, fatigue crack growth, fatigue life estimation, and deformation and failure of composite materials.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

Prerequisites: MEM 230 [Min Grade: D]

MEM 345 Heat Transfer 4.0 Credits

Covers fundamentals of conduction, convection, and radiation; steady and unsteady heat conduction; fundamentals of boundary layer flows; introduction to forced and free convection for external and internal flows; blackbody radiation; and radiation and surface radiation properties.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGR 210 [Min Grade: D] and (MEM 220 [Min Grade: D] or CIVE 320 [Min Grade: D]) and (MATH 210 [Min Grade: D] or MATH 262 [Min Grade: D] or ENGR 232 [Min Grade: D])

MEM 351 Dynamic Systems Laboratory I 2.0 Credits

Includes experiments involving modeling and simulation of linear and non-linear dynamic systems, including feedback controls. Spring.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 255 [Min Grade: D]

MEM 355 Performance Enhancement of Dynamic Systems 4.0 Credits

This course introduces measures of performance of dynamical systems, means of computing/evaluation-of such measures, and how to design controllers to improve performance.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 255 [Min Grade: D]

MEM 361 Engineering Reliability 3.0 Credits

Reviews probability concepts and modeling of random phenomena, including parameter estimation, empirical determination of distribution models, catastrophic failure models, material strength and fatigue life distribution, and reliability improvement.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: MATH 290 [Min Grade: D] or MATH 201 [Min Grade: D] or MATH 261 [Min Grade: D] or ENGR 231 [Min Grade: D]

MEM 371 Introduction to Nuclear Engineering I 2.0 Credits

Introduces the fundamental scientific, technical, social and ethical issues in nuclear engineering; nuclear reactions and re-radiation, radiation protection and control, nuclear energy production and utilization, nuclear fuel cycle, nuclear materials, controlled fusion and thermonuclear plasma systems, basics of plasma physics and plasma chemistry, nuclear waste management, nuclear reactor safety, analysis of severe nuclear accidents, risk assessment and related issues of engineering ethics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 201 [Min Grade: D] and (ENGR 210 [Min Grade: D] or CHE 206 [Min Grade: D])

MEM 373 Space Systems Engineering I 3.0 Credits

Introduction to space engineering through presentation of two topics that serve as the foundation of space systems analysis and design: rocket propulsion and orbital mechanics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 220 [Min Grade: D] and MEM 238 [Min Grade: D] and MEM 310 [Min Grade: D]

MEM 374 Space Systems Engineering II 3.0 Credits

Introduction to design principles and theory of satellite systems engineering, including design theories and parameters involved in satellite development, as well as real life conditions such as applications, product assurance, assembly, and testing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 373 [Min Grade: D]

MEM 391 Introduction to Engineering Design Methods 1.0 Credit

Introduces the design process, including information retrieval, problem definition, proposal writing, patents, and design notebooks. Includes presentations on problem areas by experts from industry, government, and education. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EE or major is ETLM or major is MECH.

Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

MEM 395 Hess Undergraduate Scholars Research 0.5-3.0 Credits

A change for undergraduates to experience independent research as part of the MEM Hess Honors Program. Weekly group meetings to discuss the details of the research endeavor are coupled with independent student in a research laboratory. May be repeated five times for credit.

College/Department: College of Engineering

Repeat Status: Can be repeated 5 times for 18 credits

Prerequisites: MEM 310 [Min Grade: D]

MEM 400 Internal Combustion Engines 3.0 Credits

Covers engine types and trends, thermodynamics of engines and engine processes, ideal and actual engine processes and cycles, combustion and emissions, fuel chemistry and properties, detonation and knock, and engine testing and performance.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 310 [Min Grade: D]

MEM 402 Power Plant Design 3.0 Credits

Covers heat cycle arrangement, equipment selection, analysis of cost demands, and diversity factors. Includes economic studies of plant and cycle arrangements.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 310 [Min Grade: D]

MEM 403 Gas Turbines & Jet Propulsion 3.0 Credits

Covers fundamentals of thermodynamics and aerothermodynamics, and application to propulsion engines; thermodynamic cycles and performance analysis of gas turbines and air-breathing propulsion systems, turbojet, turboprop, ducted fan, ramjet, and ducted rocket; theory and design of ramjets, liquid and solid rockets, air-augmented rockets, and hybrid rockets; aerodynamics of flames, including the thermodynamics and kinetics of combustion reactions; supersonic combustion technology and zero-g propulsion problems; and propulsion systems comparison and evaluation for space missions.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 220 [Min Grade: D] and MEM 310 [Min Grade: D]

MEM 405 Principles of Combustion I 3.0 Credits

Covers thermochemistry, the relationship between heats of formation and bond energies, heat capacity and heats of reaction, chemical equilibrium, calculation of flame temperature, and composition of burned gas.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 410 [Min Grade: D]

MEM 406 Principles of Combustion II 3.0 Credits

Covers laminar flame propagation in premixed gases, detonation and deflagration, burning of liquid and solid fuels, and diffusion flames.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 405 [Min Grade: D]

MEM 410 Thermodynamic Analysis II 3.0 Credits

Covers thermodynamic analysis of ideal and real mixtures and gas phase reacting systems. Introduces equilibrium analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 310 [Min Grade: D]

MEM 413 HVAC Loads 3.0 Credits

Human comfort and associated models; state-of-the-art methods of calculating building peak heating and cooling loads; analysis of different psychrometric processes; different types of secondary systems: description, operating principles, modeling, simulation and sizing of secondary systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 345 [Min Grade: D] and (MEM 310 [Min Grade: D] or AE 220 [Min Grade: D])

MEM 414 HVAC Equipment 3.0 Credits

Standard and real, single-stage multistage refrigeration cycles; vapor compression components (compressor, expansion devices, condensers, and evaporators); heat pumps; absorption systems; boilers; heat exchangers; cooling coils, cooling towers; part-load energy performance; annual energy; annual energy estimation methods (degree-day, bin method, modified degree-day).

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 345 [Min Grade: D] and (MEM 310 [Min Grade: D] or AE 220 [Min Grade: D])

MEM 415 Fuel Cell Engines 3.0 Credits

Introduces fundamental aspects and operating principles of fuel cell systems, including: basic electrochemical principles, thermodynamics required for understanding the operation, components including functions and materials, electrochemical performance characteristics, analysis of system losses and efficiency, various fuel cell types, current state of technology, application areas/implementation, and current technical challenges.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (MEM 220 [Min Grade: D] or CHE 302 [Min Grade: D] or CHE 311 [Min Grade: D] or CIVE 320 [Min Grade: D]) and MEM 310 [Min Grade: D]

MEM 417 Introduction to Microfabrication 3.0 Credits

This course focuses on the fundamentals of microfabrication technologies. The materials, principles, and applications of silicon-based microfabrication technologies such as photolithography, wet/dry etching, deposition techniques, surface micromachining, and polymer micromachining are covered. This course also includes two lab sessions through which students have hands-on experiences in microfabrication.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

MEM 419 Microfluidics and Lab-on-a-Chip 3.0 Credits

This course focuses on design, manufacturing, and application of lab-on-a-chip systems as well as understanding microfluidic phenomena. The lecture covers novel microfluidic phenomena, microsensors, microactuators, and case studies. This course also includes two lab sessions through which student have hands-on experiences in lab-on-a-chip technology.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: MEM 417 [Min Grade: D]

MEM 420 Aerodynamics 3.0 Credits

Covers steady and unsteady flow, flow around a body, wing theory, thin airfoil theory, fundamental equation of finite-wing theory, and aerodynamic characteristics of wings. Introduces potential theory and boundary layer phenomena.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 220 [Min Grade: D]

MEM 423 Mechanics of Vibration 4.0 Credits

Covers free and forced vibrations of one-, two-, and multiple-degree-of-freedom systems; continuous systems; and transient and random vibration problems. Includes use of digital computer for homework and special class problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 238 [Min Grade: D] and (TDEC 222 [Min Grade: D] or ENGR 232 [Min Grade: D] or MATH 210 [Min Grade: D] or MATH 262 [Min Grade: D])

MEM 424 Biomechanics 3.0 Credits

Introduces modeling of dynamics of biomechanical systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 202 [Min Grade: D] and MEM 238 [Min Grade: D]

MEM 425 Aircraft Design & Performance 3.0 Credits

Introduces aerodynamics and airfoils; steady flight; power required and power available curves; range and endurance; takeoff, glide, and landing; stick force and control-free stability; moment coefficients and derivatives; and designing to specification. Students must have Junior class standing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

MEM 426 Aerospace Structures 3.0 Credits

Covers properties of wing and fuselage sections, torsion of thin-walled and skin-stringer multiple-cell sections, non-symmetrical bending of wing and fuselage sections, shear in thin-walled and skin-stringer sections, and buckling. Introduces matrix methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 230 [Min Grade: D]

MEM 427 Finite Element Methods 3.0 Credits

Introduces the fundamental theory and formulations of finite element method and its application in structural mechanics and thermal/fluid science. Topics include formulation of 1-D and 2-D elements, isoparametric elements, static and dynamic analysis of trusses, beams, and frames, 2-D plane problems, and heat transfer problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 230 [Min Grade: D]

MEM 428 Introduction to Composites I 3.0 Credits

Introduces anisotropic elasticity, lamina stiffness and compliance, plane stress and strain, test methods, and failure criteria.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 330 [Min Grade: D]

MEM 429 Introduction to Composites II 3.0 Credits

Covers laminated plate theory, stiffness and compliance of laminated plates, effect of laminated configuration on elastic performance, and strength production.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 428 [Min Grade: D]

MEM 430 Advanced Stress Analysis 4.0 Credits

Examines three-dimensional representation of stress and strain, coordinate transformation, stress strain relationships for anisotropic and isotropic materials, equilibrium equations, boundary value problems, governing equations in plane strain and plane stress problems, Airy's stress function, two-dimensional problems in polar coordinates, and selected applications to stress analysis problems in mechanical engineering.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 330 [Min Grade: D]

MEM 431 Machine Design I 3.0 Credits

Covers static strength and fatigue theories of failure, fasteners, welded joints, springs, roller bearings, and lubricated spur gears.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

Prerequisites: MEM 202 [Min Grade: D] and MEM 230 [Min Grade: D] and MEM 238 [Min Grade: D]

MEM 435 Introduction to Computer-Aided Design and Manufacturing 4.0 Credits

Covers fundamental use of CAD/CAM systems for geometry definition, finite element applications, and introductory computer graphics concepts.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: MEM 201 [Min Grade: D]

MEM 436 Introduction to Computer-Aided Manufacturing 3.0 Credits

Examination of the basic elements that are used to integrate the design and manufacturing processes. Robotics computerized-numerical controlled machine, and CAD/CAM systems. Manufacturability considerations when integrating unit process elements.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 201 [Min Grade: D] and MEM 435 [Min Grade: D]

MEM 437 Manufacturing Process I 3.0 Credits

Examines the basic elements used to integrate the design and manufacturing processes; robotics, computerized-numerical-controlled machines, and CAD/CAM systems; and manufacturability considerations when integrating unit process elements.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 220 [Min Grade: D] and MEM 230 [Min Grade: D]

MEM 438 Manufacturing Process II 3.0 Credits

Covers plastics and reinforced plastics processes, theory of polymer and plastic process, simple models of polymer flows, and manufacturability of plastics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 437 [Min Grade: D]

MEM 440 Thermal Systems Design 3.0 Credits

This course covers fundamentals of thermal system design; the role of design in engineering practice; economic analysis used for design of thermal systems; advanced concepts and analysis of heat exchangers and distillation equipment; modeling of thermal systems; simulation of thermal systems; fundamentals of optimization and design of optimized thermal systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 345 [Min Grade: D]

MEM 444 Biofluid Mechanics 3.0 Credits

This course introduces flow-related anatomy and pathophysiology, and biomedical flow devices and their design challenges. Analysis methods to solve biological fluid mechanics design problems are introduced and several interdisciplinary team projects are assigned to apply fluid mechanics to practical biological or medical problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 220 [Min Grade: D] or BMES 451 [Min Grade: D]

MEM 445 Solar Energy Fundamentals 3.0 Credits

This course focuses on basic theories of solar radiation, solar thermal energy, and photovoltaics. Students will learn basic radiation heat transfer, solar radiation, solar thermal collection and storage, passive and active solar heating/cooling, physics of photovoltaic cells, and characteristics and types of solar cells.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 345 [Min Grade: C] and PHYS 201 [Min Grade: C]

MEM 446 Fundamentals of Plasmas I 3.0 Credits

Introduces the fundamentals of plasma science and modern industrial plasma applications in electronics, fuel conversion, environmental control, chemistry, biology, and medicine. Topics include quasi-equilibrium and non-equilibrium thermodynamics, statistics, fluid dynamics and kinetics of plasma and other modern high temperature and high energy systems and processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 201 [Min Grade: D] or TDEC 201 [Min Grade: D] or PHYS 112 [Min Grade: D] or PHYS 187 [Min Grade: D]

MEM 447 Fundamentals of Plasmas II 3.0 Credits

Continues the development of the engineering fundamentals of plasma discharges applied in modern industrial plasma applications in electronics, fuel conversion, environmental control, chemistry, biology, and medicine. Topics include quasi-equilibrium and non-equilibrium thermodynamics, statistics, fluid dynamics of major thermal and non-thermal plasma discharges, operating at low, moderate and atmospheric pressures.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 446 [Min Grade: D]

MEM 448 Applications of Thermal Plasmas 3.0 Credits

Introduces applications of modern thermal plasma processes focused on synthesis of new materials, material treatment, fuel conversion, environmental control, chemistry, biology, and medicine. Topics Include thermodynamics and fluid dynamics of high temperature plasma processes, engineering organization of specific modern thermal plasma technologies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 201 [Min Grade: D] or TDEC 201 [Min Grade: D] or PHYS 112 [Min Grade: D] or PHYS 187 [Min Grade: D]

MEM 449 Applications of Non-Thermal Plasmas 3.0 Credits

Application of modern non-thermal plasma processes focused on synthesis of new materials, material treatment, fuel conversion, environmental control, chemistry, biology, and medicine. Topics Include non-equilibrium thermodynamics and fluid dynamics of cold temperature plasma processes, engineering organization of specific modern non-thermal plasma technologies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 201 [Min Grade: D] or TDEC 201 [Min Grade: D] or PHYS 112 [Min Grade: D] or PHYS 187 [Min Grade: D]

MEM 453 Aircraft Flight Dynamics & Control I 3.0 Credits

Covers general equations of motion for aircraft; linearization based on small disturbance theory and modal analysis to identify longitudinal open-loop characteristics; review of classical control theory; state space analysis; and autopilot design, including classical, pole placement, and optimal.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 355 [Min Grade: D]

MEM 454 Aircraft Flight Dynamics & Control II 3.0 Credits

Covers observers; lateral dynamics; Dutch roll, roll convergence, and spiral modes; autopilot design and evaluations; and inertial cross-coupling computer simulation and analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 453 [Min Grade: D]

MEM 455 Introduction to Robotics 4.0 Credits

Introduces basic concepts in robot operation and structure, including actuators, sensors, mechanical components, robot control and robot programming.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 238 [Min Grade: D] and MEM 255 [Min Grade: D]

MEM 456 Robotics II 3.0 Credits

Covers homogeneous kinematics of robots; velocities and accelerations; and static forces in manipulators, including iterative Newton-Euler formulation of manipulator dynamics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 455 [Min Grade: D]

MEM 457 Robotics III 3.0 Credits

Covers robotic-based automated manufacturing, including robot work cell configurations, applications of robots in manufacturing, material transfer, assembly, and inspection.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MEM 456 [Min Grade: D]

MEM 458 Micro-Based Control Systems I 3.0 Credits

Provides hands-on experience in real-time control and manipulation of hardware dynamic systems, including microcomputer, architecture, software, and device drivers. Emphasizes real-time interfacing of data acquisition and control systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 355 [Min Grade: D]

MEM 459 Control Applications of DSP Microprocessors 3.0 Credits

Continues MEM 458. Provides real-time control and manipulation of hardware dynamic systems. Emphasizes real-time interfacing of data acquisition and control systems. Topics include Code Composer Studio, Microprocessor C programming, Pulse width modulation (PWM), Quadrature encoder pulse (QEP) circuits, DSP system control and interrupts, Digital loop systems, design of PID digital controllers, design of digital controllers in state space, microcomputer controller implementation, sensors and actuators, and implementation of digital controllers in microprocessors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MEM 458 [Min Grade: D]

MEM 462 [WI] Introduction to Engineering Management 3.0 Credits

Introduces the general theory of management, including the processes of planning, organizing, assembling resources, supervising, and controlling. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

MEM 475 Medical Robotics I 3.0 Credits

Use of robots in surgery, safety considerations, understanding robot kinematics, analysis of surgeon performance using a robotic devices, inverse kinematics, velocity analysis, acceleration analysis, various types of surgeries case study.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 238 [Min Grade: D]

MEM 476 Medical Robotics II 3.0 Credits

Force and movement for robot arms, robot dynamics, computer vision, vision based control, combining haptics, vision and robot dynamics in a cohesive framework for the development of a medical robotic system.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 475 [Min Grade: D]

MEM 477 Haptics for Medical Robotics 3.0 Credits

Introduction to haptics, physiology of touch, actuators, sensors, non-portable force feedback, portable voice feedback, tactile feedback interfaces, haptic sensing and control.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 238 [Min Grade: D]

MEM 478 Computer-Aided Tissue Engr 3.0 Credits

Introduction to the engineering aspects of tissue reengineering and integrated CAD/CAE/CAM technology applied to tissue engineering with hands-on experience combining CAD, medical image processing, 3-D reconstruction software, and solid freeform fabrication of tissue scaffolding.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

MEM 491 [WI] Senior Design Project I 3.0 Credits

Introduces the design process, including information retrieval, problem definition, proposal writing, patents, and design notebooks. Includes presentations on problem areas by experts from industry, government, and education. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MEM 230 [Min Grade: D] and MEM 238 [Min Grade: D] and MEM 345 [Min Grade: D] and MEM 355 [Min Grade: D]

MEM 492 [WI] Senior Design Project II 3.0 Credits

Continues MEM 491. Requires written and oral progress reports. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MEM 491 [Min Grade: D]

MEM 493 [WI] Senior Design Project III 3.0 Credits

Continues MEM 492. Requires written and oral final reports, including oral presentations by each design team at a formal Design Conference open to the public and conducted in the style of a professional conference. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MEM 492 [Min Grade: D]

MEM I199 Independent Study in MEM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MEM I299 Independent Study in MEM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MEM I399 Independent Study in MEM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

MEM I499 Independent Study in MEM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MEM T180 Special Topics in MEM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MEM T280 Special Topics in MEM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MEM T380 Special Topics in MEM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MEM T480 Special Topics in MEM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Mechanical Engineering Technology

Courses

MHT 201 Kinematics 3.0 Credits

Study of four-bar linkages, sliders, and other devices using orthogonal of vectors, instantaneous centers, equivalent linkages, and effective cranks. Graphic solutions are emphasized, including an introduction to computer software.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: PHYS 103 [Min Grade: D]

MHT 205 Thermodynamics I 3.0 Credits

Students are introduced to the general theory of heat and matter; laws of thermodynamics; energy-transformation principles and availability of energy; and properties and processes for substances and ideal gases.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 103 [Min Grade: D] and MATH 122 [Min Grade: D] and MET 209 [Min Grade: D]

MHT 206 Thermodynamics II 3.0 Credits

First and second law analysis of power cycle components. Analysis of gas power cycles, including Otto & Diesel engines and Brayton cycle turbines. Analysis of traditional power plant cycles, including Rankine, Refrigeration and heat pump.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MHT 205 [Min Grade: D]

MHT 214 Technology Laboratory I 3.0 Credits

Conduct experiments to determine the physical properties of incompressible fluids and to measure the flow rates of velocities utilizing pilot tubes, orifice plates, Venturi and Weirs flow meter, U-tube differential manometers and piezometers. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: MHT 301 [Min Grade: D] (Can be taken Concurrently)

MHT 220 Applied Statics 3.0 Credits

Explores forces, moments, couples, statistics of particles, and rigid bodies in two and three dimensions. Examines external and internal distributed forces, first moments and centroids, and structures such as trusses, frames and machines.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 282 [Min Grade: D] and MATH 122 [Min Grade: D]

MHT 222 Applied Dynamics I 4.0 Credits

This course deals with the motion of bodies under the action of a single or multiple forces. It covers kinematics and kinetics of particles in rectilinear and curvilinear motions using various coordinate systems, work and energy, impulse and momentum, planar kinematics using analytical and graphical methods. Kinetics of rigid bodies using force and acceleration, work and energy, and impulse and momentum principles.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 103 [Min Grade: D] or MATH 122 [Min Grade: D]

MHT 224 Applied Dynamics II 3.0 Credits

Impulse and momentum of particles; kinematics and dynamics of rigid bodies-force-mass and acceleration; dynamics of rigid bodies - work and energy. Impulse and momentum; introduction to mechanical vibration.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MHT 222 [Min Grade: D]

MHT 226 Measurement Techniques and Instrumentation 3.0 Credits

Basic concepts of measurement and measurement systems and techniques, causes of errors and error propagation; uncertainty analysis, data collection and analysis using statistical methods, data acquisition systems; students perform experimental laboratory activities involving various measurement sensors and instruments.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 104 [Min Grade: D] and STAT 201 [Min Grade: D] and EET 207 [Min Grade: D]

MHT 295 Environmental Control Plasma Laboratory 2.0 Credits

The course presents engineering principles of non-thermal plasma application to air cleaning from Volatile Organic Compounds by combining hands-on laboratory experience with lectures. The students learn the engineering and physical principles of non-equilibrium plasma systems using the unique pulsed corona system of the Drexel Plasma Institute Environmental Laboratory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 111 [Min Grade: D] and CHEM 113 [Min Grade: D]

MHT 301 Fluid Mechanics I 3.0 Credits

Examine hydrostatics; principles governing fluids at rest; pressure measurement; hydrostatic forces on submerged areas and objects; simple dams. Discuss fluid flow in pipes under pressure; fluid energy; power and friction loss; Bernoulli's theorem. Flow measurement.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MHT 205 [Min Grade: D] and MET 213 [Min Grade: D] and MET 209 [Min Grade: D]

MHT 310 Applied Strength of Materials I 3.0 Credits

Topics include axially loaded members, stress and strain, allowable stresses, factor of safety, temperature effects, indeterminate members, torsional stresses and deformation. Students also examine shear moment beams; and flexural and transverse shearing stresses in beams.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MHT 222 [Min Grade: D]

MHT 312 Applied Strength of Materials II 3.0 Credits

A study of determinate and indeterminate beam deflections and reactions by superposition, integration and moment area methods. Topics include combined stresses; principal stresses; Mohr's circle; and theories of failure.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MHT 310 [Min Grade: D]

MHT 314 Thermo and Heat Transfer Analysis 3.0 Credits

Explores basic thermodynamic and heat transfer concepts and relations including fundamental of conduction, convection, and radiation using modern experiential methods to analyze thermodynamics systems and the related heat transfer mechanisms.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MHT 205 [Min Grade: D]

MHT 316 Fluid Mechanics Laboratory 3.0 Credits

Conduct experiments to determine the physical properties of incompressible fluids and to measure the flow rate of velocities as the fluid flows through open channels, partially filled conduits, conduits under pressure, pipe networks, and turbines and pumps.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MHT 301 [Min Grade: D]

MHT 401 Mechanical Design I 4.0 Credits

An introduction to mechanical design, the design process, design factors, creativity, optimization, human factors, and value engineering. Topics include simple design, properties and selection of materials; stress concentrations; strength under combined stresses; theories of failure; impact; and fluctuating and repeated loads.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MET 100 [Min Grade: D] and MET 213 [Min Grade: D]

MHT 402 Mechanical Design II 4.0 Credits

Topics include deformation and design of belt drives, chair drives, detachable fasteners and bearings, lubrication, and journal bearings. Covers stresses and power transmission of spur, bevel, and worm gear, shaft design, and clutches and brakes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MHT 401 [Min Grade: D]

MHT 403 Fluid Mechanics II 3.0 Credits

Consider pipe networks and reservoir systems, flow in open channels and uniform flow energy, friction loss, minor losses, velocity distribution, alternate stages of flow, critical flow, non-uniform flow, accelerated, retarded flow and hydraulic jump.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MHT 301 [Min Grade: D]

MHT 404 Advanced Materials 3.0 Credits

Lectures on inorganic materials, i.e., polymers, glasses, ceramics, concrete, wood, and materials having important electrical and magnetic properties; also a summary of the most up-to-date applications for the fabrication and uses of both metals and nonmetals.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MET 101 [Min Grade: D]

MHT 405 HVAC 3.0 Credits

Heating, Ventilation, and Air Conditioning (HVAC) focuses on air conditioning principles, including psychometrics and heat pumps. Examines calculation of heating and cooling loads in accordance with ASHRAE practices, principles of gas compression, analysis of vapor compression; refrigeration systems, low temperature refrigeration cycles, and absorption refrigeration systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: MHT 206 [Min Grade: D]

MHT T180 Special Topics in MHT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MHT T280 Special Topics in MHT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MHT T380 Special Topics in MHT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MHT T480 Special Topics in MHT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Medical Billing & Coding

Courses

MBC 101 Medical Terminology for Billers and Coders 3.0 Credits

This course covers medical terminology and anatomy from a biller's and coder's perspective and provides a foundation for courses in medical billing and coding.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

MBC 201 Medical Billing I 3.0 Credits

Designed as part one of a two-part sequence, this course is intended for those who have no experience or minimal experience with medical billing. The student will learn principles of medical billing related to proper claim form preparation, submission, and payment processing.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

MBC 202 Medical Billing II 3.0 Credits

Designed as part two of a two part sequence, this course is intended for those who have completed MBC 201 and who are seeking further knowledge of medical billing.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: MBC 201 [Min Grade: D] or HSAD 201 [Min Grade: D]

MBC 250 Medical Billing Software 3.0 Credits

This course takes the theory learned in Medical Billing I and II and applies it to billing software applications. Charge entry, payment posting, report design, and generation are covered.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: MBC 202 [Min Grade: D] or HSAD 202 [Min Grade: D]

MBC 301 Physician-Based Medical Coding I 3.0 Credits

Part one of a two-part program. The student will learn principles of medical coding related to the three main coding manuals; CPT, ICD-9-CM, and HCPCS. The student will learn principles of medical coding related to the three main code books: CPT®, ICD-9-CM Volumes 1 & 2 and HCPCS Level II.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: MBC 201 [Min Grade: D]

MBC 302 Physician-Based Medical Coding II 3.0 Credits

Designed as part two of a two-part sequence, this course continues instruction in the principles of medical coding related to the three main coding manuals, as well as preparing the students to sit for one of the two national board exams in medical coding.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: MBC 301 [Min Grade: D] or HSAD 301 [Min Grade: D]

MBC 303 Hospital-Based Medical Coding I 3.0 Credits

Designed as part one of a two-part sequence, this course teaches the principles of hospital-based medical coding related to the coding for in-patient hospital cases by means of the main coding manuals, as well as helping to prepare the student to sit for one of the two national board exams in medical coding.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: MBC 301 [Min Grade: D] or HSAD 301 [Min Grade: D]

MBC 304 Hospital-Based Medical Coding II 3.0 Credits

Designed as part two of a two-part sequence, this course continues instruction in the principles of hospital-based medical coding related to the coding for in-patient and out-patient hospital cases by means of the main coding manuals, as well as helping to prepare the students to sit for one of the two national board exams in medical coding.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: MBC 303 [Min Grade: D] or HSAD 303 [Min Grade: D]

MBC 350 Physician-Based Chart Auditing 3.0 Credits

This course applies knowledge learned in Physician-Based Medical Coding I and II to auditing patient-visit documentation. Use of various audit tools and software will be explored in addition to preparing a presentation of audit results to physician and staff.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: MBC 302 [Min Grade: D] or HSAD 302 [Min Grade: D]

MBC 360 Hospital-Based Case Studies 3.0 Credits

This course applies knowledge learned in Hospital Based Medical coding I and II and applies it to actual coding of case studies for the hospital in-patient and out-patient setting, as well as providing additional preparation for hospital-based coding certification credentials.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: MBC 304 [Min Grade: D] or HSAD 304 [Min Grade: D]

Military Science

Courses

MLSC 101 Basic Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

MLSC 102 Basic Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

MLSC 103 Basic Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

MLSC 110 Leadership and Personal Developmnt 1.0 Credit

Introduces students/cadets to the personal challenges and competencies that are critical for effective leadership. Focus is placed on developing basic knowledge and comprehension of the U.S. Army's Leadership Dimensions while gaining a "big picture" understanding of the Army ROTC program, its purpose in the U.S. Army and our nation, and its advantages for the student. Classes are conducted for one hour once each week.

College/Department: University Courses

Repeat Status: Not repeatable for credit

MLSC 120 Foundations in Leadership 1.0 Credit

Reviews leadership fundamentals such as setting direction, problem solving, listening, presenting briefs, providing feedback and using effective writing skills. Students/cadets are also exposed to key fundamentals of skills required to be successful as an MS II cadet; namely, military map reading and land navigation, and small unit operations/leadership drills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

MLSC 130 Continuing Studies: Foundations in Leadership 1.0 Credit

Continues to develop leadership fundamentals, while emphasizing increased awareness of and proficiency in military map reading and land navigation skills, and small unit operations/ leadership drills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Prerequisites: MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]

MLSC 201 Basic Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

MLSC 202 Basic Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

MLSC 203 Basic Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

MLSC 210 Innovative Tactical Leadership 2.0 Credits

Explores the dimensions of creative and innovative tactical leadership strategies and styles by studying historical case studies and engaging in interactive student exercises. Focus is on continued development of the knowledge of leadership values and attributes through an understanding of rank, uniform, customs and courtesies.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B]

MLSC 220 Leadership in Changing Environments 2.0 Credits

Examines the challenges of leading in complex contemporary operational environments. Students/cadets are exposed to more complex land navigation/map reading tasks, as well as more advanced small unit operations/ leadership drills. Cadets develop greater self awareness as they practice communication and team building skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B]

MLSC 230 Adaptive Team Leadership 2.0 Credits

Challenges cadets to study, practice, and evaluate adaptive leadership. Cadets begin to analyze and evaluate their own leadership values, attributes, skills, and actions. Primary attention is given to preparation for LDAC and the development of both tactical skills and leadership qualities.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B]

MLSC 301 Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B]

MLSC 302 Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B]

MLSC 303 Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B] and MLSC 320 [Min Grade: B]

MLSC 310 Leadership in Contact 2.0 Credits

Uses increasingly intense situational leadership challenges to build cadet awareness and skills in leading small units. Skills in decision-making, persuading, and motivating team members when "in combat" are explored, evaluated, and developed.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B]

MLSC 320 Complex Team Leadership Issues 2.0 Credits

Challenges cadets with more complex leadership issues to further develop, practice, and evaluate adaptive leadership. Cadets continue to analyze and evaluate their own leadership values, attributes, skills, and actions in preparation for the Leadership Development and Assessment Course (LDAC). Primary attention is given to preparation for LDAC and the development of both tactical skills and leadership qualities.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B]

MLSC 330 Military Leadership Co-op Preparation 2.0 Credits

Continues the methodology of MLSC 320 by using increasingly intense situational leadership challenges to build cadet awareness and skills in leading small units. Skills in decision-making, persuading, and motivating team members when "in combat" are explored, evaluated, and developed. Emphasis is also placed on honing oral and written communication skills and mastering group dynamics while conducting tactical and Garrison operation orders.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B] and MLSC 320 [Min Grade: B]

MLSC 390 Special Topics in Military Science 0.5-12.0 Credits

Special Topics of interest in Military Science. May be repeated for credit.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

MLSC 401 Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B] and MLSC 320 [Min Grade: B] and MLSC 330 [Min Grade: B]

MLSC 402 Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B] and MLSC 320 [Min Grade: B] and MLSC 330 [Min Grade: B] and MLSC 410 [Min Grade: B]

MLSC 403 Leadership Lab/Practicum 0.0 Credits

Provides hands-on experience to reinforce leadership fundamentals, while emphasizing increased awareness of and proficiency in military skills.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B] and MLSC 320 [Min Grade: B] and MLSC 330 [Min Grade: B] and MLSC 410 [Min Grade: B] and MLSC 420 [Min Grade: B]

MLSC 410 Developing Adaptive Leaders 2.0 Credits

Develops cadet proficiency in planning, executing, and assessing complex operations, functioning as a member of a staff, and providing leadership performance feedback to subordinates. Cadets are given situational opportunities to assess risk, make ethical decisions, and provide coaching to fellow ROTC cadets.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B] and MLSC 320 [Min Grade: B] and MLSC 330 [Min Grade: B]

MLSC 420 Leadership in Contemporary Environments 2.0 Credits

Explores the dynamics of leading in the complex situations of current military operations. Cadets examine differences in customs and courtesies, military law, principles of war, and rules of engagement in the face of international terrorism. Aspects of interacting with non-government organizations, civilians on the battlefield, and host nation support are examined and evaluated.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B] and MLSC 320 [Min Grade: B] and MLSC 330 [Min Grade: B] and MLSC 410 [Min Grade: B]

MLSC 430 Advanced Leadership in Contemporary Environments 2.0 Credits

Continues exploration of the dynamics of leading in the complex situations of current military operations. Culminates the ROTC curriculum with a capstone "hands-on" small unit leadership exercise which tests the cadet's tactical, technical and leadership skills utilizing an intense, realistic tactical scenario based on actual military operations in the contemporary operating environment of the 21st century.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (MLSC 110 [Min Grade: B] or MLSC 120 [Min Grade: B]) and MLSC 130 [Min Grade: B] and MLSC 210 [Min Grade: B] and MLSC 220 [Min Grade: B] and MLSC 230 [Min Grade: B] and MLSC 310 [Min Grade: B] and MLSC 320 [Min Grade: B] and MLSC 330 [Min Grade: B] and MLSC 410 [Min Grade: B] and MLSC 420 [Min Grade: B]

Music

Courses

MUSC 101 University Chorus 1.0 Credit

A large chorus that studies and performs music of many styles; performs each term. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 102 Chamber Singers 1.0 Credit

A select choir that performs advanced choral repertoire; performs frequently on and off campus. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 103 Naturally Sharp (Vocal Jazz Ensemble) 1.0 Credit

Naturally Sharp is a select group of singers, chosen by audition in the fall from the University Chorus. Naturally Sharp performs vocal jazz repertoire from the past hundred years with a three-piece backup band. Singers must also be able to do solos.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Corequisite: MUSC 101

MUSC 104 All-College Choir 1.0 Credit

All-College Choir is a non-auditioned, mixed voice ensemble that performs repertoire of various styles, genres and eras - including music of the classical tradition, jazz, spirituals, American musical theater, folk and pop.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 105 Concert Band 1.0 Credit

Performs a wide variety of music written for a large band; concerts given each term. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 106 Guitar Ensembles 1.0 Credit

Performs a wide variety of music written for a small guitar ensemble; concerts given at least twice a year. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 107 Jazz Ensembles 1.0 Credit

Offers rehearsal, study, and performance of jazz compositions for both large and small ensembles; concerts given on and off campus, sometimes with guest soloists. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 108 Jazztet 1.0 Credit

Jazztet is a subset of the larger Jazz Orchestra. Its size can vary based upon the availability of instrumentation and the desire of the director.

Its purpose is to present jazz music in a small instrumentation format.

Performances are typically part of the greater Jazz Orchestra concerts at the end of each term.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Corequisite: MUSC 107

MUSC 109 University Orchestra 1.0 Credit

This is a full orchestra that performs concert repertoire of various periods from the 18th century to the present day. Wind, brass, and percussionists must be in the concert band in order to participate.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 110 Keyboard Ensembles 1.0 Credit

Performs a wide variety of music written for a small keyboard ensemble; concerts given at least twice a year. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 111 Chamber Music Ensemble 1.0 Credit

Various small ensembles performing a variety of music of many periods and styles. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 112 Fusion Band 1.0 Credit

Performs a wide variety of music written for a small fusion ensemble. The Fusion Band gives concerts at least twice a year. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 113 Percussion Ensembles 1.0 Credit

Performs a wide variety of music written for a small percussion ensemble. The ensemble gives concerts at least twice a year. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 114 Mediterranean Ensemble 1.0 Credit

The Drexel University Mediterranean Ensemble is open to any student with an interest in performing traditional music from the Balkans, the Middle East and Northern Africa. All instruments are welcomed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 115 Gospel Choir 1.0 Credit

Performs gospel music drawn from both traditional and contemporary sources. Performance opportunities for both singers and instrumentalists. Concerts given on and off campus each term. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 116 Pep Band 1.0 Credit

Pep Band is a group of roughly forty-five student musicians primarily from the concert band. The purpose of the Pep Band is to support the Drexel Dragons basketball team and play from the bleachers at home games as well as travel to tournaments.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Corequisite: MUSC 105

MUSC 117 Rock Ensemble 1.0 Credit

Rock Ensemble is an ensemble where students have the opportunity to gain experience working as a group rehearsing, arranging, organizing, recording, and ultimately performing songs in the rock/pop/contemporary genres. By choosing music that is both of high quality and varied, students have a unique opportunity to develop a strong work ethic while being exposed to various musical challenges.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 118 Chamber Music: Strings 1.0 Credit

MUSC 118 forms its participants into various sized string groups from trios and quartets to octets. The repertoire spans music of the classical tradition and beyond, from the modern day back to the 17th century. These small groups will perform as part of a larger chamber recital at the end of each term.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 120 Music Fundamentals 3.0 Credits

Music Fundamentals teaches students essential skills and knowledge relating to Western music. Focus is placed on ear training and core music theory concepts. This course perfectly compliments any student's musical playing ability, beginning to advanced, and is essential to further musical development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 121 Music Theory I 3.0 Credits

MUSC 121 covers the foundations of: notation, major/minor scales and keys, intervals, chord construction, phrase construction, small forms, and basic techniques of harmonizing a melody. The methodology centers on analysis combined with application.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 122 Music Theory II 3.0 Credits

MUSC 122 covers: texture and textural reduction, chromatic harmony, modulation, and large forms. This is a continuation of MUSC 121 and provides more depth into the topics of that course as well as offers advanced material. The methodology combines musical analysis with application.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 121 [Min Grade: D]

MUSC 123 Music Theory III 3.0 Credits

Covers a variety of musical forms from binary and rondo to sonata-allegro, including both sectional and continuous forms, to gain an understanding of the relationship between form and the materials of music. Studies form both in relation to its historical evolution and in terms of its generative role in the creation of music.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 122 [Min Grade: D]

MUSC 124 Jazz Theory 3.0 Credits

Jazz Theory introduces musical concepts and skills as they pertain to this specific style of music. The material discussed is foundational knowledge for jazz composition, arranging, and improvisation. Therefore, this course is suitable for students interested in jazz performance or composition.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 121 [Min Grade: D]

MUSC 125 Ear Training I 1.0 Credit

Introduces the basics of ear training and sight singing.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 121 [Min Grade: D]

MUSC 126 Ear Training II 1.0 Credit

Continues MUSC 125.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 125 [Min Grade: D]

MUSC 127 Ear Training III 1.0 Credit

Continues MUSC 126.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 126 [Min Grade: D]

MUSC 130 Introduction to Music 3.0 Credits

Provides an introduction to music in the European classical tradition, including elements of melody, harmony, rhythm, texture, structure, history, and principal composers. Emphasizes listening with understanding.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 134 Mambo, Samba, Salsa, and More 3.0 Credits

This course introduces the various Latin American musical traditions, as well as their historical contexts, evolution, inter-connectivity and current importance.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 152 Survey of Songwriting 3.0 Credits

This course will examine the art and craft of songwriting. Students will listen to and analyze many examples from folk and popular music, from the 1930's through to the present day. Students will use this knowledge, as well as that of basic music fundamentals, to compose a song at the end of the term.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 190 Class Piano I 2.0 Credits

Uses a group situation to teach basic performance skills and beginning instruction on piano.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 191 Class Guitar I 2.0 Credits

Uses a group situation to teach basic performance skills and beginning instruction on guitar.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 192 Class Percussion I 2.0 Credits

Uses a group situation to teach basic performance skills and beginning instruction on percussion.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 193 Class Voice I 2.0 Credits

Uses a group situation to teach basic performance skills and beginning instruction in voice.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 194 Class Bass I 2.0 Credits

Class Bass I uses group instruction to teach basic performance skills and techniques on electric bass guitar and upright bass.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 6 credits

MUSC 195 Class Bass II 2.0 Credits

Class Bass II uses group instruction to teach advanced performance skills and techniques on electric bass guitar and upright bass.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 6 credits

MUSC 196 Jazz Class Piano 2.0 Credits

Students will learn the fundamentals in jazz piano playing by studying the melodic, harmonic and rhythmic aspects associated with jazz. Students will learn how to read, "lead sheets" and improvise over modal and standard chord changes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 229 Modern Arranging Techniques 3.0 Credits

Modern Arranging Techniques. Discusses the capabilities and ranges of varying instruments. Students study modern arranging techniques utilizing strategies and standard music material.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 122 [Min Grade: D]

MUSC 231 Music History I 3.0 Credits

Surveys and analyzes compositions from antiquity through the Baroque period in European music history. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 232 Music History II 3.0 Credits

Surveys and analyzes compositions from the classical and romantic periods in European music history as well as the development of music in the 20th century. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 234 The Beatles 3.0 Credits

This course will examine the cultural phenomena of The Beatles from their early history as a band through the end of their regular collaboration in 1970. While The Beatles have been examined in many different ways, this course will concentrate on their productivity as a rock band through the single pop song, the pop album, and film. It will also serve to provide a more in depth study of the group and their influence on other popular culture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 235 [WI] History of Film Music 3.0 Credits

This course surveys film music from the silent film era to the present.

Topics will include the composers of the genre, the changing musical styles through the decades, and the techniques used by film composers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 236 Rock Music Through the Mid-60s 3.0 Credits

Surveys rock music from its roots through the mid-60s.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 238 Rock Music Since the Mid-60s 3.0 Credits

Surveys rock music from the mid-60s through the mid-90s.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 241 Private Lesson 2.0 Credits

Weekly private music lessons on an instrument or voice as indicated by the section number. Lessons are fifty minutes per week. The specific day and time is mutually agreed upon by the instructor and the student. Musical style, level of ability, and learning objectives are individually based. Students are encouraged to contact the instructor if they have questions. Students are charged a lab fee every term they register.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 242 Applied Music V 2.0 Credits

Continuation of MUSC 242. Weekly private applied music instruction at the sophomore level. Fee requirement. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: MUSC 241 [Min Grade: D]

MUSC 243 Applied Music VI 2.0 Credits

Continuation of MUSC 242. Weekly private applied music instruction at the sophomore level. Fee requirement. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: MUSC 242 [Min Grade: D]

MUSC 249 Digital Music Composition 3.0 Credits

Digital Music Composition teaches students how to compose music intended to be produced by a computer and related to software, opposed to composing for acoustic instruments. Students will learn how to use specific music software and explore contemporary compositional techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 121 [Min Grade: D]

MUSC 252 Music Composition 3.0 Credits

Music Composition engages students in writing music for ensembles ranging from solo performer to large ensemble. Techniques of the common practice period as well as modernist harmonic techniques will be introduced and applied. Live performance of student projects will be provided and is an important feature of the course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 229 [Min Grade: D]

MUSC 290 Class Piano II 2.0 Credits

Class Piano II is a continuation of Class Piano I. By the end of the term students will be able to perform a number of simple songs, play several scales and chord progressions, and have basic note reading skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 190 [Min Grade: D]

MUSC 291 Class Guitar II 2.0 Credits

Class Guitar II is a continuation of Class Guitar I. In this course students continue to work on note reading in first position, develop rhythmic skills and reading ability in different keys, learn movable barred chords and power chords, and learn basic finger picking technique.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 191 [Min Grade: D]

MUSC 292 Advanced Class Percussion 2.0 Credits

Uses a group situation to teach performance skills on percussion. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: MUSC 192 [Min Grade: D]

MUSC 300 Improvisation 3.0 Credits

Provides study and practice of various improvisatory styles in music. Includes classroom lectures, listening, and solo and ensemble performance.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 323 Songwriting 3.0 Credits

Addresses basic songwriting techniques including form, melody, rhythm, lyrics, and production. Projects are required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 121 [Min Grade: D]

MUSC 331 World Musics 3.0 Credits

Surveys various musical traditions from around the world in their cultural contexts. Includes selected music from Africa, the Americas, Europe, South Asia, Southeast Asia, Northeast Asia, West Asia, and Oceania.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 333 Afro-American Music USA 3.0 Credits

Examines the African heritage and related New World forms outside the United States. Covers work songs, spirituals, blues, folk music, ragtime, gospel, rhythm and blues, jazz, etc.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 336 History of Jazz 3.0 Credits

Surveys the music popularly known as jazz from before 1900 through the stylistic changes and trends of the 20th century. Covers precursors, early jazz, big bands, bebop, the new music, etc.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 338 [WI] American Popular Music 3.0 Credits

Examines popular music (dances, marches, ragtime, jazz, musical comedy, movie music, swing, rock, etc.) from Colonial times to the present, with cultural-historical contexts. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSC 341 Advanced Applied Music 2.0 Credits

Weekly private applied music instruction at the advanced level. Fee requirement. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: MUSC 243 [Min Grade: D]

MUSC 342 Applied Music-Recital 2.0 Credits

Students will present a public recital featuring significant solo repertoire. Repertoire choices for recital must be made through the Applied Music instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSC 241 [Min Grade: D]

MUSC 380 Special Topics in Music 0.5-12.0 Credits

Covers selected topics in music. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC 381 MADKo Concert Promotions 1.0-3.0 Credit

Students participate in organizing, advancing, booking, promoting and implementing concerts at venues both on and off -campus.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 9 times for 9 credits

Restrictions: Can enroll if major is EAM or major is MUSI.

Prerequisites: MUSC 262 [Min Grade: D] or MUSC 265 [Min Grade: D] or THTR 132 [Min Grade: D]

MUSC 470 Advanced Seminar in Music 3.0 Credits

Covers selected topics in music-theoretical, historical, technical, or commercial. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is MUSC or major is MUSI and classification is Junior or Senior.

MUSC 495 Directed Studies in Music 0.5-12.0 Credits

Provides supervised individual study of special subjects in music. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC I199 Independent Study in MUSC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC I299 Independent Study in MUSC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC I399 Independent Study in MUSC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC I499 Independent Study in MUSC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC T180 Special Topics in Music 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC T280 Special Topics in Music 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC T380 Special Topics in Music 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MUSC T480 Special Topics in Music 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Music Industry Program

Courses

MIP 131 History of the Music Industry 3.0 Credits

This course teaches the students the background of the recording industry, including technologies, social and political events that shaped the industry to the present.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 132 Survey of the Recording Industry 3.0 Credits

This course offers a comprehensive overview of the history of the Recording Industry plus an in-depth examination of the key changes that have affected the world of the Industry over the past 25 years. Marketing, Promotion, Branding, Music Streaming, Touring, Social Media development, and artist development will be covered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 133 Digital Audio Workstations I 3.0 Credits

This course will provide students with a basic understanding of Digital Audio Workstation theory and practice as it relates to content creation through Music Instruments Digital Interface (M.I.D.I.) sequencing. In addition to M.I.D.I. sequencing, students will be introduced to editing, and mixing.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 161 Copyrights in the Music Industry 3.0 Credits

This course is an in-depth exploration of what, how, when and where intellectual property exists in the music industry, with a particular emphasis on the role that copyrights play.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 170 Radio Management 3.0 Credits

Students learn about the growth and development of radio through the 20th century to today, including current challenges and new technologies, programming and marketing techniques, payola, organizational structure, corporate consolidation, the F.C.C., podcasting, satellite, and internet radio. Students also create their own radio stations and formats.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MIP 179 Introduction to Sound Recording 2.0 Credits

Introduces the art of sound recording, including fundamentals of sound, sound capture, acoustic environment, recording devices, and the recording studio. Stakeholders, such as engineers, producers, and technicians are discussed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Corequisite: MIP 227

MIP 227 Listening Techniques 1.0 Credit

Students will develop critical listening skills needed for all aspects of music production including commercial arranging, tracking, and mixing.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Corequisite: MIP 179

MIP 233 Digital Audio Workstations II 3.0 Credits

This course focuses on Digital Audio Workstation techniques used in modern audio production. This course will provide students with a basic understanding of Digital Audio Workstation theory of operation, system setup and troubleshooting, audio recording, editing, and "in the box" mixing.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 133 [Min Grade: D]

MIP 262 Trademarks and Patents in the Music Industry 3.0 Credits

This course is an in-depth continuation of the exploration of what, how, when and where intellectual property exists in the music industry, with a further emphasis on the use of trademarks and patents in the music and music software industries.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 263 Media Promotion 3.0 Credits

Students learn about the procedures and mechanisms used to promote music and music-related content through various media forms, primarily radio and video, and through any new media forms recently or futuristically discovered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EAM or major is MUSI.

Prerequisites: MIP 170 [Min Grade: D]

MIP 270 Live Music Industry 3.0 Credits

Course examines the basic concepts, key terms and roles of all essential players for both the venue management and touring and concert promotion industry and the relationships between venues, booking agents, tour managers and media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 271 The Recording Industry I 3.0 Credits

This course teaches the students the fundamentals of the structure and function of the recording industry. It is a comprehensive exploration of the structure and function of the professionals in the recording industry with relation to: major labels, independent labels, and production companies with an analysis of those entities.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 161 [Min Grade: D]

MIP 272 The Recording Industry II 3.0 Credits

This course is a continuation of the recording industry principles learned in MIP 271.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 271 [Min Grade: D]

MIP 276 Sound Recording for Business Concentration 3.0 Credits

Sound recording techniques are presented to provide Music Industry Business Concentration students with basic recording competency through practical application. Students are required to create several recordings through projects that require teamwork and self-analysis.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 179 [Min Grade: C]

MIP 279 Sound Recording I 3.0 Credits

Basic sound recording procedures are presented with an emphasis on microphone techniques, signal-flow, and session workflow. Requires students to create several multitrack recordings, including editing and mixing.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Cannot enroll if classification is Freshman

Prerequisites: MIP 179 [Min Grade: D]

MIP 293 Survey of Music Production 3.0 Credits

This course analyzes various music recordings, including the genres of jazz, pop, R&B, and rock, from the modern recording era (1930's to the present) and discusses the production techniques used to create them.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 311 Artists and Repertoire in the Music Industry I 4.0 Credits

Educates students in the art of selecting recording artists for a recording label's artist roster. It analyzes target demographics for the label, genre specificity, A&R administration processes and takes the student through the myriad duties performed by an A&R executive in the recording industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 312 Artists and Repertoire in the Music Industry II 4.0 Credits

This course teaches the art of selecting recording artists for a recording label's artist roster. This student in this course work directly with A&M/Octone Records executive David Boxenbaum, to search and present artists to consider signing to the label. The class engages in weekly conference calls and presentations to Mr Boxenbaum and the staff.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 318 Music Merchandising 3.0 Credits

Students work in interdisciplinary groups with Design and Merchandising students to create a comprehensive merchandise extension program including product selection, production, distribution and promotion within the context of the artists' overall brand package.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MIP 331 Music Venues and Concerts 3.0 Credits

Students will learn how to operate a music venue by learning how to book talent, market and promote, staff and hire personnel, create visibility, establish a long-term vision for the music venue.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 333 Digital Audio Workstations III 3.0 Credits

This course focuses on advanced Digital Audio Workstation techniques used in modern recording production with an emphasis on audio editing. Sound replacement, pitch correction, alignment, audio quantization, and editing proficiency are covered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 233 [Min Grade: D]

MIP 336 Contracts and Legal Issues in the Music Industry 3.0 Credits

This course explores contractual agreements and the legal issues affecting the music industry today, such as free speech in radio and music lyrics, rights of publicity for recording artists, fair use and piracy, as well as the various standard agreements in common use in the music and recording industries.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 161 [Min Grade: D] and BLAW 201 [Min Grade: D]

MIP 338 Audio Seminar 2.0 Credits

Students present Extra Curricular recording projects to the instructor and fellow students for an in-class critique. The in-class critique will give the student direct feedback on their creative work and allow them to compare their work against the work of their peers. The production critiques will be moderated by the instructor and grades will be assessed based on in-class participation and presentations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 4 credits

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 379 [Min Grade: D]

MIP 341 Touring and Booking 3.0 Credits

Educates student about the Live Performance revenue stream in the music industry, encompassing tour management, tour planning and implementation, concert promotion agreements, insurance issues and revenue breakdowns.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

MIP 343 MADKo Concert Promotions 3.0 Credits

This course teaches the students, through experiential, hands-on learning, how to organize, market, promote, advance and settle music concerts.

The students conceive of, organize and book artists for concerts locally and regionally. They are responsible for every facet of the concert, from conception to final settlement.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 331 [Min Grade: D] or MIP 341 [Min Grade: D]

MIP 358 Electronic Music Production 3.0 Credits

This course is a holistic approach to electronic music production through the study of its history and hands on digital audio workstations techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MIP 233 [Min Grade: D]

MIP 361 Music Publishing 3.0 Credits

This course explores the fundamental responsibilities of a music publisher including reviewing, evaluating, marketing, licensing, monetizing, representing and protecting original music, as well as the rights of songwriters and related content creators. Students will discover how music publishing is a crucial element of support in a thriving music industry and will learn how music publishers build value for their creative clients.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 161 [Min Grade: D]

MIP 365 Cities of Music and Culture 3.0 Credits

This course is designed to give students an introductory insight and understanding of the music industry in the chosen location of the class. This class is a Study Tour.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MIP 366 Music Supervision 3.0 Credits

Students will be introduced to the creative and administrative elements of music supervision including sourcing, evaluating, licensing, and placing music into visual productions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 161 [Min Grade: D] or MIP 361 [Min Grade: D]

MIP 374 Entrepreneurship in the Music Industry 3.0 Credits

Students will learn how to devise, conceive, create and implement a music industry-related business through the drafting of a business plan. This course is team-driven and will involve student discussions and critique.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: FIN 301 [Min Grade: D]

MIP 375 [WI] Marketing and Promo in Music Industry 3.0 Credits

This course is designed for students to understand marketing & promotion in the music industry and provide insight into the concepts of marketing and the tactics employed by labels, independent agents, and artists in the marketplace. Students will acquire the skills to assemble comprehensive, integrated marketing strategies that accompany a successful marketing campaign. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 132 [Min Grade: D] or MIP 272 [Min Grade: D]

MIP 376 MAD Dragon Music Group 3.0 Credits

MAD Dragon Music Group is designed to immerse students in the world of the independent music business and includes all of the professor led, student operated enterprises that create, organize and administer MAD Dragon Music Group projects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 9 credits

Prerequisites: MIP 132 [Min Grade: D]

MIP 377 MAD Dragon Media 3.0 Credits

MAD Dragon Media is the marketing, publicity and media relation arm of the MAD Dragon Music Group.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 12 credits

Restrictions: Can enroll if major is MUSI.

MIP 379 Sound Recording II 3.0 Credits

An advanced examination of current state of the art sound recording techniques. Special attention is paid to concert recording, digital and analog mixing techniques, advanced compression and equalization techniques, and time-based processing. Research methods in sound are introduced.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI and classification is Junior or Pre-Junior or Senior.

Prerequisites: MIP 279 [Min Grade: D]

MIP 380 Special Topics in Music Industry 0.5-12.0 Credits

Covers special topics in music industry. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MIP 381 Audio for Video 3.0 Credits

This course will introduce the student to the technological and creative aspects of developing an audio score for audio/visual elements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 233 [Min Grade: D] and MIP 279 [Min Grade: D]

MIP 382 Scoring to Picture 3.0 Credits

This course will expand the students' ability to create and produce an original score for an audio/visual element, drawing upon their creative and technological skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 381 [Min Grade: D]

MIP 383 MAD Dragon Studios 1.0 Credit

Students are involved in the day-to-day operations of MAD Dragon Recording Studios. Students will perform the business operations such as scheduling, logistics, and promotion, as well as oversee session needs, tech requirements and supplies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 6 credits

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 279 [Min Grade: D]

MIP 384 Synthesis and Sampling 3.0 Credits

This is an advanced course focusing on the theory and operation of hardware and virtual synthesizers and digital audio samplers. Students learn how to identify and manipulate the various parameters of synthesis and sampling devices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 233 [Min Grade: D]

MIP 386 Commercial Music Production 3.0 Credits

An examination of the various ways that music is composed and used in television advertising, industries, trailers/promos for film, television, and radio, including bumpers and station ids.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 381 [Min Grade: D]

MIP 387 Studio Maintenance 3.0 Credits

Introduces the student to basic maintenance and troubleshooting techniques used in the modern recording studio. Basic electronic components, cabling, soldering skills, audio measurements, and equipment calibration are emphasized.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 279 [Min Grade: C]

MIP 388 Music and Audio Freelancing 2.0 Credits

Students will gain an understanding of how to prepare for and develop a career as a freelancer in the music and/or audio industries. They will learn how to develop career goals and a plan of action, create a basic professional website, and learn the basic financial, business, and marketing practices of a freelancer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Cannot enroll if classification is Freshman or Sophomore

MIP 389 Sound Reinforcement 3.0 Credits

This course covers all aspects of sound reinforcement for live performances, including system design, equipment usage, and acoustical concerns. The course uses both lecture and hands-on components for greater student understanding.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MIP 390 Video Game Music and Audio 3.0 Credits

The objective of this course is to give students a well-rounded understanding of the state of contemporary video game music and audio; how the game development process works; the evolution of game audio, and how to approach the creation of video game music and audio.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MIP 391 Analog Recording 3.0 Credits

This class enables students to practice the art of analog recording, editing and mixing. It puts in perspective the concepts, tools, and techniques of studio production that can be taken for granted in the digital domain. The constraints and aesthetic choices that are magnified by the analog format are very important parts of a holistic music production curriculum.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI and classification is Junior or Senior.

Prerequisites: MIP 379 [Min Grade: C]

MIP 392 Music Production Master Class 1.0 Credit

A guest music producer and his team will share their knowledge of record production. Students will learn both technical and business aspects of professional record production and will be assigned projects helping them develop a high level of expertise and professionalism.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI and classification is Junior or Senior.

Prerequisites: MIP 379 [Min Grade: C]

MIP 394 Big Data In The Music Industry 3.0 Credits

This course offers a comprehensive overview of collecting, analyzing, and understanding all aspects of Big Data research in the music industry. By intensive studies of the analytics of the data flow and how that information is used, this course will show students how to interpret the ebb and flow of the music business.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 132 [Min Grade: D] and STAT 201 [Min Grade: D]

MIP 395 Digital Revenue & Creative Destruction 3.0 Credits

Students will study the disruption, destruction and transformation of the music industry business model through the lens of entrepreneurial innovation in the post-Napster era. This course is team-driven and will involve extensive student discussions and critique.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

MIP 396 International Recording Business 3.0 Credits

This course is designed to give students an international perspective of the recording business. Students will research individual markets and compare and contrast them in order to evaluate business conditions and consider future economic prospects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 132 [Min Grade: D]

MIP 426 Global Trends in the Music Industry 3.0 Credits

This course explores how the music, arts and entertainment industries operate and interact with a global perspective. Students will examine the unique attributes and different cultural and artistic components of global music industry centers with emphasis on "placemaking" factors, government-support models, economic landscape, market trends, chart history, deal types/income streams, hitmakers and moguls, and specific genres and styles emanating from around the world. Students will gain a greater understanding of how music, entertainment and various media platforms are perceived, supported and commoditized throughout the world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: BLAW 201 [Min Grade: D]

MIP 433 Digital Audio Workstations IV 3.0 Credits

This course focuses on advanced Digital Audio Workstation techniques used in modern audio production. This course will explore trends in DAW technology and showcase emerging production techniques used in the creation of modern music.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 133 [Min Grade: D]

MIP 440 Legal and Business Affairs for MAD Program 3.0 Credits

L&B Affairs gives students the opportunity to examine, draft, revise, and negotiate all legal agreements attendant to MAD Dragon enterprise and all of its entities. The student will participate in business negotiations for all MAD Dragon-related dealing as well as working with real-world timelines and deadlines.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is MUSI.

MIP 441 DraKo Booking 3.0 Credits

This course teaches the students, through experiential, hands-on learning, how to effectively act as a booking agent. They do so by booking tours for the MAD Dragon Records artists.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 331 [Min Grade: D] or MIP 341 [Min Grade: D]

MIP 443 Entertainment Contracts I 3.0 Credits

This course encompasses drafting and negotiating the most common types of agreements in the music industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: BLAW 201 [Min Grade: D]

MIP 444 MAD Dragon Records 3.0 Credits

MAD Dragon Records is the hands-on real-world component of the Music Industry Program as a full-service record label.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 271 [Min Grade: D]

MIP 445 MAD Dragon Publishing 3.0 Credits

Students engage in the everyday business of a Publishing Company, including investigating placement possibilities for songs in, e.g., movies and TV. They draft and negotiate licenses for uses, compile database, create and disseminate compilation CDs to music supervisors and like-users, and seek out and sign songwriters to the company.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 361 [Min Grade: D]

MIP 453 Entertainment Contracts II 3.0 Credits

This course is a continuation of Entertainment Contracts I that encompasses drafting and negotiating the most common types of entertainment agreements used by the Music Industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 443 [Min Grade: D]

MIP 464 Music Industry Cyberlaw 3.0 Credits

This course explores the law and legal issues that exist on the Internet, such as publication, domain names, disclaimers, liabilities of an e-commerce store or site related to the music industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: BLAW 201 [Min Grade: D]

MIP 467 Artist Representation 3.0 Credits

Students will gain an historical perspective on the evolving role of the Manager from an entrepreneurial perspective. The class examines the core components that comprise an artist's professional team. The course will explore and analyze the central role that managers in particular, but also, attorneys, agents, business managers, services firms, record labels and other entities each play in representing, developing, and supervising the artist's overall business and brand.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Cannot enroll if classification is Freshman

MIP 468 Music Industry E-Commerce 3.0 Credits

This course explores the inner workings of commerce in the music industry as it occurs in the Internet. The student gains an understanding of how to market and promote websites, utilize social networking sites and how digital services for the industry can serve the label, artist and/or publishing company.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 132 [Min Grade: D]

MIP 477 Music Production 3.0 Credits

The students in this class learn contemporary music production techniques through a combination of lecture, demonstration and independent work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 379 [Min Grade: D]

MIP 481 Mixing and Mastering 3.0 Credits

The art of mixing and mastering music are covered in depth. This is an advanced audio engineering course that will focus on the mixing and mastering process. Proper equipment usage, methods, formats, and production goals are covered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 379 [Min Grade: D]

MIP 482 Recording Session 3.0 Credits

Students will be involved in all aspects of recording production including artist selection, session planning, recording, overdubbing, editing, mixing and mastering.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Can enroll if major is MUSI.

Prerequisites: MIP 379 [Min Grade: D]

MIP 491 Senior Project in Music Industry 3.0 Credits

Senior Project is a thesis course in which student groups engage over the three quarters of senior year in intensive research on a topic selected by a jury among individual proposals. The thesis will result in some form of publishable material. The student will present their thesis to a jury in their final quarter of senior year.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 12 credits

Restrictions: Can enroll if major is MUSI and classification is Senior.

MIP 495 Directed Studies in Music Industry 0.5-12.0 Credits

Provides supervised individual study of special topics in the music industry. Departmental permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is MUSI.

MIP 1199 Independent Study in Music Industry Program 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MIP 1299 Independent Study in Music Industry Program 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MIP 1399 Independent Study in Music Industry Program 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MIP 1499 Independent Study in Music Industry Program 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MIP T180 Special Topics in Music Industry Program 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MIP T280 Special Topics in Music Industry Program 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MIP T380 Special Topics in Music Industry Program 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

MIP T480 Special Topics in Music Industry Program 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Naval Science

Courses

NSC 100 Naval Science Drill 0.0 Credits

A professional laboratory covering various aspects of naval leadership and professional development. While emphasis is given to military marching, formation, and parade, the course also includes lectures from sources in and out of the Navy. Guest speakers cover topics such as leadership, Navy career paths, equal opportunity, rights and responsibilities, AIDS awareness, terrorism/counter-terrorism, naval warfare doctrine, employment of naval forces, ethics and values, operations security, and safety.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 101 Naval Orientation/Introduction to Naval Science 0.0 Credits

A course designed to familiarize the student with the history, characteristics and present employment of sea power. Particular emphasis is placed upon our naval forces and their capability in achieving and maintaining our national objectives. Naval organization and operational functions are discussed in conjunction with sea power concepts. Additionally, the student is given an insight into the Naval Service, shipboard organization and safety, time management skills and study techniques.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 102 Seapower and Maritime Affairs 2.0 Credits

A broad survey of naval history designed to add historical perspective to current defense problems. Topics covered include: naval power as an aspect of national defense policy, navies as an instrument of foreign policy, strategy selection, resource control, technology, and manning.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 201 Leadership & Management 2.0 Credits

This course emphasizes principles of leadership, personnel and material management, and subordinate development in the context of the naval organization. Practical applications are explored through experiential exercises and case studies.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 202 Navigation I 2.0 Credits

A comprehensive study of the theory and practice of terrestrial, and electronic navigation and the laws of vessel operations. Topics include fundamentals of coastal and harbor piloting, electronic navigation and mean of navigating without reference to land. An in-depth study of the international and inland nautical Rules of the Road is also included. Case studies and practical exercises are used to reinforce the fundamentals of marine navigation.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 301 Engineering 2.0 Credits

This course provides an overview of how propulsion and electricity are provided to our Navy's fighting ships. The basic engineering principles relating to thermodynamics, steam propulsion (conventional and nuclear), gas turbine propulsion, internal combustion engines, electricity generation and distribution, and various support systems will be taught. Ship design, stability, damage control, and some engineering-related ethical issues will also be discussed.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 302 Weapons 2.0 Credits

This course provides an overview of the theory and concepts underlying modern weapons systems. The principles behind sensors and detection systems, tracking systems, computational systems, weapon delivery systems, and the fire control problem will be examined, with a consistent emphasis on the integration of these components into a "weapons system". Case studies will be used to illustrate and reinforce concepts introduced in the course.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 310 Evolution of Warfare 2.0 Credits

This course is designed to add broad historical perspective to understanding military power. Treating war and the military as an integral part of society, the course deals with such topics as: war as an instrument of foreign policy, military influences on foreign policy, the military as a reflection of society, manning and strategy selection.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 401 Navigation II 2.0 Credits

Insight into modern naval operations is gained through analysis of relative motion pertaining to ships at sea, underway replenishment, ship handling, and tactical communications. The process of command and control and leadership is examined through case studies of actual incidents at sea.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 402 Leadership and Ethics 2.0 Credits

The capstone course of the NROTC curriculum, this course is intended to provide the midshipman with the ethical foundation and basic leadership tools to be effective junior officers. Topics such as responsibility, accountability, ethics, the law of armed conflict, military law, division organization and training, and discipline are introduced through practical exercises, group discussion, and case studies.

College/Department: University Courses

Repeat Status: Not repeatable for credit

NSC 410 Amphibious Warfare 2.0 Credits

Maneuver Warfare is designed to provide a foundation of knowledge regarding leadership, tactics, and general military skills. Specific topics range from introduction to leadership and problem resolution, to Boyd's decision cycle and military law. Ideas are introduced and reinforced through a wide range of instructional methods, to include lecture, group discussion, practical application, and case studies.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Neuroscience

Courses

NEUR 410 Neuroscience 4.0 Credits

This course is designed to provide the student with a strong foundation in the structure and function of the nervous system. Clinical correlations are provided throughout the course to underscore the necessity for understanding the material for effective clinical practice and to provide a neurophysiological basis for various pathological conditions commonly encountered in the practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 103 [Min Grade: D]

Nursing

Courses

NURS 110 Essentials of Relationship-Based Professional Nursing Practice 4.0 Credits

This course provides students with the tools, strategies, and resources inherent in relationship-based professional nursing practice. This course focuses on exploring the historical context of nursing, introducing the IOM core competencies, and examining the role of the professional nurse in today's healthcare environment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NURS.

Prerequisites: ANAT 102 [Min Grade: C] (Can be taken Concurrently) ANAT 101 [Min Grade: C] and ENGL 102 [Min Grade: C]

NURS 112 Relationship-Based Health Assessment & Promotion 5.0 Credits

This course focuses on establishing the professional nurse / patient relationship-based care that promotes and assesses health within the adult population. Special emphasis is placed on screening for health risks identified by national goals and population trends. The student develops physical assessment skills applicable to professional practice and incorporates health promotion activities associated with the guidelines established by Healthy People 2020.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NURS.

Prerequisites: NURS 110 [Min Grade: C] (Can be taken Concurrently) ANAT 101 [Min Grade: C] and ANAT 102 [Min Grade: C] and ANAT 103 [Min Grade: C]

NURS 120 Contemporary Health Care 3.0 Credits

Students will examine the role of nursing within the health care system; recognizing historical influences on current practice, organizational structures of healthcare, and informatics to promote quality care. Nursing standards, ethics, scholarship, policy and government are introduced.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

NURS 121 Relationship-Based Nursing Care 3.0 Credits

This course focuses on the development of skills for the practice of relationship-based nursing care (RBC) with an emphasis on both verbal and nonverbal communication to create a caring and healing environment for patients. An understanding of the dimensions of Relationship Based Nursing Care and how they apply to all three essential relationships will provide the framework for exploring best practices in nursing to promote patient safety while practicing patient centered care. Legal and ethical principles will be explored to examine their role in health care decision making. *This course is writing intensive for BSN Co-op students only.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

NURS 200 Principles of Nursing Practice 6.0 Credits

This course will focus on the concepts, skills, and the attitudes fundamental to professional nursing practice within a framework of clinical decision-making. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NURS.

Prerequisites: ANAT 103 [Min Grade: C] and BIO 226 [Min Grade: C] and MATH 108 [Min Grade: C] and CHEM 103 [Min Grade: C]

Corequisites: INFO 204, NURS 112

NURS 205 Strategies for Academic Success 1.0 Credit

This course helps students to explore the learning process, to gain essential skills needed to achieve academic success and to develop the ability to make effective use of university resources. Discussion, personal reflection, and relevant electronic resources are used to foster students' development as self-directed learners. Specific attention will be given to the following topics: study skills, learning strategies, time management, academic planning, test-taking techniques, and goal-setting. The goal of this course is to help improve students' efficacy in the areas of academic self-management, self-direction, and resource utilization.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 220 Foundations of Nursing Practice 8.0 Credits

This course will focus on the concepts, skills, and attitudes fundamental to professional nursing practice within a framework of clinical decision-making. It will also emphasize the professional nurse/patient relationship-based care that promotes and assesses health throughout the lifespan.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: ANAT 103 [Min Grade: C] and MATH 101 [Min Grade: C]

Corequisite: NURS 223

NURS 221 Concepts of Pathophysiology in Nursing 3.0 Credits

This course builds upon the theoretical foundations of nursing theory, human anatomy, and physiology by addressing basic concepts, principles, and processes associated with common genetics, pathologies, physiologic alterations in body systems, and the body's ability to compensate for these changes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: ANAT 103 [Min Grade: C] and MATH 101 [Min Grade: C]

NURS 222 Medication Principles 3.0 Credits

The purpose of this course is to provide students with foundational tools, strategies, and resources for medication calculations and medical terminology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

NURS 223 Clinical Concepts 2.0 Credits

This course will provide students with an introduction to patient care experiences. Students will be offered a variety of clinical experiences to assist in the integration of the theoretical content from previous or concurrent nursing courses. Clinical experiences at a variety of inpatient settings will be used for the evaluation of the student's ability to complete the essential nursing skills and provide safe care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 120 [Min Grade: C], NURS 121 [Min Grade: C] (Can be taken Concurrently)

Corequisite: NURS 220

NURS 300 Comprehensive Adult Nursing I 6.0 Credits

This course will focus on the development of selected competencies for nursing care assessment and management of adults with predictable human responses to specific system alterations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 200 [Min Grade: C] and NURS 112 [Min Grade: C]

Corequisite: NURS 301

NURS 301 Pharmacology for Nursing I 3.0 Credits

Introduces professional nursing students to the principles of pharmacology and drug therapies, pharmacologic-therapeutic classes of drugs and important drug information resources.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 200 [Min Grade: C] and NURS 112 [Min Grade: C]

Corequisite: NURS 300

NURS 303 Women's Health Nursing 6.0 Credits

This course focuses on the development of competencies for the nursing care management of child-bearing families and health problems/concerns that affect women. The course will also emphasize the nurse's role in health assessment, health promotion, and promotion of adaptive processes for the maternity patient and the promotion of women's health in general. Sociocultural, economic, political, and ethical factors that impact on health promotion, disease prevention, and risk reduction for the childbearing family and women in general are examined. Selected women's health clinical settings will be utilized for clinical practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 300 [Min Grade: C] and NURS 301 [Min Grade: C]

NURS 304 Nursing of Children 6.0 Credits

This course focuses on the development of competencies for the nursing care management of children experiencing potential and actual alterations in health. An emphasis will be placed on the nurse's role in health assessment, health promotion, and promotion of adaptive processes for the child within the context of the family. Selected pediatric clinical agencies will be utilized for clinical practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 300 [Min Grade: C] and NURS 301 [Min Grade: C] and NURS 308 [Min Grade: C]

NURS 305 Comprehensive Adult Nursing II 6.0 Credits

This course is a continuation of NURS 300. It will focus on the development of selected competencies for nursing care assessment and management of adults with predictable human responses to specific system alterations. Risk reduction, recovery, and rehabilitation of patients with selected disease processes and common clinical problems are addressed. Didactic medical-surgical content will focus on the gastrointestinal, renal, immunologic, integumentary, sensorineural, neurologic, musculoskeletal, male reproductive, and infectious disease systems. Home care principles and health policy for adults with common acute and chronic illnesses and diseases will also be explored. Selected general medical-surgical settings and home-care agencies will be utilized for clinical practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 300 [Min Grade: C] and NURS 301 [Min Grade: C]

Corequisite: NURS 306

NURS 306 Pharmacology for Nursing II 3.0 Credits

This course is a continuation of NURS 301. The course will begin with a review of drug and dosage calculations. This course will focus on drugs and cardiovascular and renal systems, respiratory system, antiinfective and anti-inflammatory agents, immune and biologic modifiers and chemotherapeutic agents, gastrointestinal system and nutrition, and miscellaneous therapeutics including hematologic, dermatologic, ophthalmic, and optic agents. Strategies to prevent medication errors in health care agencies will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 301 [Min Grade: C]

NURS 308 Mental Health Nursing 6.0 Credits

This course focuses on the development of competencies necessary for the practice of mental health nursing with emphasis on the use of self in relationships with patients and health team members. An understanding of the brain-behavior connection and the importance of the therapeutic nurse-patient relationship will provide the framework for exploring factors which contribute to stress, maladaptive behaviors and mental illness. Cross-cultural aspects of mental health and appropriate culturally relevant interventions will also be emphasized. Selected inpatient and outpatient mental health settings and agencies will be utilized for clinical practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 300 [Min Grade: C] and NURS 301 [Min Grade: C]

NURS 310 Courageous Action: Leading Authentically 3.0 Credits

This course is the first in a series of three courses included in the Macy Undergraduate Leadership Fellow's Program. Completion of all courses earns students nine credits and recognition as a Macy Undergraduate Leadership Fellow. Courageous Action: Leading Authentically will enable students in the undergraduate health professions programs an opportunity to embark on paths of personal leadership development; gain a deeper understanding and appreciation of differences; provide students with ideas, techniques, and tools to assist them in their leadership development journeys; explore concepts such as the power of your life story, discovering your authentic self, knowing and clarifying your values, leadership principles, ethical boundaries, and understanding your motivated capabilities.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

NURS 311 Group Dynamics and Leading Teams 3.0 Credits

This course is the 2nd in a series of 3 courses of the Macy Undergraduate Leadership Fellow's Program. NURS 311 focuses on leading teams and understanding group dynamics that are inherently linked to interpersonal processes/relationships and structural characteristics that influence teams and individual behavior during interactions. This course will explore various aspects of group dynamics such as emotional intelligence, power, perception, motivation, leadership, and decision-making. The goal is to develop skills in diagnosing opportunities and threats that face teams, enhance teamwork expertise as well as one's judgment, understanding, and competence to be better facilitators of one's own and others' learning in a variety of group situations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 310 [Min Grade: C]

NURS 312 Leadership in Action and Community Health 3.0 Credits

This course is the third in a series of 3 courses of the Macy Undergraduate Leadership Fellow's Program. Grounded in a social justice perspective, this course encourages critical thinking about health outcomes framed by the broad context of the political and social environment. This course offers a hands-on opportunity for students to explore what it means to be civically engaged since they are required to engage in 40 hours of service in the community throughout Spring Quarter. The goals are to support understanding of complex health issues and to empower students in their development as agents of positive change. This course will draw heavily on students' involvement in service and will weave these together with elements of other academic coursework and future academic/career goals.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 310 [Min Grade: C] and NURS 311 [Min Grade: C]

NURS 320 Health and Illness Concepts I 6.0 Credits

This course will focus on nursing care of common health alterations for the adult population. Emphasis will be on the development of evidence-based, holistic care pertaining to the prevention, treatment, recovery, and long-term management of alterations related to the concepts of oxygenation, homeostasis, and perfusion.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 120 [Min Grade: C] and NURS 121 [Min Grade: C] and NURS 220 [Min Grade: C] and NURS 221 [Min Grade: C] and NURS 222 [Min Grade: C] and NURS 223 [Min Grade: C]

Corequisite: NURS 323

NURS 321 Health and Illness Concepts II 6.0 Credits

This course will focus on nursing care of common health alterations. The focus will be on the development of evidence-based, holistic care pertaining to the prevention, treatment, recovery, and long term management of alterations related to homeostasis and protection and movement.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 120 [Min Grade: C] and NURS 121 [Min Grade: C] and NURS 220 [Min Grade: C] and NURS 221 [Min Grade: C] and NURS 222 [Min Grade: C] and NURS 223 [Min Grade: C]

Corequisites: NURS 320, NURS 323

NURS 322 Concepts of Mental Health Nursing 6.0 Credits

This course focuses on the development of competencies for the practice of mental health nursing with emphasis on the use of self in relationships with patients and health team members. An understanding of the brain-behavior connection and the importance of the therapeutic nurse-patient relationship will provide the framework for exploring factors which contribute to stress, maladaptive behaviors and mental illness. Emphasis will be on the development of evidence-based, holistic care pertaining to the prevention, treatment, recovery, and long-term management of alterations related primarily to the concepts of coping and stress tolerance, emotions, cognitive functions, and maladaptive behavior.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 120 [Min Grade: C] and NURS 121 [Min Grade: C] and NURS 220 [Min Grade: C] and NURS 221 [Min Grade: C] and NURS 222 [Min Grade: C] and NURS 223 [Min Grade: C]

Corequisites: NURS 320, NURS 323

NURS 323 Nursing Pharmacology Concepts I 3.0 Credits

This course introduces the professional nursing student to the concepts of pharmacology and drug therapies, pharmacological-therapeutic classes of drugs, and important drug information resources. Knowledge of pharmacology provides the nurse with information to provide drug related patient care; optimizing beneficial effects of medications while minimizing adverse effects. The focus of the course is pharmacology basics and drugs affecting the cardiovascular, renal, respiratory, and endocrine systems. In addition, immune and biologic modifiers, chemotherapeutic agents, and psychotherapeutic drugs are presented. Legal, ethical, and cultural considerations in pharmacology as well as lifespan considerations with regard to pharmacotherapeutics and medication administration are addressed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 120 [Min Grade: C] and NURS 121 [Min Grade: C] and NURS 220 [Min Grade: C] and NURS 221 [Min Grade: C] and NURS 222 [Min Grade: C] and NURS 223 [Min Grade: C]

NURS 324 Intro to Online Learning:Tools for Success 3.0 Credits

This course provides a guided, hands-on introduction to the skill sets necessary to support online learning, communication, and the production of scholarship. Students will be introduced to technologies and resources that are fundamental to success in the RN-BSN program.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 325 [WI] Critical Issues in Nursing 3.0 Credits

Critical Issues in Shaping Nursing. The health care system has undergone dramatic shifts, driven by changing economic; demographic; and technological forces. This course explores the impact of these forces on healthcare delivery, and concerns relating to ethical, legal and social issues that influence nursing practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUOL.

Prerequisites: NURS 324 [Min Grade: C] (Can be taken Concurrently)

NURS 326 Reproductive Health Across the Lifespan 6.0 Credits

This course focuses on management of human reproductive health and sexual issues with an emphasis on women and newborn health. It explores social determinants of health and their impact on health promotion, risk reduction, and disease prevention for the child bearing family. Women's health clinical settings will be utilized for clinical practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 320 [Min Grade: C] and NURS 321 [Min Grade: C] and NURS 323 [Min Grade: C]

Corequisite: NURS 329

NURS 327 Population Health Concepts 6.0 Credits

The focus of this course is the professional nurse's role in working with aggregates in the community. The principles of health promotion and illness prevention form the basis of effective population health nursing practice. Epidemiological and multiple sources of data are used to understand the social and ecological determinants of health.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 320 [Min Grade: C] and NURS 321 [Min Grade: C] and NURS 322 [Min Grade: C] and NURS 323 [Min Grade: C]

Corequisite: NURS 329

NURS 328 Pediatric Health Concepts 6.0 Credits

The course will focus on nursing care management of infants, children, and adolescents. An emphasis will be placed on the nurse's role in health assessment, health promotion, and promotion of adaptive processes for the child within the context of the family and community.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 320 [Min Grade: C] and NURS 321 [Min Grade: C] and NURS 323 [Min Grade: C]

Corequisite: NURS 329

NURS 329 Nursing Pharmacology Concepts II 3.0 Credits

This course will introduce the professional nursing student to the concepts of pharmacology and drug therapies, pharmacologic-therapeutic classes of drugs, and important drug information resources. Pharmacological knowledge goes beyond medication preparation and administration and involves knowledge of the mechanism of action, drug effects, therapeutic uses, side effects, and adverse effects. The focus of the course will be on pharmacology basics and drugs affecting the gastrointestinal, immunological, neurological, musculoskeletal, and dermatological systems. Legal, ethical, and cultural considerations in pharmacology, herbal, botanical and nutritional supplements, and lifespan perspectives for medication administration will also be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 323 [Min Grade: C]

NURS 330 [WI] Research Basis of Nursing 4.0 Credits

This course will introduce the student to the theoretical and research bases on which practice is built. Students will examine the knowledge that guides nursing interventions and critique published research reports. The importance of reviewing the nursing literature in order to maintain currency in practice will be addressed. Ethical issues as they relate to research, theory and practice will be discussed. This is a writing intensive course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: STS 345 [Min Grade: C] and NURS 304 [Min Grade: C]

NURS 335 Genetics and Genomics: Application to Nursing Practice 3.0 Credits

This course focuses on current issues in genetics, genomics, and pharmacogenomics and healthcare. Genetic and genomic influences across the healthcare continuum (health prevention, health promotion, disease management, and personalized medicine) are addressed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 325 [Min Grade: C]

NURS 337 [WI] Genetics in Nursing and Health 3.0 Credits

This course will discuss the implications of the Human Genome Project and how to apply genetic knowledge to patient care in the following ways: identifying those in need of further genetic testing, offering genetic information, recording genetic information, referring patients and families for further genetic information and evaluation, support informed choice regarding health decisions, advocacy for privacy, confidentiality, and non-discrimination with regard to genetic information, and participate in management of patients with genetic conditions. The ethical consideration as they relate to genetics will also be explored. This is a writing intensive course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 103 [Min Grade: C] and NURS 300 [Min Grade: C] and NURS 301 [Min Grade: C]

NURS 338 Introduction to Complementary & Integrative Therapies 3.0 Credits

This course provides the underpinning philosophy and practice of complementary and integrative therapies (CIT). It presents an overview of the major categories, including herbal medicine, clinical aromatherapy, mind-body interventions, and the role of spirituality in health and healing. In addition, students explore effective relaxation techniques that help to integrate the mind-body-spirit connection, which support health and well-being.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 339 Pathophysiology 3.0 Credits

Pathophysiology for Nurses. This course builds upon the theoretical foundations of nursing theory; human anatomy, and physiology by addressing basic concepts, principles, and processes associated with common pathologies, physiological alterations in body system, and the body's ability to compensate for these changes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 103 [Min Grade: C] and CHEM 103 [Min Grade: C] and BIO 226 [Min Grade: C]

NURS 340 Transformational Leadership 3.0 Credits

Transformational Leadership. This course will focus on the professional nurses roles in applying the principles of leadership, management and ethics in health care organizations across the continuum of care. The course will provide opportunities in problem solving, critical thinking, constructive communication and well as teaching learning strategies that emphasize the leadership/management roles of the nurse.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 345 Holistic Self-Care 3.0 Credits

Holistic Self-Care provides students with an A-Z approach to "living" a holistic, balanced life, complete with step-by-step guidelines necessary to incorporate dietary and lifestyle changes and effective stress reduction and stress management techniques to assist in navigating through the common challenges associated with student life and beyond. Students will be required to purchase a "Holistic Student Stress Reduction Kit", complete with specific essential oils, Meditation DVD, and guided stress reduction techniques.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 346 Health Assessment 6.0 Credits

Health Assessment and Promotion for Diverse Vulnerable Populations. This course is designed to assist professional nurses in developing interviewing skills, physical assessment techniques, and preventive health interventions when working diverse and vulnerable populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUOL.

Prerequisites: NURS 325 [Min Grade: C]

NURS 350 Independent Study in Nursing 1.0-3.0 Credit

This is a guided independent study. Students study a subject under the supervision of the nursing faculty member. May be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 9 credits

NURS 375 Nurses Building a Healthy Community 6.0 Credits

Nurses Building a Healthy Community. This course focuses on the professional role of the community public health nurse working collaboratively to build a health community. The role of nurses is explored by their actions with aggregate population, community partners, and other health providers.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 346 [Min Grade: C] and NURS 330 [Min Grade: C]

NURS 380 Complex Systems of Care: Technology, Patient Safety & Quality 4.0 Credits

The course is designed to provide students with the opportunity to explore advances in technology, how information systems are developed, validated, and endorsed. Students will create linkages between technology, cost effectiveness, safety, quality outcomes and the delivery of care. The course is further designed so that students will build critical reflection and communication skills to become an active, effective, and safe member of a transdisciplinary care team. In addition, students will explore potential and actual ethical implications of advances in science and technology and the importance of creating a culture of safety within the healthcare environment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 325 [Min Grade: C]

NURS 388 Nursing Case Study I 1.0 Credit

Nursing Case Study Integration I. This course is designed to extend students' understanding of common adult health disorders. Critical thinking skills will be used to integrate and analyze knowledge of therapeutic communication, health assessment and nursing process, pharmacology, nutrition, and anatomy and physiology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 300 [Min Grade: C] and NURS 301 [Min Grade: C]

NURS 400 [WI] Leadership, Management, and Entrepreneurship in Nursing 3.0 Credits

Focuses on professional nursing role in applying principles of leadership and management in health care organizations across the continuum of care. Emerging and roles for nurse entrepreneurs and professional practitioners will be explored. Also emphasizes the role of the professional nurse in efficient patient care management in complex health care settings. This is a writing intensive course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NURS.

Prerequisites: NURS 305 [Min Grade: C]

NURS 401 Comprehensive Adult Nursing III 6.0 Credits

This course will focus on the development of selected competencies for nursing care assessment and management of adults with unpredictable and complex human responses to specific system alterations. The course will emphasize the assessment of functioning, adaptation, and recovery for patients with high acuity illnesses and clinical problems. Selected high acuity acute care settings will be utilized for clinical practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 303 [Min Grade: C] and NURS 304 [Min Grade: C] and NURS 305 [Min Grade: C] and NURS 306 [Min Grade: C] and NURS 308 [Min Grade: C]

NURS 403 Community Public Health Nursing 6.0 Credits

The focus of this course is the professional nurse's role in working with aggregates in the community. The student will first reexamine the principles of health promotion as they form the bases for effective community health nursing practice. The student will then explore the role of the community health nurse working collaboratively with the community as part of an interdisciplinary team. Grounded in systems theory and informed by the concepts and principles of community health nursing, public health nursing, wellness, health promotion, and national goals, the student works with aggregates in the community setting. An introduction to conceptual frameworks that guide community-based, population-focused practice and research is included in both the classroom and clinical portions of the course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 303 [Min Grade: C] and NURS 304 [Min Grade: C] and NURS 305 [Min Grade: C] and NURS 306 [Min Grade: C] and NURS 308 [Min Grade: C]

NURS 404 Nursing Informatics for BSN Completion 3.0 Credits

Designed for registered nurses in the RN-BSN completion program. Examines computer applications, technology, internet tools. Focuses on health care informatics context for data management, information systems & telecommunications in nursing administration, education and practice. Problem solving and mini-design projects related to increased efficiency in nursing care delivery.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUOL.

Prerequisites: NURS 325 [Min Grade: C]

NURS 407 [WI] Issues in Aging and Longevity 4.0 Credits

This course focuses on current issues in promoting longevity with healthy aging. Current biopsychosocial theories on aging are explored. The multidisciplinary needs of older adults, including relationship challenges, are addressed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUOL.

Prerequisites: NURS 325 [Min Grade: C] and NURS 330 [Min Grade: C] and NURS 380 [Min Grade: C]

NURS 410 Pharmacology for Practicing Nurses 5.0 Credits

This course builds upon the practicing nurses' educational and experiential foundation in pharmacotherapeutics. Course emphasis includes the pharmacokinetics and pharmacodynamics of drug classes commonly encountered by the professional nurse. The interaction between pharmacodynamics and pathophysiology of disease states is analyzed. Critical evaluation of complex safety and interaction issues is developed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUOL.

NURS 420 Health and Illness Concepts III 6.0 Credits

This course will focus on the nursing care, assessment and management of patients with complex healthcare needs related to the constructs of homeostasis, regulation, perfusion, oxygenation, protection, and attributes and role of the nurse.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 320 [Min Grade: C] and NURS 321 [Min Grade: C] and NURS 329 [Min Grade: C]

NURS 421 Holistic Gerontological Nursing 6.0 Credits

This course will focus on a holistic and interprofessional approach to nursing care and coordination to meet the unique health needs of a diverse and growing population of older adults. The continuum of aging, including normal changes of aging, health and illness, acute and chronic conditions, and the end of life will be emphasized. Students' clinical experiences will be in a variety of settings reflective of health promotion and palliative care delivery options available to meet the health and illness trajectory needs of the older adult.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 320 [Min Grade: C] and NURS 321 [Min Grade: C] and NURS 323 [Min Grade: C] and NURS 329 [Min Grade: C]

NURS 422 Leadership Concepts in Nursing 3.0 Credits

This course will focus on the professional nursing role in applying principles of leadership and management across the continuum of care. Emerging and new roles for nurse entrepreneurs and professional practitioners will be explored. Also emphasizes the role of the professional nurse in efficient patient care management in complex health care settings and advocacy in health policy.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 326 [Min Grade: C] and NURS 327 [Min Grade: C] and NURS 328 [Min Grade: C]

NURS 423 Research Basis of Nursing Practice 4.0 Credits

This course will introduce the student to the theoretical and research basis on which practice is built. Students will examine the knowledge that guides nursing interventions and critique published research reports. The importance of reviewing the nursing literature in order to maintain currency in practice will be addressed. Ethical issues as they relate to research, theory and practice will be discussed. *This course is a writing intensive class for BSN Co-Op students only.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 320 [Min Grade: C] and NURS 321 [Min Grade: C] and NURS 323 [Min Grade: C]

NURS 450 Contemporary Gerontological Nursing 6.0 Credits

This course will focus on the nursing management of older adults. Contemporary theories of gerontology, theories of aging, physiological/psychological functioning, impact of developmental changes, illness, and dysfunction will be emphasized. The geriatric patient will be examined at various levels -- healthy older adult, older adult at risk, the older adult experiencing acute and chronic illness. Students' clinical experiences will be in home health agencies, transitional, and long-term facilities.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: NURS 303 [Min Grade: C] and NURS 304 [Min Grade: C] and NURS 305 [Min Grade: C] and NURS 306 [Min Grade: C] and NURS 308 [Min Grade: C] and NURS 401 [Min Grade: C]

NURS 460 Global Health & Policy Issues 6.0 Credits

Global Health and Policy Issues. This course is an overview of global health issues. Emphasis will be placed on understudy of health policy development related to global health issues, healthcare systems, and its effect on selected population.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUOL.

Prerequisites: NURS 330 [Min Grade: C] and NURS 325 [Min Grade: C] and NURS 407 [Min Grade: C]

NURS 465 Senior Capstone in Nursing 3.0 Credits

The student, with faculty supervision, plans a project that will be implemented this quarter. This project will integrate the academic and practical knowledge the student has acquired in the RN-BSN curriculum. Students will develop objectives relevant to the project, critique the literature, and present a plan for implementation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUOL and classification is Senior.

Prerequisites: NURS 325 [Min Grade: C] and NURS 330 [Min Grade: C] and NURS 407 [Min Grade: C]

NURS 481 Issues & Resolutions in End of Life Care 3.0 Credits

Promotes understanding of complexities associated with care of clients and families across the lifespan at end-of-life. Explores nursing management of individuals and families facing end-of-life care and decisions. Emphasis on evidenced-based practice in legal, ethical and professional decision-making framework. Conforms with AACN/ELNEC model.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS and classification is Senior.

NURS 482 Cultural Dimensions of Nursing Care 3.0 Credits

The focus of this course will be on strategies for providing culturally competent nursing care in a multicultural society. Emphasis is placed on evidence-based nursing practice within a framework of ethical, legal, and professional decision making.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS and classification is Senior.

NURS 483 Human Trafficking 3.0 Credits

This course introduces students to what human trafficking is, how to identify victims, what health problems are common among this population, special considerations to be aware of when working with trafficking victims and how to access services for them. In addition, the course will distinguish between various types of human trafficking/slavery such as sex trafficking, bonded and forced labor, domestic servant labor and child soldiers. It will also provide an overview of the history of human trafficking and counterstrategies, discuss the causes and physical, emotional and social consequences of human trafficking, and will assess the achievements of counter-strategies devised and implemented by governments, international organizations, private sectors and NGOs.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 488 Nursing Case Study II 1.0 Credit

Nursing Case Study Integration II. This course is designed to extend students' understanding of common adult health disorders. Critical thinking will be used integrate and analyze knowledge of therapeutic communication, health assessment and nursing process, pharmacology, nutrition, and anatomy and physiology using selected case studies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 305 [Min Grade: C] and NURS 306 [Min Grade: C]

NURS 489 Synthesis of Nursing Knowledge 4.0 Credits

Synthesis of Nursing Knowledge. This course prepares students for senior seminar by providing a comprehensive content review of clinical material and culminating in a comprehensive HESI exam. Skills needed for effective interpersonal communication and professional behaviors of the nurse will be learned and rehearsed utilizing the standardized patient lab experience. May be repeated once for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 4 credits

Prerequisites: NURS 401 [Min Grade: C]

NURS 492 Senior Seminar in Nursing 3.0 Credits

This course will serve as a review of important concepts from the nursing curriculum. Students will focus on those concepts that they need to improve for the successful practice of professional nursing. Students will utilize the Nursing Technology lab to review procedures practiced throughout the nursing curriculum and will use computerized testing to gauge their mastery of professional nursing content.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: NURS 303 [Min Grade: C] and NURS 304 [Min Grade: C] and NURS 305 [Min Grade: C] and NURS 306 [Min Grade: C] and NURS 308 [Min Grade: C] and NURS 401 [Min Grade: C] and NURS 403 [Min Grade: C] and NURS 489 [Min Grade: C]

NURS 495 Comprehensive Nursing Concepts 3.0 Credits

This course will serve as a comprehensive review of important and essential concepts from the nursing curriculum. Students will focus on those concepts that they need to improve for the successful practice of professional nursing. Students will utilize the Nursing Academic Clinical Support Services (NACSS) to review procedures practiced throughout the nursing curriculum, in particular the core professional skills, and will use computerized testing to gauge their mastery of professional nursing content.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NACE or major is NFFT or major is NURS.

Prerequisites: NURS 329 [Min Grade: C] and NURS 420 [Min Grade: C] and NURS 421 [Min Grade: C] and NURS 422 [Min Grade: C] and NURS 423 [Min Grade: C]

NURS T280 Special Topics in Nursing 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

NURS T480 Special Topics in Nursing 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 5 times for 20 credits

Nutrition & Food Science

Courses

NFS 100 Nutrition, Foods, and Health 2.0 Credits

Covers the six nutrient categories and how they function in the body. Includes nutritional implications of major diseases, food safety issues, and current food and nutrition controversies with an emphasis on personal health.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 101 Introduction to Nutrition & Food 1.0 Credit

Provides basic understanding of required nutrients and how they are used in the body. Students complete a computerized nutrient analysis and apply the science of nutrition and food to food choices to improve their personal health.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 111 Introduction to Dietetics 2.0 Credits

A survey of the dietetics field with emphasis on the role of the Registered Dietetics in practice. Discussion of current professional issues including evidence-based practice and the nutrition care process.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIET or major is HNUT.

NFS 200 Nutrition I: Principles of Nutrition 4.0 Credits

Covers principles of human nutrition, including energy metabolism. Covers physiological mechanisms and food sources of carbohydrates, lipids, proteins, vitamins, and minerals in relation to optimal human health.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: CHEM 103 [Min Grade: C]

NFS 203 Nutrition II: Nutrition in the Lifecycle 4.0 Credits

Covers nutrition in human life cycles with emphasis on prenatal, maternal, infant, childhood, adolescent, adulthood and later maturity. Also covers nutrient requirements and typical health and disease problems of each stage of the life span. Laboratory activities provide application of nutrition topics in preventive health activities related to the life span, with emphasis on diet-evaluation techniques.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: NFS 200 [Min Grade: C] or NFS 101 [Min Grade: C] or NFS 230 [Min Grade: C]

NFS 205 Introduction to Human Lactation 3.0 Credits

This course will provide a foundation in breastfeeding and human lactation, including breastfeeding education and promotion during the prenatal period, successful initiation of breastfeeding, prevention of many common pitfalls, and ongoing breastfeeding support. This course covers the fifteen specific areas required by Baby Friendly USA for all nurses working in prenatal and perinatal areas in Baby-Friendly Hospitals.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 215 Nutritional Chemistry 3.0 Credits

Covers the chemistry of carbohydrates, lipids, proteins, and nucleic acids and their behavior in the body's major metabolic mechanisms, including the role of vitamins and minerals in enzyme systems critical to normal human nutrient metabolism.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 103 [Min Grade: C]

Corequisite: NFS 217

NFS 216 Nutrition and the Schoolchild 3.0 Credits

A course designed for future elementary school teachers to increase their knowledge of childhood nutrition as it relates to health promotion, health maintenance, and the prevention and treatment of nutritionally relevant health abnormalities in elementary school students. The scientific basis of nutrition and principles of education are emphasized. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 100 [Min Grade: C]

NFS 217 Nutrient Quality & Composition 1.0 Credit

Applications of principles of nutritional chemistry involving macronutrients and micronutrients.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CHEM 103 [Min Grade: C]

Corequisite: NFS 215

NFS 220 Normal & Lifespan Nutrition 4.0 Credits

Builds on basic nutrition principles to include nutrient metabolism and chemical and biological aspects of nutrition. Addresses special nutrient needs of people through the life cycle.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 103 [Min Grade: C]

NFS 230 Intermediate Nutrition 4.0 Credits

The role of nutrients in body structure and function. Factors involved in the availability, digestion, absorption, and utilization of nutrients. Identification of the normal nutritional needs of individuals, and sources of nutrients. The interpretation of current research in nutritional studies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is NURS

Prerequisites: NFS 101 [Min Grade: C]

NFS 265 Professional Issues in Nutrition and Foods 3.0 Credits

Introduces professional issues in dietetics, food science, and nutrition science. Covers issues affecting current and future practice, and resources available to professionals in these fields.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: NFS 230 [Min Grade: C]

NFS 305 Clinical Issues in Human Lactation 3.0 Credits

The focus of this course will be to understand clinical aspects of lactation, including in- depth infant and maternal assessment and composition of human milk. Emphasis will be on first recognizing normal anatomy and physiology and then exploring presentations of the difficulties that breastfeeding dyads encounter. The course will examine the effects of infant and maternal characteristics as well as the effects of the birth on breastfeeding outcomes. Strategies to improve breastfeeding success will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 310 Nutrition and Sports 3.0 Credits

After reviewing the fundamental processes of nutrition and human development, the course applies principles of nutrition to athletic conditioning, performance, and rehabilitation from sports-related injuries. Identifies evidence based recommendations for nutritional needs of today's athlete and explores the validity of sport diet fads. Development cycle of the recreational, amateur, and competitive athlete.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

NFS 315 Nutrition in Chronic Disease 4.0 Credits

This course provides a basic understanding of nutrition therapy and its role in the prevention and treatment of medical conditions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 220 [Min Grade: C] or NFS 230 [Min Grade: C]

NFS 320 Pediatric Nutrition 4.0 Credits

This course provides an overview of pediatric nutrition assessment, as well as nutrition therapy and its role in the prevention and treatment of medical conditions found in the newborn through adolescent.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 101 [Min Grade: C] or NFS 220 [Min Grade: C] or NFS 230 [Min Grade: C]

NFS 325 Nutrition & Exercise Physiology 3.0 Credits

An advanced level course covering nutrient needs to maximize exercise performance. Energy metabolism, with emphasis on macronutrient and micronutrient needs during different levels of exercise will be emphasized. Benefits of exercise in the prevention and treatment of chronic diseases and the safety of ergogenic aids will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 100 [Min Grade: C] or NFS 101 [Min Grade: C] or NFS 230 [Min Grade: C]

NFS 345 Foods and Nutrition of World Cultures 3.0 Credits

Provides an understanding of the diversity of cultural food choices and their nutritional implications. Includes an emphasis on cultural groups in the United States and methods to provide nutrition education to culturally diverse groups.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CULA 115 [Min Grade: C]

NFS 365 [WI] Nutrition Laboratory: Food and Nutrient Analysis 4.0 Credits

Provides quantitative study of metabolism and observable effects of nutrient factors (vitamins, minerals, fats, carbohydrates, and proteins), using foods. This is a writing intensive course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: NFS 215 [Min Grade: C] and NFS 217 [Min Grade: C]

NFS 370 Foodservice Systems Management 4.0 Credits

In-depth analysis of food purchasing, financial management of foodservices, cost controls, marketing in foodservice, equipment layout and design, and management/leadership theories and applications.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: HRM 215 [Min Grade: C]

NFS 371 Institutional Organization and Administration 3.0 Credits

Covers organization, administration, and application of managerial techniques in food-service systems; personnel training; job and person analysis; and morale and motivation. Includes field trips to food-service systems.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

NFS 391 Community Nutrition 4.0 Credits

Studies nutrition services provided by national, state, and local governments and private organizations. Discusses nutritional needs-assessment techniques and program-development methods. Field trips will be made to community nutrition programs.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

Prerequisites: NFS 203 [Min Grade: C]

NFS 405 Public Policy of Breastfeeding 3.0 Credits

This course will examine the barriers to optimal breastfeeding using a socioecologic framework. Participants will gain a better understanding of the different factors that influence breastfeeding behaviors. Strategies to more effectively protect, promote and support breastfeeding will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 415 Advanced Nutrition I: Macronutrition 4.0 Credits

Covers biochemical and physiological topics of macronutrient metabolism, with emphasis on ingestion, digestion, absorption, and excretion of carbohydrate, protein, and lipid.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: NFS 230 [Min Grade: C] and NFS 215 [Min Grade: C] and NFS 217 [Min Grade: C]

NFS 416 Advanced Nutrition II: Micronutrients 4.0 Credits

Provides in-depth study of vitamin and mineral absorption, metabolism, and degradation, with an emphasis on human health requirements and a thorough understanding of nutrient and dietary requirements.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: NFS 415 [Min Grade: D]

NFS 431 Nutrition Counseling 4.0 Credits

Emphasizes nutrition-counseling techniques for use with individuals and small groups. Includes development of nutrition education materials as well as verbal and non-verbal communication skills.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NFSC and classification is Senior.

Prerequisites: NFS 443 [Min Grade: C]

NFS 443 Medical Nutrition Therapy I 3.0 Credits

First of a three-course sequence examining the interrelationships of physiology, biochemistry, and nutrition as related to medical nutrition therapy. Emphasizes nutritional assessment and the role of nutrition in preventing and treating diseases/disorders: gastrointestinal diseases, diabetes, obesity, and cardiovascular disease.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

Prerequisites: NFS 416 [Min Grade: C]

NFS 444 Medical Nutrition Therapy II 3.0 Credits

Second of a three-course sequence examining the interrelationships of physiology, biochemistry, and nutrition as related to medical nutrition therapy. Emphasizes nutrition assessment and the role of nutrition in preventing and treating disease/disorders; disease of the liver, pancreas, and gallbladder; pulmonary disease; renal disease; cancer; HIV/AIDS; allergies, pediatric disease; and metabolic disturbances.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

Prerequisites: NFS 443 [Min Grade: C]

NFS 445 Medical Nutrition Therapy III 3.0 Credits

Third of a three-course sequence examining the interrelationships of physiology, biochemistry, and nutrition as related to severe/stressful conditions which require enteral or parenteral nutrition or other advanced medical nutrition therapies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

Prerequisites: NFS 444 [Min Grade: C]

NFS 446 Perspectives in World Nutrition 3.0 Credits

Examines world nutrition and food supply, including the nutritional status of various peoples, deficiency diseases, problems of food distribution, and other timely subjects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

NFS 475 Advanced Seminar in the Dietetics Profession 3.0 Credits

Reviews, evaluates, and synthesizes contemporary professional issues in dietetics.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

Prerequisites: NFS 203 [Min Grade: C]

NFS 480 Special Studies in Nutrition and Food 12.0 Credits

Covers selected topics of interest. May be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

NFS 485 Lactation Supervised Practice 3.0 Credits

Lactation Supervised Practice is designed to prepare competent, entry-level lactation consultants who will be eligible to sit the International Board Lactation Consultant Examination by completing Pathway 2. The course will provide appropriate experiences to practice the roles of lactation consultant under the supervision of a preceptor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

Prerequisites: NFS 205 [Min Grade: C] and NFS 305 [Min Grade: C] and NFS 405 [Min Grade: C]

NFS 494 Senior Project I 2.0 Credits

First in a series of capstone courses in which student carry out the research process. In NFS 494, students work cooperatively to identify an applied, discipline oriented problem and then develop research hypotheses and a written research proposal in response to that problem.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NFSC and classification is Senior.

NFS 495 Senior Project II 2.0 Credits

Second in a series of capstone course in which students carry out the research process. In NFS 495, students work cooperatively to carry out the research objectives according to the research proposal developed in NFS 494.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 494 [Min Grade: D]

NFS 496 Senior Project III 2.0 Credits

Third in a series of capstone course in which students carry out the research process. In NFS 496, students work cooperatively to document the finding of their research in NFS 495. Students make oral and poster presentations as well as produce a written report of their research results.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 495 [Min Grade: D]

NFS 497 Research 1.0-3.0 Credit

Provides individual research in nutrition under faculty supervision.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Cannot enroll if classification is Freshman

NFS 498 Independent Study 1.0-3.0 Credit

Provides individual study or research in nutrition under faculty supervision.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Cannot enroll if classification is Freshman

Operations Management

Courses

OPM 200 Operations Management 4.0 Credits

Provides students with an understanding of the transformation process, which converts inputs into outputs. This is the primary function of every manufacturing/service organization, and how it adds value to the outputs. Discusses the decision-making process and techniques for planning and controlling the operations function.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPM 315 Service Operations Management 4.0 Credits

Analyze service systems from the viewpoint of the operations manager to understand where and in what ways the body of knowledge developed in operations management, strategy, and marketing can be applied and where other approaches are necessary. Focus on understanding what customers want, designing systems and procedures delivering services, and controlling quality.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPM 321 Planning and Control of Operations 4.0 Credits

The course objective is to provide students with an understanding of managerial concepts and quantitative tools required in the design and operation of manufacturing/service systems. This course examines strategic planning decision problems, such as capacity planning, facility planning, locations decision, work/job design, and project management from the perspective of a production/operations manager of a business organization.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 205 [Min Grade: D] or STAT 201 [Min Grade: D]

OPM 325 Advanced Planning and Control of Operations 4.0 Credits

This course focuses on the medium to short-term managerial decision processes and models within the realm of the operations function of manufacturing and service organizations. Topics covered include time series forecasting, aggregate planning, materials management, operations and staff scheduling, and statistical quality control.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: OPM 321 [Min Grade: D] and OPR 320 [Min Grade: D]

OPM 341 Supply Chain Management 4.0 Credits

Presents and explains the concepts, insights, practical tools and decision support systems that are important for the effective managements of supply chains. Long-term strategic design issues, shorter-term tactical and operational issues are closely examined. State-of-the-art concepts of globally optimal decision making, often across traditional organizational boundaries are emphasized.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: OPM 325 [Min Grade: D]

OPM 342 Sustainable Supply Chain Management and Logistics 4.0 Credits

This course is a survey of solutions and techniques to design, evaluate, and improve supply chain operations with the goal of promoting environmental, social, and economic sustainability. Topics include product and process design for sustainability, cradle-to-cradle design, "green" sourcing and procurement, reverse logistics and closed-loop supply chains, supply chain coordination for sustainability, end-of-life management, facilities location and design, sustainable transportation and logistics solutions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: OPM 341 [Min Grade: C-]

OPM 343 Managing Queues for Service Operations 4.0 Credits

The emphasis of this course is on waiting time management. The course will introduce quantitative methods to analyze queueing models and build insights and intuition about various performance metrics in queueing systems. Specifically, the course will establish an understanding of the impact of variability and utilization on the waiting time, and demonstrate the wide applicability of queueing models across various industries. The course will draw examples and case studies from a wide array of applications in service industries such as restaurants, entertainment, health care, insurance, financial institutions, and air transportation. The analytical tools covered in class aim to guide appropriate process design choices to improve system performance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: (STAT 201 [Min Grade: C-] or STAT 205 [Min Grade: C-]) and OPM 315 [Min Grade: C-]

OPM 344 Revenue Management 4.0 Credits

The course will convey to future business leaders innovative ways to boost profitability. It will explore how firms can improve the operational management of the demand for their products (goods or services) to more effectively align it with their supply through business analytics lenses. It will introduce quantitative methods to improve decision-making, with special emphasis on spreadsheet modeling and analysis.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: OPR 320 [Min Grade: C-] and (STAT 201 [Min Grade: C-] or STAT 205 [Min Grade: C-])

OPM I199 Independent Study in OPM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPM I299 Independent Study in OPM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPM I399 Independent Study in OPM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPM I499 Independent Study in OPM 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 3 times for 12 credits

OPM T180 Special Topics in OPM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPM T280 Special Topics in OPM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPM T380 Special Topics in OPM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPM T480 Special Topics in OPM 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 3 times for 12 credits

Operations Research

Courses

OPR 320 Linear Models for Decision Making 4.0 Credits

Applies modeling and mathematical techniques to complex decision problems in business, with a focus on deterministic systems. Covers linear programming, integer programming, goal programming and networks.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MATH 102 [Min Grade: D] or MATH 122 [Min Grade: D]

OPR 330 Advanced Decision Making and Simulation 4.0 Credits

Applies modeling and mathematical techniques to complex decision problems, with a focus on nonlinearity and uncertainty in the business environment. Covers nonlinear programming, dynamic programming, queuing theory, Markov Processes, decision analysis and simulation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: OPR 320 [Min Grade: C-] and (STAT 201 [Min Grade: C-] or STAT 205 [Min Grade: C-])

OPR 340 Decision Models for the Public Sector 4.0 Credits

This course will cover the basics of analytical modeling, optimization, and simulation as tools for decision-making in the public sector. The students will analyze cases illustrating the powerful impact of using these tools in cities across the country. Of particular focus will be the implementability of these tools and their recommendations in the real-world. Moreover, a city, especially one as big as Philadelphia, is a complex and dynamic environment, so we will investigate how to address some of the resulting challenges in our analyses. Specifically, we will address scenarios involving the improvement of existing operations, optimal resource allocation and distribution, and measuring and improving the quality and efficiency of service delivery.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: OPR 330 [Min Grade: C-]

OPR I199 Independent Study in OPR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPR I299 Independent Study in OPR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPR I399 Independent Study in OPR 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPR I499 Independent Study in OPR 0.5-4.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPR T180 Special Topics in OPR 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPR T280 Special Topics in OPR 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPR T380 Special Topics in OPR 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

OPR T480 Special Topics in OPR 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Organizational Behavior

Courses

ORGB 300 [WI] Organizational Behavior 4.0 Credits

Provides conceptual understanding of various principles of management and organizational processes and the opportunity for skill-building in the areas of individual, interpersonal, and intergroup organizational behaviors. This is a writing intensive course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

ORGB 320 Leadership: Theory and Practice 4.0 Credits

This course provides both a theoretical and practical understanding of leadership through theoretical and experiential learning. Course time will be devoted to lecture and course discussion that will teach students theories of leadership and hands-on activities that will demonstrate the practicality and applicability of these theories.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ORGB 400 Team Development and Leadership 4.0 Credits

This course examines how team structures, member characteristics, and interpersonal processes influence the effectiveness of work teams, and the dynamics of interpersonal relationships within and across team boundaries. This course also examines forms and functions of team leadership to provide students with a set of general principles to help them lead teams in a range of situations. This course uses an experiential learning format; students will engage in a series of team activities, each of which will be followed by a debriefing.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ORGB 420 Negotiations and Conflict Resolution 4.0 Credits

This course provides both a theoretical understanding of the central concepts in negotiation and conflict management through applied experience in these processes. Through classroom exercises, discussion, and personal reflection, students will improve their ability to negotiate and manage conflicts through gained confidence in these processes.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Sophomore or Senior.

ORGB 430 Strategic Career Development 4.0 Credits

This course provides a conceptual understanding of career management and a practical application of this material to the career decisions that students currently face and will face in the future. A blend of theory, case analysis, and self-assessments relate course concepts to effective techniques for managing a career at different phases of life.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

ORGB I199 Independent Study in ORGB 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ORGB I299 Independent Study in ORGB 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ORGB I399 Independent Study in ORGB 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ORGB I499 Independent Study in ORGB 1.0-4.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

ORGB T180 Special Topics in ORGB 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ORGB T280 Special Topics in ORGB 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ORGB T380 Special Topics in ORGB 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ORGB T480 Special Topics in ORGB 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Performing Arts

Courses

PRFA 100 Community Arts Performance Practicum 1.0 Credit

Provides practical experience as a participant in a Department of Performing Arts community arts initiative. Includes involvement with off campus activities with community members under faculty supervision and direction.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA 380 Special Topics in Performing Arts 0.5-12.0 Credits

Covers selected topics in the performing arts. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA 495 Directed Studies in Performing Arts 0.5-12.0 Credits

Provides supervised individual study of special subjects in performing arts. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA I199 Independent Study in Performing Arts 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA I299 Independent Study in Performing Arts 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA I399 Independent Study in Performing Arts 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA I499 Independent Study in Performing Arts 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA T180 Special Topics in Performing Arts 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA T280 Special Topics in Performing Arts 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA T380 Special Topics in Performing Arts 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PRFA T480 Special Topics in Performing Arts 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Philosophy

Courses

PHIL 101 Introduction to Western Philosophy 3.0 Credits

Introduces the main methods and aims of Western Philosophy, involving the study of problems central to metaphysics, theory of knowledge, and ethics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 102 Introduction to Eastern Philosophy 3.0 Credits

Introduction to the main topics of study in Buddhist, Hindu and other systems of Eastern thought.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 105 Critical Reasoning 3.0 Credits

Introduces and develops the skills involved in reasoning effectively about experience, and being able to distinguish strong arguments from weak ones.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 107 Philosophy and Knowledge Organization 3.0 Credits

This course imparts knowledge and skills associated with organizing concepts. The context for the course is the history of knowledge organization, viewed philosophically, with special emphasis on the Platonic, Cartesian, Kantian, Comtean and Digital paradigms. Students will learn to recognize the classical principles of knowledge organization and how to apply them using a "logic of concepts." Students will also come to understand how and why knowledge is organized the way it is in the modern university.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 111 Symbolic Logic I 3.0 Credits

An introduction to the fundamental concepts of symbolic logic: argument, validity, soundness, provability, completeness, consistency, decidability, entailment, logical equivalence, logical truth, logical contradiction. Covers truth-functional connectives, rules of formation and translation, and rules of inference. Proof techniques studied include natural deduction, truth-tables, and/or truth-trees.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 207 Symbolic Logic II 3.0 Credits

Concentrates on syntax and semantics of quantification. Formation principles include A, E, I, and O statements (and square of opposition), domain of discourse, quantifier scope, multiple quantification, relations, and identity. Proof mechanics covered include natural deduction, instantiation, semantic tableaux, and possible-world counterexamples. Also explored are the completeness, consistency, and decidability of first-order systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHIL 111 [Min Grade: D]

PHIL 210 Philosophy of Sport 3.0 Credits

Studies theories about philosophical issues arising in sport, in areas including its personal, social, aesthetic, and political dimensions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 211 Metaphysics 3.0 Credits

Studies theories about the nature of reality and philosophical issues such as the nature of time, mind, personal identity, and free will.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D]

PHIL 212 Ancient Philosophy 3.0 Credits

Studies central works that have shaped Western Philosophy and culture from the Ancient Greek era and its legacy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 214 Modern Philosophy 3.0 Credits

Studies central works that have shaped Western Philosophy and culture from the Renaissance through the late Nineteenth Century.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 215 Contemporary Philosophy 3.0 Credits

Studies central works that have had important impacts upon Western Philosophy and culture from the Twentieth Century through the present.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 216 Philosophy of Time 3.0 Credits

In this course we will study philosophical problems surrounding the nature of time. We will consider questions like, "Does the present exist?"; "Does time have a direction?"; "Are events pre-determined?"; "Is time travel possible?"; etc. Students will read and discuss treatments of these issues in philosophy, literature, and film.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 218 Philosophy of Mathematics 3.0 Credits

This course introduces the student to a critical analysis of the fundamental concepts, principles, and assumptions of mathematics. Included will be a consideration of the reality of mathematical "objects" (numbers, sets, functions), the nature of mathematical knowledge, the relationship between logic and mathematics, and other topics which may include the discussion of mathematical concepts of continuity and infinity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 221 Epistemology 3.0 Credits

Studies theories about knowledge that bear upon philosophical issues concerned with the nature and status of knowledge claims as expressed in concepts like belief, truth, and justification.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D]

PHIL 231 Aesthetics 3.0 Credits

Studies theories about art and the nature of beauty that bear on philosophical issues concerned with artistic production, performance, and perception, such as arise in activities like painting, sculpture, film literature, music, and dance.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 241 Social & Political Philosophy 3.0 Credits

Studies theories about human social and political life that bear on philosophical issues such as the nature and scope of justice, the legitimacy of states, and the relationship between democracy, civil rights, and civil disobedience.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 251 Ethics 3.0 Credits

Studies theories about human conduct which bear upon the rightness and wrongness of actions, and the goodness and badness of ends, including the nature, scope, purposes, and varieties of moral and ethical theories.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 255 Philosophy of Sex & Love 3.0 Credits

This course investigates sexual activity and desire, and the morality of sexual behavior. It also examines various types of love and their links with sexuality. Figures studied include Plato, Aristotle, Augustine, Aquinas, Kant, Kierkegaard, Freud and Foucault. Topics include marriage, prostitution, pornography, homosexuality, perversion, rape, intentionality, irreplaceability, unconditionality, reciprocity, and exclusivity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 301 Business Ethics 3.0 Credits

Study of such moral issues as truth-telling, puffery, and lying in business communications; employer-employee relations; obligations to customers; obligations to foreign populations; and government contracts.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 305 Communication Ethics 3.0 Credits

Ethical analysis of current laws and legislation aimed at regulating speech in the context of mass communications (radio, television and film).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 311 Computer Ethics 3.0 Credits

Ethical analyses of current laws and pending legislation aimed at regulating computer use as well as Internet practices and content.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 315 Engineering Ethics 3.0 Credits

Provides critical reflection on the nature of engineering and technology and on the ethical obligations and responsibilities unique to the engineering profession. Topics include the social responsibilities of engineering, the nature of professionalism, professional autonomy, whistleblowing, conflicts of interest, organizational (dis)obedience, the ethics of risk assessment, and the place and purpose of engineering codes of ethics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is BUSN or major is ECON or classification is Freshman or Sophomore

PHIL 317 Ethics and Design Professions 3.0 Credits

Examines ethical theories and their application to architecture; the ethics of architectural space and place; the logic of ethical reasoning applied to the practice of architecture; professional ethics and the social responsibility of architects; the ethics of safety and risk in the production of architectural structures; sustainable environmental architectural design.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ARCH or major is INTR.

PHIL 321 Biomedical Ethics 3.0 Credits

Studies moral issues related to health and disease, patients' rights and professional responsibilities, informed consent, abortion, euthanasia, and biomedical research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 322 Ethics of Human Enhancement 3.0 Credits

Discussion of developments in health-care with the potential not only to treat disease, but also to improve human performance and cosmetically change the human body, thereby creating ethical considerations about the nature of health and disease and the proper scope and goals of health care.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: HSAD 210 [Min Grade: D] or PHIL 251 [Min Grade: D]

PHIL 323 Organizational Ethics 3.0 Credits

This course focuses on the application of ethical theories and principles to organizational systems and decision-making. Emphasis will be placed on how ethical principles affect and are applied to organizational policy-making, leadership behavior, systems of communication, technology use, and other systems of organization.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Pre-Junior or Senior.

PHIL 325 Ethics in Sports Management 3.0 Credits

An introduction to various ethical issues in sports and sports management, such as leadership and coaching; gender and racial equity in sports; fair play and cheating; violence and competition; commercialization of sports; the relation of sports to cultural value systems; ethics of technology and sports performance.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

PHIL 330 Ethical Issues in Criminal Justice 3.0 Credits

Studies ethical issues in the policies and practices of criminal justice, and theories that bear upon issues such as the relationship of law to justice, the definition of crime, the use of deception and coercion in law enforcement, and the purposes and varieties of criminal punishment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 335 Global Ethical Issues 3.0 Credits

Offers an introduction to the ethical tensions of our age, globally construed. May address such issues as terrorism, genocide, religious exclusivism, nuclear proliferation, the regulation of the Internet, as well as culturally competing notions of right and wrong, and good and bad.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 340 Environmental Ethics 3.0 Credits

This course examines ethical questions about human relations with the nonhuman world. These questions will be informed by assessing sustainable practices, indigenous ways of life, environmental movements, and such issues as biodiversity loss and global climate change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHIL 341 Philosophy of the Environment 3.0 Credits

Studies ecological issues from a philosophical standpoint stressing the implications of scientific and technological developments as they affect people's lives and choices.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 351 Philosophy of Technology 3.0 Credits

Studies technology from a philosophical standpoint stressing its role in shaping human existence and values, considering issues such as the control and distribution of information, housing and city planning, automation, and the uses of technology in medicine.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 355 Philosophy of Medicine 3.0 Credits

Examines the ideas of medicine, disease, and health from a philosophical perspective. Examines such concepts as gender, mental-illness, mind-body unity, aging and physical perfection as derived from both Eastern and Western traditions. Current health policy alternative treatment practices are also discussed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 361 Philosophy of Science 3.0 Credits

Studies natural scientific theory-construction and investigative methods from a philosophical standpoint, considering issues such as the nature and scope of experimental method, and the history and justification of theory change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D] or PHIL 102 [Min Grade: D] or PHIL 105 [Min Grade: D] or PHIL 107 [Min Grade: D] or PHIL 111 [Min Grade: D]

PHIL 371 Philosophy of Social Sciences 3.0 Credits

Studies social scientific theory-construction and investigative methods from a philosophical standpoint, considering issues such as the distinction between explanation and interpretation, and the history and justification of theory change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D] or PHIL 102 [Min Grade: D] or PHIL 105 [Min Grade: D] or PHIL 107 [Min Grade: D] or PHIL 111 [Min Grade: D]

PHIL 381 [WI] Philosophy in Literature 3.0 Credits

Studies philosophical issues such as the concept of the self, the nature and course of evil, the nature and scope of free will, and ideals in living as they appear in significant works of literature.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 385 Philosophy of Law 3.0 Credits

This course addresses philosophical issues in the law. Topics include the meaning of "law," the nature and logic of legal (in contrast to moral) concepts and principles, and competing conceptions of law (Natural Law, Positivism, Realism, Rights-Based, etc.). Authors may include Plato, Mill, Rawls, Hart, Dworkin and others.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHIL 391 Philosophy of Religion 3.0 Credits

Studies various aspects of religious belief and experience from a philosophical standpoint, considering issues such as the definition and existence of God, the nature and course of evil, and the relationship between faith and reason in a religious life.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHIL 101 [Min Grade: D] or PHIL 102 [Min Grade: D] or PHIL 105 [Min Grade: D] or PHIL 107 [Min Grade: D] or PHIL 111 [Min Grade: D]

PHIL 395 Advanced Topics in Logic 3.0 Credits

Specialized topics, from among: self-reference paradoxes, set theory, axiomatization of arithmetic, computability, Church-Turing thesis, Gödel's theorem, minds and machines, Turing test, artificial intelligence, definitions of truth, models and satisfaction, analyticity, syntax/semantics, ontological commitment, intention/extension, reference justifying deduction, nominalism/realism, multi-valued logic, intuitionism, modal logic, doxastic logic, and logic of moral discourse.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: PHIL 111 [Min Grade: D] and PHIL 207 [Min Grade: D]

PHIL 421 [WI] Seminar in Ancient Philosophy 3.0 Credits

Advanced study and discussion of the works of the leading philosophers and philosophical schools of Western antiquity. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 425 [WI] Seminar in Medieval Philosophy 3.0 Credits

Advanced study and discussion of the works of the leading philosophers and philosophical schools of the Medieval period. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 431 [WI] Seminar in Modern Philosophy 3.0 Credits

Advanced study and discussion of the works of the leading philosophers and philosophical schools of the Modern period (circa. 1500 A.D. to 1900 A.D.) on the European Continent and British Isles. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D]) and (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D])

PHIL 461 [WI] Seminar in Contemporary Philosophy 3.0 Credits

Advanced study and discussion of the works by leading philosophers from 1900 to present. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 465 [WI] Seminar in American Philosophy 3.0 Credits

Advanced study and discussion of works by leading American philosophers, including Peirce, James, Mead, Royce, C.I. Lewis, Quine, Davidson, Rorty and others. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 481 [WI] Seminar in a Philosophical School 3.0 Credits

Development of doctrines, theories, arguments and problems associated with one or more philosophical schools (or movements). Schools (or movements) may include Pythagoreanism, Platonism, Epicureanism, or recently, Positivism, Pragmatism, and Existentialism. This course is Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 485 [WI] Seminar in a Major Philosopher 3.0 Credits

Study of the works of a major philosopher such as Plato, Aristotle, Descartes, Locke, Hume, Kant, etc. Reading and Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: (PHIL 211 [Min Grade: D] or PHIL 212 [Min Grade: D] or PHIL 214 [Min Grade: D] or PHIL 215 [Min Grade: D]) and (PHIL 221 [Min Grade: D] or PHIL 231 [Min Grade: D] or PHIL 241 [Min Grade: D] or PHIL 251 [Min Grade: D])

PHIL 497 [WI] Senior Essay I: Research & Thesis Development 3.0 Credits

Individual supervision. Selection of research topic for the senior argumentative essay; collection and analysis of hard-copy and electronic research material; construction of bibliography. Initial thesis formulation and drafting of argument sketch. Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHIL and classification is Senior.

PHIL 498 [WI] Senior Essay II: Argument Construction 3.0 Credits

Supervised construction of the main and supporting arguments of the senior essay involving drafting and re-drafting of the prose statement. Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHIL and classification is Senior.

Prerequisites: PHIL 497 [Min Grade: D]

PHIL 499 [WI] Senior Essay III: Defense 3.0 Credits

Individual Supervision. Defense of the senior essay thesis before the philosophy faculty and fellow senior philosophy majors. Written replies to main criticisms as determined by the faculty supervisor. Final submission of senior essay. Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHIL and classification is Senior.

Prerequisites: PHIL 498 [Min Grade: D]

PHIL I199 Independent Study in PHIL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL I299 Independent Study in PHIL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL I399 Independent Study in PHIL 1.0-12.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

PHIL I499 Independent Study in PHIL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL T180 Special Topics in Philosophy 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL T280 Special Topics in Philosophy 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL T380 Special Topics in Philosophy 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHIL T480 Special Topics in Philosophy 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Photography

Courses

PHTO 110 Photography 3.0 Credits

Lecture-laboratory course in black and white photography. With a combination of lectures, assignments and group critiques, students learn to see photographically through an exploration of the basic tools, techniques and aesthetics of photography. For PHTO Majors, a manual 35mm film camera is required. For PHTO Minors & non-majors a digital point and shoot camera or DSLR, 16 megapixels or greater is required. Cameras that are capable of shooting in RAW format are strongly recommended.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

PHTO 140 Digital Photography I 4.0 Credits

The objective of this course is to give you an introduction to the technical skills necessary to use computers, equipment, and software as a means of visually communicating your photographic ideas.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 110 [Min Grade: D]

PHTO 141 Digital Photographic Post Production 3.0 Credits

This course is an introduction to the manipulation and output of files using Photoshop and Lightroom. Skills acquired include working with RAW files, density, contrast and color correction, basic retouching, compositing of image, type and color elements along with special effects and output via inkjet printer. A digital point and shoot camera or DSLR, 16 megapixels or greater is required that is capable of shooting in RAW file format.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 110 [Min Grade: D]

PHTO 210 Intermediate Photography 3.0 Credits

Continues the aesthetic and technical investigations of black and white photography begun in PHTO 110 through a mix of lectures, slide discussions, analytical and creative projects, and group critiques. For PHTO Majors, a manual 35mm film camera is required. For PHTO Minors & non-majors a digital point and shoot camera or DSLR, 16 megapixels or higher is required. Cameras that are capable of shooting in RAW format are strongly recommended.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 110 [Min Grade: D]

PHTO 231 Color Photography 4.0 Credits

An introduction to the aesthetics and technology of color photography. There is an emphasis on color composition and theory. Class includes a variety of color processes, utilizing analog/film and digital materials.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 210 [Min Grade: D] or PHTO 140 [Min Grade: D] or PHTO 240 [Min Grade: D]

PHTO 233 Large Format Photography 4.0 Credits

Provides a thorough exploration of large-format camera techniques and large-format film exposure/development techniques including the zone system. Introduces the aesthetic of the large-format black-and-white photograph and expands the student's vision of the potential of the photographic image.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 210 [Min Grade: D]

PHTO 234 Studio Photography 4.0 Credits

Introduces professional studio photography practices. Continues utilization of the digital camera. Examines artificial lighting techniques and provides context for exploration of the studio as a creative photographic environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 110 [Min Grade: D]

PHTO 236 Photojournalism 4.0 Credits

Approaches the subject of photojournalism through lectures on its history and current practices and through application. Considers the documentary genre of photography in general.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 210 [Min Grade: D] or PHTO 240 [Min Grade: D] or PHTO 140 [Min Grade: D]

PHTO 240 Digital Photography II 4.0 Credits

Explores the digital image within the context of photographic practice. Examines current capabilities and future potentials in image capture, manipulation, output, and dissemination. Projects include utilization of image-manipulation programs, direct digital cameras, and hybrid film/digital approaches. Addresses aesthetic, conceptual, and professional issues.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 210 [Min Grade: D] or PHTO 140 [Min Grade: D]

PHTO 253 Fine Black & White Printing 3.0 Credits

Explores the aesthetic of the fine black-and-white print, including issues of print scale, tonality, surface quality, toning, and archival techniques. Uses zone-system analysis to optimize the relationship of the negative and the print.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 210 [Min Grade: D]

PHTO 275 [WI] History of Photography I 3.0 Credits

Provides an overview of the history of photography from 1839 to approximately 1930, including technological developments, aesthetic trends, theoretical and philosophical understandings, and effects on society and culture at large. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARTH 101 [Min Grade: D]

PHTO 276 History of Photography II 3.0 Credits

Provides an overview of the history of photography from approximately 1930 to the present, including technological developments, aesthetic trends, theoretical and philosophical understandings, and effects on society and culture at large.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 275 [Min Grade: D]

PHTO 291 Internship 0.5-12.0 Credits

Incorporates a nonpaying internship in the field of photography for academic credit. An initial informational sheet on the internship and a final paper on the experience are required. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO.

PHTO 334 Advanced Studio Photography 4.0 Credits

An advanced studio photography class that will teach the student the workflow associated with high-end digital studio capture. The class will also cover various advanced studio lighting techniques. The development of a personal portfolio of work produced in the studio will be required by all students.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO.

Prerequisites: PHTO 234 [Min Grade: D]

PHTO 335 Portraiture 3.0 Credits

This course is devoted to the development of a single project. The course will deal in depth with issues of format, lighting and composition. The course will address ethical and legal matters in photographic portraiture. An overview of the history of photographic portrait will be covered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO.

Prerequisites: PHTO 231 [Min Grade: D] and PHTO 233 [Min Grade: D] and PHTO 236 [Min Grade: D] and PHTO 253 [Min Grade: D]

PHTO 336 Assignment Photography 3.0 Credits

Assignment is simply said to be photography that supports the written word, which may be either news or advertising, article photographs, advertisements, or the cover of a magazine. The purpose of this course is to teach students how to stand out from the photographic crowd by injecting personal style.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if major is PHTO and classification is Junior or Pre-Junior or Senior.

Prerequisites: PHTO 234 [Min Grade: D] and PHTO 334 [Min Grade: D]

PHTO 340 Digital Photography III 4.0 Credits

This class will build on intermediate Photoshop skills while exploring the new field of building a photographic image by using more than one frame or multiple elements. Students will be expected to produce a body of work using the skills learned. Large format printing will be stressed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO and classification is Junior or Senior.

Prerequisites: PHTO 140 [Min Grade: D] and PHTO 240 [Min Grade: D]

PHTO 361 Advanced Photography 4.0 Credits

Extends study and experimentation in studio, color, and historical photography. Examines non-silver and non-traditional photographic technologies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO.

Prerequisites: PHTO 233 [Min Grade: D] and PHTO 253 [Min Grade: D]

PHTO 392 Junior Project in Photography 3.0 Credits

Integrates the technical and conceptual understandings that the student has acquired in photography through development of a personally defined photographic project. Students will meet in weekly seminars to plan, discuss, and critique in-progress work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO and classification is Junior.

Prerequisites: PHTO 234 [Min Grade: D]

PHTO 399 Independent Study In Photography 0.5-12.0 Credits

Provides individualized study in photography in a specialized area. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is PHTO.

PHTO 451 Photography and Business 3.0 Credits

Seminar course with invited professionals from the photographic and business fields. Helps prospective photographers understand legal aspects of photography, freelance business practices, and potential employment possibilities and expectations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 240 [Min Grade: D]

PHTO 452 [WI] History of Contemporary Photography 3.0 Credits

The course will focus on aesthetic and conceptual development in contemporary photographic practice. Through lectures, field trips and in-class discussions, students will learn concepts and visual trends employed in photography since 1970. Topics covered include 19th and 20th century influences, multi-cultural interpretation of genres, new approaches to representation of self.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 275 [Min Grade: D] and PHTO 276 [Min Grade: D]

PHTO 453 Photography Production 3.0 Credits

The objective of this course is to introduce prospective photographers to commercial production practices. Topics covered will include the definition and marketing of personal style, the varied roles of vendors and clients, interpreting layouts and concepts, and approaches to commercial production.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO and classification is Senior.

Prerequisites: PHTO 451 [Min Grade: D]

PHTO 455 Landscape Photography 3.0 Credits

This class is designed to explore the rich tradition and history of the landscape photograph and how to visually translate the contemporary landscape.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO and classification is Junior or Senior.

Prerequisites: PHTO 233 [Min Grade: D]

PHTO 456 Fashion Photography 3.0 Credits

The objective of this course is for students to become familiar with both the aesthetics and techniques involved in the production of fashion photographs. In addition, the history of fashion photography will be covered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO and classification is Junior or Senior.

Prerequisites: PHTO 234 [Min Grade: D] and PHTO 334 [Min Grade: D]

PHTO 457 Palladium Printing 3.0 Credits

This class explores the technical and aesthetic aspects of the 19th century, hand-coated palladium and platinum printing processes. Students will use large format negatives to produce a body of work. This course will include hand-coating techniques, paper and chemistry options.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO and classification is Junior or Senior.

Prerequisites: PHTO 233 [Min Grade: D] and PHTO 361 [Min Grade: D]

PHTO 458 Advertising Portfolio Development 3.0 Credits

This course is designed to prepare students to enter the commercial market. Topics covered will include the definition and marketing of personal visual style, identity and cohesion, and contemporary self-promotion practices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO and classification is Senior.

Prerequisites: PHTO 451 [Min Grade: D] and PHTO 453 [Min Grade: D]

PHTO 459 Marketing for Photographers 3.0 Credits

The objective of this course is to give students practical skills about marketing, design, and production of materials you will need as a photographer. Discussions and demonstrations will show you how to use print, web, and other technologies to promote your photography.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO and classification is Junior or Senior.

Prerequisites: PHTO 451 [Min Grade: D]

PHTO 465 Special Topics in Photography 0.5-12.0 Credits

Provides study in photography on a special topic or on an experimental basis. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PHTO 492 Senior Thesis in Photography I 3.0 Credits

Integrates the technical and conceptual understandings that the student has acquired in photography through development of a personally defined photographic project. Students will meet in weekly seminars to plan, discuss, and critique in-progress work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 392 [Min Grade: D]

PHTO 493 Senior Thesis in Photography II 3.0 Credits

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PHTO 492 [Min Grade: D]

PHTO 495 Senior Thesis in Photography III 3.0 Credits

Integrates the technical and conceptual understandings that the student has acquired in photography through development of a personally defined photographic project. Students will meet in weekly seminars to plan, discuss, and critique in-progress work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHTO and classification is Senior.

Prerequisites: PHTO 492 [Min Grade: D] and PHTO 493 [Min Grade: D]

PHTO I199 Independent Study in Photography 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PHTO I299 Independent Study in Photography 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

PHTO I399 Independent Study in Photography 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PHTO I499 Independent Study in PHTO 12.0 Credits**College/Department:** Antoinette Westphal College of Media Arts Design**Repeat Status:** Can be repeated multiple times for credit**PHTO T180 Special Topics in Photography 12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design**Repeat Status:** Can be repeated multiple times for credit**PHTO T280 Special Topics in Photography 12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design**Repeat Status:** Can be repeated multiple times for credit**PHTO T380 Special Topics in Photography 12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design**Repeat Status:** Can be repeated multiple times for credit**PHTO T480 Special Topics in Photography 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design**Repeat Status:** Can be repeated multiple times for credit

Physics

Courses

PHYS 050 Preparation for Engineering Studies 0.0 Credits

PHYS-050 is a self-paced online course and is intended for students who need additional preparation in mathematics and physics to be successful in the beginning physics courses (PHYS-101, 102). The online course is divided into six UNITS : Simultaneous Equations, Fundamentals of Plane Geometry, Use of Trigonometric Functions, Fundamentals of Solid geometry Vectors, and Kinematics. Each UNIT is organized in four sections: [i] Introduction; [ii] Interactive Problems; [iii] Sample Problems; and [iv]Tests.

College/Department: College of Arts and Sciences**Repeat Status:** Can be repeated multiple times for credit**PHYS 100 Preparation for Engineering Studies 4.0 Credits**

This is a basic mathematics foundational course to prepare the students for the beginning sequence of Engineering Physics. Topics include: simultaneous equations, fundamentals of plane and solid geometry, use of trigonometric functions and vectors and translational kinematics.

College/Department: College of Arts and Sciences**Repeat Status:** Not repeatable for credit**Corequisite:** EXAM 080**PHYS 101 Fundamentals of Physics I 4.0 Credits**

First of a four course sequence teaching fundamental physics to engineering and science majors. Topics include: description of motion, inertial and non-inertial frames, special relativity, Newton's Laws, translational and rotational equilibrium, one- and two-dimensional motion, fundamental forces, inverse square laws, Gauss' Law, Bohr's quantization, rotational dynamics, potential energy, black holes, determinism and chaos.

College/Department: College of Arts and Sciences**Repeat Status:** Not repeatable for credit**Prerequisites:** (PHYS 050 [Min Grade: CR] or PHYS 100 [Min Grade: D] or APC 070) and MATH 121 [Min Grade: C-]**Corequisite:** EXAM 080**PHYS 102 Fundamentals of Physics II 4.0 Credits**

Second of a four course sequence teaching fundamental physics to engineering and science majors. Topics include: electrostatics, capacitors, charges in motion, insulators, semiconductors, conductors, superconductors, voltage and current measurements, magnetism, electromagnetic induction, magnetic materials, quantum dots, magnetic resonance phenomenon.

College/Department: College of Arts and Sciences**Repeat Status:** Not repeatable for credit**Prerequisites:** PHYS 101 [Min Grade: D] and MATH 122 [Min Grade: D]**Corequisite:** EXAM 080**PHYS 103 General Physics I 4.0 Credits**

Algebra-based course that covers force, motion, work, energy properties of matter, and wave motion and sound propagation.

College/Department: College of Arts and Sciences**Repeat Status:** Not repeatable for credit**PHYS 104 General Physics II 4.0 Credits**

Algebra-based course that covers electricity and applications, magnetism, and optics.

College/Department: College of Arts and Sciences**Repeat Status:** Not repeatable for credit**Prerequisites:** PHYS 103 [Min Grade: D]**PHYS 105 Computational Physics I 3.0 Credits**

Introduces computational physics. Covers analytical and numerical solutions of equations governing the behavior of physical systems. Includes the use of Maple and simple FORTRAN/C/C++ programming methods to solve selected problems. Introduces UNIX, X-windows, programming languages, and visualization and data analysis tools for problems in computational physics. Introduces elementary programming concepts as needed.

College/Department: College of Arts and Sciences**Repeat Status:** Not repeatable for credit**Prerequisites:** (PHYS 113 [Min Grade: D] or PHYS 101 [Min Grade: D]) and CS 171 [Min Grade: D]**PHYS 106 [WI] The Physics of High Fidelity 3.0 Credits**

Applies physical principles to understanding how hi-fi systems work. Includes consumer education in selecting components. This is a writing intensive course.

College/Department: College of Arts and Sciences**Repeat Status:** Not repeatable for credit

PHYS 107 Acoustics 3.0 Credits

Covers the theory describing sound, behavior and sound waves, resonance and harmonics, frequency analysis, electronic production of sound, sound perception by the human ear, sound recording and reproduction, and room acoustics. Emphasis will be placed on understanding how sound operates in the physical world and how our ears respond to it.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 113 Contemporary Physics I 5.0 Credits

Part I in an introductory physics sequence for majors. This course combines the traditional lecture/lab format with real-time numerical simulations designed by the students. Topics include: the fundamental forces, Newton's laws, the atomic nature of matter, work and energy, light, friction, and atomic nuclei.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: MATH 121

PHYS 114 Contemporary Physics II 5.0 Credits

Part II in an introductory sequence for majors. This course combines the traditional lecture/lab format with real-time numerical simulations designed by the students. Topics include: angular momentum, entropy, gas dynamics, electric fields, electricity and matter, and electric potential.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 113 [Min Grade: D]

Corequisite: MATH 122

PHYS 115 Contemporary Physics III 5.0 Credits

Part III in an introductory sequence for majors. This course combines the traditional lecture/lab format with real-time numerical simulation designed by the students. Topics include: magnetic fields, electronics, radiation, waves and particles, and an introduction to semiconductor devices.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 114 [Min Grade: D]

Corequisite: MATH 123

PHYS 121 Physical Science for Design I 4.0 Credits

Offers a non-calculus-based survey of physical science for students in design and the visual arts. Topics include kinematics in two dimensions, forces, Newton's laws, applications using the constant acceleration model, energy, momentum, conservation laws, universal gravitation, circular motion, satellites, oscillatory motion, wave motion, sound, and music.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

PHYS 122 Physical Science for Design II 4.0 Credits

Continues PHYS 121. Topics include electricity, magnetism, em waves, light, geometrical and physical optics, anatomic structure, the elements, and nuclear decay and nuclear energy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 121 [Min Grade: D]

Corequisite: EXAM 080

PHYS 128 Introduction to Experimental Physics 3.0 Credits

This course will give students an introduction to all aspects of experimental physics, including experiment theory, laboratory techniques, data analysis, scientific writing, literature research, and presentations. Students are required to perform experiments in physics, such as the Millikan oil-drop experiment, the photoelectric effect measurement, the Michelson interferometer experiment, and radioactivity and spectroscopy measurements. Students are also required to write detailed laboratory reports and give an oral presentation. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 113 [Min Grade: D] (Can be taken Concurrently)

PHYS 131 Survey of the Universe 3.0 Credits

Provides an overview of modern astronomy, including the scientific method; telescopes; stars and star clusters; stellar evolution; galaxies and the large-scale structure of the universe; and the Big Bang. May also include periodic visits to the university observatory.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 135 How Things Work 4.0 Credits

This course examines the science behind everyday phenomena and devices. It uses real-world applications such as amusement park rides, microwave ovens, photocopiers, CDs, MRI, etc., as contextual vehicles to convey principles of classical and modern physics. It emphasizes conceptual understanding and uses pedagogy such as lecture demonstrations and active feedback.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 141 Atmospheric Science I - Climate and Global Change 3.0 Credits

The atmosphere and its structure and variations; greenhouse effect; ozone depletion; the influence of weather on man; air pollution; acid rain.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: PHEV 142

PHYS 142 Atmospheric Science I Laboratory 1.0 Credit

Introduction to climate analysis and methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 143 Atmospheric Science II - Weather & Forecasting 3.0 Credits

The atmosphere and its properties; weather systems; severe weather; hurricanes; weather forecasting.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Corequisite: PHEV 144

PHYS 144 Atmospheric Science II Laboratory 1.0 Credit

Introduction to meteorological analysis and forecasting methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHYS 151 Applied Physics 3.0 Credits

Non-calculus-based introductory physics for business majors. Covers basic mechanics and simple harmonic motion, followed by an introduction to more advanced topics such as relativity, electromagnetism, and quantum phenomena.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 081

PHYS 152 Introductory Physics I 4.0 Credits

First part of a three-course algebra-based sequence providing a comprehensive introduction to Physics. Covers basic mechanics, including motion in 1, 2, and 3 Newton's laws, gravitation, energy, momentum, rotational motion and elastic properties of materials. Includes labs to enrich class material. High school physics not required.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: EXAM 081

PHYS 153 Introductory Physics II 4.0 Credits

Second part of a three-course algebra-based sequence providing a comprehensive introduction to Physics. Covers fluids, vibrations, waves, sound, heat and thermodynamics, geometrical optics and optical instrumentation. Includes labs to enrich class material.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 152 [Min Grade: D] or PHYS 101 [Min Grade: D]

Corequisite: EXAM 081

PHYS 154 Introductory Physics III 4.0 Credits

Third part of a three-course algebra-based sequence providing a comprehensive introduction to Physics. Covers fundamentals of electricity and magnetism, including charges, fields, potential, circuits, magnetic induction, electromagnetic waves, special relativity, and physical optics. Includes labs to enrich class material.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 101 [Min Grade: D] or PHYS 152 [Min Grade: D]

Corequisite: EXAM 081

PHYS 160 Introduction to Scientific Computing 3.0 Credits

Basic introduction to scientific problem solving and numerical modeling of physical system using Excel and Maple.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 181 Astronomy 3.0 Credits

Provides an overview of modern astronomy, including the scientific method; telescopes; stars and star clusters; stellar evolution; galaxies and the large-scale structure of the universe; and the Big Bang. May also include periodic visits to the university observatory.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 182 Applied Physics I 3.0 Credits

Covers vectors; statics, kinematics, and classical dynamics, including Newton's laws, torque, projectile motion, and circular motion; work; power and energy; impulse and momentum; and rotation, in a non-calculus-based course. Fall.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 183 [Min Grade: D] or MATH 101 [Min Grade: D] or MATH 102 [Min Grade: D]

PHYS 183 Applied Physics II 3.0 Credits

Covers fluids; elasticity; vibration, including simple harmonic motion; sound waves and acoustics; thermodynamics of temperature; heat; thermal-expansion; phase change; and heat transfer, in a non-calculus-based course. Winter.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 182 [Min Grade: D]

PHYS 184 Applied Physics III 3.0 Credits

Covers light and illumination, electrostatics, potential, direct-current electrical circuits, magnetic fields, induction, generators, motors, and AC circuits, in a non-calculus-based course. Spring.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 183 [Min Grade: D]

PHYS 185 Fundamentals of Physics Lecture I 3.0 Credits

First of a three course sequence teaching fundamental physics to engineering and science majors. Topics include: description of motion, inertial and non-inertial frames, special relativity, Newton's Laws, translational and rotational equilibrium, one- and two-dimensional motion, fundamental forces, inverse square laws, Gauss' Law, Bohr's quantization, rotational dynamics, potential energy, black holes, determinism and chaos.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 121 [Min Grade: D]

PHYS 186 Physics I-A 1.0 Credit

A companion course for PHYS 185. Students will perform experiments related to Mechanics. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 185 [Min Grade: D] (Can be taken Concurrently)

PHYS 188 Physics II-A 1.0 Credit

A companion course for PHYS 189. Students will perform experiments related to Electricity and Magnetism. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 189 [Min Grade: D] (Can be taken Concurrently)

PHYS 189 Fundamentals of Physics Lecture II 3.0 Credits

Second of a four course sequence teaching fundamental physics to engineering and science majors. Topics include: electrostatics, capacitors, charges in motion, insulators, semiconductors, voltage and current measurements, magnetism, electromagnetic induction, magnetic materials, quantum dots, magnetic resonance phenomenon.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 185 [Min Grade: D]

PHYS 201 Fundamentals of Physics III 4.0 Credits

Third of a four course sequence teaching fundamental physics to engineering and science majors. Topics include: oscillations, EM waves, interference, diffraction, wave-particle duality, energy-matter equivalence, uncertainty relations, Schrodinger's equation, Hydrogen atom, laser, and nuclear physics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 102 [Min Grade: D] and MATH 122 [Min Grade: D]

Corequisite: EXAM 081

PHYS 202 Fundamentals of Physics IV 4.0 Credits

Fourth of a four course sequence teaching fundamental physics to engineering and science majors. Topics include: statistical kinetic, equipartition of energy, entropy, ultra-low temperatures, thermal transport, interaction of charged particles and light with biological tissue, fiber optics, IR, Raman, spectroscopy, fluidics, and microfluidics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 201 [Min Grade: D]

PHYS 217 Thermodynamics 4.0 Credits

Covers macro-thermodynamics: temperature, pressure, work, heat, equations of state, the first and second laws of thermodynamics and their applications, heat engines and refrigerators, thermodynamics potentials, Maxwell relations, theory of phase changes, kinetic theory and transport phenomena.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 114 [Min Grade: D] or PHYS 102 [Min Grade: D]

PHYS 222 Modern Physics 4.0 Credits

Covers special relativity and the electron, black-body radiation, quantum theory of radiation, Bohr theory, wave particle duality, Schrodinger equation, and nuclear phenomena.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D]

PHYS 226 Instrumentation for Scientists I 3.0 Credits

Introduces measurement concepts, including a systems approach to analog and digital measurement, amplification and feedback, electrical data domains, measurements of varying analog signals, time domain measurements and conversions, and A/D and D/A conversions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHYS 227 Instrumentation for Scientists II 3.0 Credits

Covers optimization of scientific measurements, including systems analysis, signal/noise, control of frequency response, modulation and demodulation, relation of sampling parameters to signal characteristics, and signal-to-noise ratio enhancement.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 226 [Min Grade: D]

PHYS 231 Introductory Astrophysics 3.0 Credits

An introductory astrophysics course aimed at science majors. Topics include a treatment of orbits, Kepler's laws, celestial coordinates, light, blackbodies, optics, stellar structure and evolution, galactic formation, and large scale evolution and structure of the universe.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (PHYS 101 [Min Grade: D] or PHYS 113 [Min Grade: D]) and MATH 121 [Min Grade: D]

PHYS 232 Observational Astrophysics 3.0 Credits

Covers photometric and spectroscopic properties of stars, galaxies, and quasars and fundamental astrophysics of these objects. The course contains a significant lab component, which includes training in methods of observation, using the Joseph Lynch Observatory on campus to obtain astronomical measurements, and analysis of data.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 113 [Min Grade: D] and MATH 121 [Min Grade: D]

PHYS 233 Introduction to Relativity 3.0 Credits

This course covers foundational concepts in Einstein's Special Theory of Relativity, including the unification of space-time, transformations between inertial frames, relativity of simultaneity, length contraction and time dilation, and transformation between energy and momentum. Introductory concepts in General Relativity will be discussed, including space curvature and weak gravitational fields.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (PHYS 113 [Min Grade: D] or PHYS 101 [Min Grade: D]) and MATH 122 [Min Grade: D]

PHYS 261 Introduction to Biophysics 3.0 Credits

This is an introductory course to the wide field of Biophysics. The intended audience is undergraduate physics majors. However, the level and approach is also accessible to undergraduates from other concentrations, including Chemistry and Biology. Students will learn the basic principles behind cells, thermodynamics and statistical mechanics applied to cellular environments, forces affecting conformation of biological molecules, protein and nucleic acid biophysics, membrane biophysics, and basic physics principles behind nerve impulses.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 115 [Min Grade: D] or PHYS 201 [Min Grade: D]

PHYS 262 Introduction to Biophysics 3.0 Credits

This is an introductory course to the wide field of Biophysics. The intended audience is undergraduate physics majors. However, the level and approach is also accessible to undergraduates from other concentrations, including Chemistry and Biology. Students will learn the basic principles behind cells, thermodynamics and statistical mechanics applied to cellular environments, forces affecting conformation of biological molecules, protein and nucleic acid biophysics, membrane biophysics, and basic physics principles behind nerve impulses.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (PHYS 115 [Min Grade: D] or PHYS 201 [Min Grade: D])

PHYS 280 Fundamentals of Physics Lecture III 3.0 Credits

Third of a three course sequence teaching fundamental physics to engineering and science majors. Topics include: oscillations, EM waves, interference, diffraction, wave-particle duality, energy-matter equivalence, uncertainty relations, Schrodinger's equation, Hydrogen atom, laser, and nuclear physics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 102 [Min Grade: D] or PHYS 189 [Min Grade: D]

PHYS 282 Fundamentals of Physics Laboratory III 1.0 Credit

A companion course for PHYS 280. Students will perform experiments related to Thermodynamics and modern physics. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 280 [Min Grade: D] (Can be taken Concurrently)

PHYS 305 Computational Physics II 3.0 Credits

Covers the application of computational techniques to problems in physics, including numerical solution of differential equations, computation and display of particle trajectories in arbitrary potentials, introduction to non-linear dynamics, random numbers and Monte-Carlo methods, and numerical implementation of selected methods in mathematical physics. Emphasizes hands-on experience in problem-solving, using both Maple and C.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 171 [Min Grade: D], PHYS 105 [Min Grade: D]

PHYS 311 Classical Mechanics I 4.0 Credits

An intermediate treatment of classical mechanics and dynamics. Topics will include central forces, oscillatory motion, Lagrangian and Hamiltonian mechanics, phase space, and collisions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 210 [Min Grade: D] (Can be taken Concurrently)
(PHYS 115 [Min Grade: D] or PHYS 201 [Min Grade: D])

PHYS 312 Classical Mechanics II 4.0 Credits

Covers motion of system of particles, center of mass and conservation of linear momentum, description of collisions, Rutherford scattering, dynamics of rigid bodies, coordinate systems, the restricted three-body problem, generalized coordinates, Lagrange's equations and Hamilton's equations, and rotation of frame.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 311 [Min Grade: D]

PHYS 317 Statistical Mechanics 3.0 Credits

Covers distribution molecular velocities, transport phenomena, Maxwell-Boltzmann statistics, and quantum statistics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 210 [Min Grade: D] and PHYS 217 [Min Grade: D]

PHYS 321 Electromagnetic Fields I 4.0 Credits

Covers fields due to specified charge distributions, Gauss' law, multipole expansion of the fields, Laplace's equation, method of images, dielectrics, and energy of an electrostatic field. Some or all pre-requisites may be taken as either a pre-requisite or co-requisite. Please see the department for more information.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 115 [Min Grade: D] (Can be taken Concurrently)

PHYS 322 Electromagnetic Fields II 4.0 Credits

Covers electric current, continuity equation, electromotive forces, magnetic fields, electromagnetic induction, magnetic properties of matter, Maxwell's equations, radiation, and radiation by moving charges.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 321 [Min Grade: D]

PHYS 324 Topics in Mathematical Physics 3.0 Credits

This course presents the mathematical background needed for Thermodynamics, Classical Mechanics, Electricity & Magnetism, and Quantum Mechanics using the theory of linear vector spaces and the standard tools of elementary mathematical physics. Emphasis will be placed on the use of analytic and numerical programming techniques, using Maple, FORTRAN and C.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHYS 325 Computational Physics III 3.0 Credits

This is the third course in the Computational Physics sequence. It presents basic scientific programming techniques and problem-solving strategies, as applied to problems in electromagnetic theory and quantum mechanics. This hands-on focuses primarily on the solution of partial differential equations in physics, Monte-Carlo methods, and matrix methods, and includes solutions of Laplace's, Poisson's and Maxwell's equations, fields due to moving charges, Fast Fourier Transforms, and solutions of the time-independent and time-dependent Schrodinger equation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 105 [Min Grade: D]

PHYS 326 Quantum Mechanics I 4.0 Credits

Explores the classical foundations of quantum mechanics, the Schrodinger equation, solutions of one-dimensional problems, and the one-dimensional harmonic oscillator.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 311 [Min Grade: D]

PHYS 327 Quantum Mechanics II 4.0 Credits

Covers the three-dimensional Schrodinger equation, angular momentum, matrix mechanics, the hydrogen atom, and perturbation theory.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 326 [Min Grade: D]

PHYS 328 [WI] Advanced Laboratory 3.0 Credits

Requires students to perform advanced laboratory experiments in the various fields of physics. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 223 [Min Grade: D]

PHYS 330 Introduction to Nuclear Physics 2.0 Credits

Provides an overview of nuclear physics; including nuclear structure; nuclear stability; radioactivity and nuclear decay; nuclear forces and interactions; fission and fusion; and the interaction of particles with matter. A small amount of quantum mechanics will be included.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (PHYS 115 [Min Grade: D] or PHYS 201 [Min Grade: D]) and (MATH 210 [Min Grade: D] or ENGR 232 [Min Grade: D])

PHYS 405 Advanced Computational Physics 3.0 Credits

Covers the application of computational techniques to one or more research topics of current interest, including grid-based solutions of partial differential equations in one and two dimensions and particle methods in fluid mechanics. Introduces high-performance computation and massively parallel computing platforms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: PHYS 305 [Min Grade: C]

PHYS 408 Physics Seminar 1.0 Credit

Requires participation in weekly departmental colloquium.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 15 times for 16 credits

Restrictions: Can enroll if major is PHYS and classification is Junior or Senior.

PHYS 409 Astrophysics Seminar 1.0 Credit

This course focuses on topics in modern astrophysics. Each term, a series of papers in a subfield is chosen. Students present and discuss recent results in fields such as stellar structure, black holes, cosmology, and dynamics. May be repeated twice for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 2 credits

Prerequisites: PHYS 231 [Min Grade: D] or PHYS 232 [Min Grade: D]

PHYS 428 Quantum Mechanics III 4.0 Credits

Advanced topics in quantum mechanics including spin, addition of angular momentum, scattering theory, relativistic quantum mechanics, atoms and molecules, and radiation from atoms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 327 [Min Grade: D]

PHYS 431 Galactic Astrophysics 3.0 Credits

This course presents an introduction to the processes responsible for the formation, structure, evolution, and present-day appearance of the Milky Way and other galaxies. Using the Milky Way Galaxy as a guide, we will develop analytical and numerical tools to help us understand of the properties of these magnificent objects, near and far. Topics will include stars, stellar formation, and stellar evolution, galactic structure and dynamics, and galaxy formation and evolution.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 311 [Min Grade: D]

PHYS 432 Cosmology 3.0 Credits

Covers cosmological models, age and distance scales in the universe, the hot big bang, primordial nucleosynthesis, inflation, baryonic and non-baryonic matter, galaxy formation and evolution, dynamics of structure formation, statistics of cosmological density fields, and cosmic background fluctuations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 311 [Min Grade: D]

PHYS 451 Quantum Structure of Materials 4.0 Credits

Introduces modern physics, including wave-particle duality; quantum mechanics of electrons located in one-dimensional potentials; introduction to solid-state physics; electronics in periodic potentials and energy band structure; numerical computations; metals, semiconductors, and insulators; electronic devices; quantum devices; and laboratory experiments in scanning tunneling microscopy and atomic force microscopy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 201 [Min Grade: D]

PHYS 452 Solid State Physics 3.0 Credits

Atomic basis of the physical properties of materials, including crystalline and non-crystalline solids. Detailed introductory treatment of the structural, vibrational, and electronic properties of solid and their inter-relationships. Overview of other materials, properties, and scientific basis of technological applications.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 317 [Min Grade: D] and PHYS 326 [Min Grade: D]

PHYS 453 Nanoscience 3.0 Credits

Scientific basis of nanoscale materials and systems including discussions of low-dimensional structures and their physical properties, the self-assembly of nanostructures, applications in various fields of science and technology, and techniques for fabrication and characterization on the nanoscale.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 311 [Min Grade: D] and PHYS 217 [Min Grade: D]

Corequisites: PHYS 321, PHYS 326

PHYS 461 Biophysics 3.0 Credits

A one course introduction to biological physics. Topics may include: structure of biomolecules, protein stability, electron transfer, protein folding, protein substrates, allostery, and self-assembly. No biological background is presumed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 3 credits

Prerequisites: PHYS 317 [Min Grade: D]

PHYS 462 Computational Biophysics 3.0 Credits

This course involves mathematical applications of biological simulations. Using classical and statistical mechanics, we will cover topics including atomic scale simulations, statistical sampling and models of molecular cellular systems and living processes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 305 [Min Grade: D] and PHYS 317 [Min Grade: D]

Corequisite: PHYS 321

PHYS 463 Single Molecule Methods 3.0 Credits

Covers the principles, operations and applications of the most commonly used single molecule methods in biophysics, including scanning probe microscopy and spectroscopy, optical trapping and fluorescence resonance energy transfer techniques.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PHYS 217 [Min Grade: D] and PHYS 322 [Min Grade: D]

PHYS 471 Nonlinear Dynamics 3.0 Credits

This course introduces the basic ideas of the new science of nonlinear dynamics and develops methods to carry out fundamental computations of fractal dimension, Lyapunov exponents, and topological invariants.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D]

PHYS 476 Particle Physics 3.0 Credits

This course will provide an introduction to the physics of fundamental particles. Topics including the fundamental forces, quarks and leptons, Feynman diagrams, symmetries and conservation laws, relativistic kinematics, bound states, and experimental methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Prerequisites: PHYS 327 [Min Grade: D]

PHYS 485 Research 3.0 Credits

Covers research problems in physics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PHYS 491 Senior Research I 3.0 Credits

A three-term sequence devoted to theoretical or experimental activities in a specific area of physics or atmospheric science to be chosen in consultation with a faculty adviser. Requires students to learn to identify interesting problems, develop a plan of attack, and carry the project to completion. Requires written and oral report at the end of the third term.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

PHYS 492 Senior Research II 3.0 Credits

Continues PHYS 491.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 491 [Min Grade: D]

PHYS 493 [WI] Senior Research III 3.0 Credits

Continues PHYS 492. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PHYS 492 [Min Grade: D]

PHYS I199 Independent Study in PHYS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS I299 Independent Study in PHYS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS I399 Independent Study in PHYS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS I499 Independent Study in PHYS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS T180 Special Topics in Physics 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS T280 Special Topics in Physics 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS T380 Special Topics in Physics 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS T480 Special Topics in Physics 12.0 Credits

Covers selected topics in physics. May be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Physics - Environmental Science

Courses

PHEV 141 [WI] Atmospheric Science I: Climate and Global Change 3.0 Credits

Covers the atmosphere and its structure and variations, the greenhouse effect, ozone depletion, the influence of weather on humans, air pollution, and acid rain. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHEV 142 [WI] Atmospheric Science I Laboratory 1.0 Credit

Introduces climate analysis and methods. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHEV 143 Atmospheric Science II: Weather Analysis and Forecasting 3.0 Credits

Covers the atmosphere and its properties, weather systems, severe weather, hurricanes, and weather forecasting.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHEV 144 [WI] Atmospheric Science II Laboratory 1.0 Credit

Introduces meteorological analysis and forecasting methods. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHEV 145 Weather I: Climate and Global Change 4.0 Credits

Introduction to the Earth's atmosphere and climate system including the structure and interaction of the components of this system. Students learn basic meteorological ideas and concepts. Special topics include weather satellite and Doppler radar imagery, daily weather discussions, the greenhouse effect and ozone depletion.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHEV 146 Weather II: Analysis and Forecasting 4.0 Credits

Course covers real problems of weather analysis and forecasting. Components focus on surface and upper-air weather maps, westerlies and the jet stream, mid-latitude cyclones, thunderstorms, tornadoes and hurricanes. Special topics include weather instruments and observations, atmospheric optics and climate analyses.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHEV 346 Atmospheric Dynamics 3.0 Credits

Covers equations of motion on a rotating earth; balanced horizontal motion and the thermal wind relation; equation of continuity; mechanism of pressure change; application of circulation and vorticity to atmospheric motion, viscosity, turbulence, and diffusion; and energy and stability relationships.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: MATH 200 [Min Grade: D] and PHYS 211 [Min Grade: D]

Physiology

Courses

PHGY 325 Physiology 5.0 Credits

Presentation of organ function with emphasis on the integration of neural and humoral control mechanisms.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ANAT 101 [Min Grade: D] and ANAT 102 [Min Grade: D] and ANAT 103 [Min Grade: D]

PHGY 382 Pathophysiology for Health Professions 5.0 Credits

Introduction to disturbances of normal function and basic mechanisms involved in diseases of major organ systems. Presentation of the general aspects of the common human pathophysiological conditions and syndromes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUOL.

Political Science

Courses

PSCI 100 Introduction to Political Science 4.0 Credits

Studies the political process, which determines who gets what, when, and how in society.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 110 American Government I 4.0 Credits

Introduces the elements of the American political system.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 120 History of Political Thought 4.0 Credits

Introduces the Western tradition of political thought, examining a selection of works by major political thinkers. Draws on primary sources, with a textual and conceptual emphasis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 131 [WI] Research Design for Political Science 4.0 Credits

Introduction to basic principles of political science research design. Examines the process of formulating research questions in political science, developing theories with testable implications, and hypothesis testing. Students produce a research proposal including research question, literature review, and research design.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 140 Introduction to Comparative Political Analysis 4.0 Credits

Examines methods used to compare state political systems with respect to world order values in varying geographic and cultural settings.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 150 International Politics 4.0 Credits

Analyzes nation-states in their external relations, including the interaction of the great powers with each other and with emerging areas.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 200 The Public Policy Process 4.0 Credits

Provides students with a general understanding of policy formulation and implementation, primarily at the national level. In addition, students gain more specialized knowledge about a policy field of their choosing. Topics covered include theories of the policy process, policy formulation and process, policy implementation, and specific policy areas.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 211 American Government II 4.0 Credits

Provides a structural analysis of selected social, economic, and political institutions at various levels of government in the American political system.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 110 [Min Grade: D]

PSCI 220 Constitutional Law I 4.0 Credits

Introduction to Constitutional law and the federal courts. Examines the emergence of judicial review, the judiciary's role in the system of check and balances, and the powers and limitations on each branch of government.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 110 [Min Grade: D]

PSCI 223 Comparative Political Thought 4.0 Credits

Provides an introduction to comparative political theory by studying non-canonical texts originating both within Europe and the United States and outside those areas, generally in colonized or formerly colonized countries. Specific theories include those of DuBois, Fanon, and Mariategui.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 120 [Min Grade: D]

PSCI 229 Theories of Justice 4.0 Credits

Examines the nature and realization of justice over time, with special attention to the ways that justice has been conceptualized and re-conceptualized over time.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 231 Qualitative and Mixed-Methods Research in Political Science 4.0 Credits

Considers the theoretical and methodological challenges and opportunities associated with qualitative and multi-method research designs. Includes issues of causation, explanation, and inference, as well as practical considerations of specific research designs and methods.

The qualitative research designs considered include "small-n" historical case studies and process tracing. Specific techniques include focus groups, structured and semi-structured interviews, oral histories, archival research, participant observation, ethnographic investigations, action research, and the use of memoir and journalistic sources as data.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 131 [Min Grade: D]

PSCI 232 Quantitative Research Methods in Political Science 4.0 Credits

This course provides students with concepts, principles and tools of quantitative research methodology for political science. Core concepts include quantitative measurement of political topics, survey research, and linear regression analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 131 [Min Grade: D]

PSCI 240 Comparative Government 4.0 Credits

Uses the tools of comparative politics to examine key political issues across democratic and non-democratic countries.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSCI 140 [Min Grade: D]

PSCI 250 American Foreign Policy 4.0 Credits

Examines current issues in American foreign policy, including the assumptions underlying policy goals, the means of achieving them, and the decision-making machinery.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 150 [Min Grade: D]

PSCI 252 Global Governance 4.0 Credits

Introduces students to the theory and practice of international organizations. Focuses on three broad questions: Do international organizations matter? How do they matter? Should they matter? Course begins with an overview of major theoretical perspectives and continues with an examination of the United Nations system and its role in security, development, human rights, global health and environmental politics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 150 [Min Grade: D] or PSCI 140 [Min Grade: D]

PSCI 255 International Political Economy 4.0 Credits

The overarching theme of this course is the process of globalization, the factors leading to a single world economy tied together by technology, trade, and investment, and the factors keeping up independent economic zones and nations in economic competition and sometimes in open political opposition.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 260 [WI] Power in Protest: Social Movements in Comparative Perspective 4.0 Credits

This course considers theoretical approaches to comparative social movements by closely examining evidence about specific movements. Questions include: When and why do people mobilize to make demands against their states and societies? What contextual conditions enable such mobilization, and under what conditions does mobilization decline? Finally, do movements actually matter for bringing about change? This course is designed to gain leverage on these questions by surveying an eclectic literature from international relations and comparative politics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 140 [Min Grade: D] or PSCI 150 [Min Grade: D]

PSCI 261 The Politics of LGBT Movements and Rights 4.0 Credits

In many countries, the subject of LGBT (lesbian, gay, bisexual, and trans) rights has entered the political discourse with unprecedented speed and suddenness. This course is designed to gain leverage on the processes that explain this rapid global expansion of LGBT rights by surveying an eclectic literature on comparative and transnational LGBT politics. Specially, we will ask: What factors have facilitated the mobilization of LGBT people? How and why have public opinion and laws towards LGBT people changed differently across various countries? To answer these questions, we will take an in-depth empirical look at movements representing LGBT people and their successes/losses—as well as those of their opposition—across time and place, from the late 1800s to present day and across the globe.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 270 Problems of Individual Liberty and Government Authority 4.0 Credits

Examines the relationship between personal freedom and a just society from a variety of perspectives, all of which are designed to serve as an introduction to history and politics.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSCI 120 [Min Grade: D]

PSCI 305 Social Development: A Global Approach 4.0 Credits

This course is a general introduction to issues posed by the notions of development and progress of societies. Issues to be discussed include indices of social development, economic growth, and health progress, and their significance in relation to general views on social development and human progress. The concept of standard of living, the human development index, the demographic transition and the gender and political aspects of development will be also discussed. As a general introduction to the issues implied by the relationships between economic progress, population growth, health, and politics, as major concepts involved in the notion of social development, the course has links with demography, sociology, history of political thought, economics, anthropology, and the health sciences.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 313 State & Local Government 4.0 Credits

Examines major political, social, and economic problems of state, local, and metropolitan governments.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSCI 320 The United States Congress 4.0 Credits

An overview of politics and policy-making in the US Congress. Topics include: How are laws really made? What determines who is elected to Congress, and who leads once members are in place? How much does money matter in Congressional politics? How effective is Congress at passing legislation, and how effective is the legislation that eventually passes?.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 110 [Min Grade: D]

PSCI 325 Political Theory from Below 4.0 Credits

Rethinks traditional approaches to political theory by emphasizing study of texts and movements "from below," drawn from both African American and Latin American thinkers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 327 Democratic Theory 4.0 Credits

Examines the works of various classical and contemporary thinkers on the nature, justification, and practice of democracy. Emphasizes matters of liberty, equality, participation, and social choice.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSCI 330 Public Opinion & Propaganda 4.0 Credits

Examines public opinion and propaganda from a variety of perspectives, including the process of opinion formation and change and its role in the development of public policy and methods of measurement and analysis of public opinion.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSCI 331 Environmental Politics 4.0 Credits

Examines environmental politics, focusing on the United States. Solving environmental problems is not simply a question of using available science and technology; rather, proposals to combat environmental degradation confront political context that may or may not favor the aims of environmental policy. Understanding politics is therefore indispensable for effective environmental problem-solving.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 332 Linear Regression for Political Science 4.0 Credits

Examines the theoretical basis for, and practical applications of, linear regression and related methods in political science. Students develop their proficiency in statistical programming by analyzing political science data in R, beginning with basic tasks such as reading in, summarizing, and manipulating data. The course continues with common regression models including ordinary least squares regression, regression methods for categorical and limited dependent variables, and maximum likelihood estimation. In addition, issues of measurement error and research design are considered.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSCI 130 [Min Grade: D] and PSCI 230 [Min Grade: D]

PSCI 334 Politics of Environment and Health 4.0 Credits

Examines political aspects of environmental health issues. Students will examine how "environment" and "health" are defined by different stakeholders. How, according to these political actors, is health impacted by environment, and how are environmental factors addressed in healthcare? How do scientists study human exposure in everyday environments? What institutions are responsible for regulating hazardous materials? How is community health impacted by pollution and what actions do communities take to protect health? Using historical and contemporary case studies, students will engage with these questions at different scales of analysis, learning about the politics of knowledge, social movements, the medical establishment, and the ethics of health in late industrialism.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 335 Political Communication 4.0 Credits

Introduces an investigation of the relationship between politics and communication, with the goal of developing an understanding of political communication's role in election campaigns, news coverage, political debates, political advertising, and "normal" portrayals of the political system through media and interpersonal communication.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSCI 345 Comparative Politics of the Middle East 4.0 Credits

Introduces students to political issues and challenges that face Middle Eastern men and women and deepens their understanding of comparative politics in non-Western cultures and nations. Analyzes such common problems as nationalism, religion, and state/society relations, then examines in depth four countries representing various regimes. Assumes some familiarity with Middle Eastern history and concentrates primarily on contemporary politics and political economy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSCI 150 [Min Grade: D] or PSCI 140 [Min Grade: D]

PSCI 351 International Organizations: The United Nations 4.0 Credits

The goal of this course is to present an overview of the nature and function of international organization in world politics. The role of the United Nations and its agencies are highlighted. Students gain an understanding of how international life is structured through these institutions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 352 Ethics and International Relations 4.0 Credits

Are ethics relevant in world politics, or are power and survival the only concerns? This course considers the main moral issues facing the international community. Topics include the "just war" tradition, human rights, humanitarian intervention, and what rich countries owe the poor.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 353 International Human Rights 4.0 Credits

This course examines the origin of the international human rights movement after World War II, and discusses key issues confronting the international community today. These include genocide, political repression, the rights of women, and religious and cultural minorities. It also considers the moral basis of the rights ideal.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 357 The European Union in World Politics 4.0 Credits

This course combines an introduction to the history and institutions of the European Union with a special analysis of EU enlargement and institutional reform.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 360 International Law 4.0 Credits

The legalization of world politics is one of the most interesting and potentially transformational trends in international relations. Across substantive areas, including matters of security, trade, environmental affairs, and human rights, international law is playing an increasing role in international politics. The course considers theoretical approaches and contemporary events to better understand where international law comes from, how it is designed, and why states comply (or not). In addition, we consider contemporary debates and challenges, including the contested jurisdiction of international courts, the immunity of the United Nations, evolving law on humanitarian military intervention, and the fragmentation of international law in environmental affairs, among other topics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 363 Constitutional Law II 4.0 Credits

Examines protections for civil liberties afforded by the First Amendment of the Constitution, specifically those related to speech, the press, religion, and assembly.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSCI 364 Constitutional Law III 4.0 Credits

Examines Constitutional civil rights claims arising under the Fourteenth Amendment equal protection and due process guarantees. Focuses on claims concerning discrimination on the basis of race, gender, and sexual orientation, as well as those asserted under an individual right to privacy in matters of reproductive rights, sexual conduct, and end of life decisions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSCI 365 Politics, Law, & Justice 4.0 Credits

Examines justice as politically determined, including the personnel, policies, and practices of units of the legal system, especially civil, criminal, and juvenile courts in urban areas.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSCI 366 Supreme Court and American Politics 4.0 Credits

This course focuses on the workings of the modern Supreme Court: theories of judicial interpretation; internal decision-making processes; the interplay of law and politics on the Court's personnel, agenda, and rulings; and the role of interest groups in shaping the Court's jurisprudence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSCI 369 The Politics of Food 4.0 Credits

This course examines how politics shapes our diet. Though cultural and personal preferences influence what we eat, our food choices unfold in the context of public policies such as agricultural subsidies, trade agreements, and food safety regulations, etc. The first part of the course describes and analyzes the US food system, with a focus on regulatory policies and interest group politics. The second part of the course examines the ideas and practices of food-based social movements that seek to create a food system that is less harmful to human and international health and more socially just than the existing system.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 371 Science, Technology, & Public Policy 4.0 Credits

Examines the political effects of technological change, including public policy efforts to affect the impact of scientific development. Covers topics including atomic energy, electronic communications, and weapons development.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSCI 372 City in United States Political Development 4.0 Credits

Course examines the role of the American city in the larger project of state-building. Topics covered include the changing functions of cities over American history; the role of cities in national political coalitions; and the construction of ethnic, racial, and class identities as a process of urbanization.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 374 Politics of Sport 4.0 Credits

The material in this course comes from a variety of disciplines and schools of thought with political science serving as an overarching framework. Issues covered include ethnicity, gender, race, nationalism, globalism, economics, and class.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 375 Politics of Immigration 4.0 Credits

This course is designed to introduce the student to the issues associated with immigration from both a US and international as well as a historical and contemporary perspective. Emphasis will be focused on the theory, public policy and philosophical issues that are associated with this area of inquiry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 376 Running for Political Office 4.0 Credits

This course is designed to introduce the students to both the theory and practice of running for political office. Emphasis will be placed upon both the theoretical and applied aspects of political campaigns. The course will use a combination of readings, a text, films, lectures, and guest speakers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 377 Politics of Latin America 4.0 Credits

Analysis of contemporary politics in South and Central American, as well as Cuba, with several in-depth country cases. Comparative themes include: legacies of military rules, economic dependency and revolution; dynamics of democratic transition, economic reform and U.S. hegemony; and, problems of domineering presidents weak parties and marginalized social groups.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 492 Political Science Thesis I 4.0 Credits

Students develop and begin an in-depth research project under the supervision of a political scientist. Course is restricted to seniors with a minimum 3.30 GPA. Can be continued as PSCI 493.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSCI and classification is Senior.

PSCI 493 Political Science Thesis II 4.0 Credits

Students complete an in-depth research project under the supervision of a political scientist.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSCI and classification is Senior.

Prerequisites: PSCI 492 [Min Grade: D]

PSCI I199 Independent Study in PSCI 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSCI I299 Independent Study in PSCI 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSCI I399 Independent Study in PSCI 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSCI I499 Independent Study in PSCI 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSCI T180 Special Topics in Political Science 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSCI T280 Special Topics II 0.5-12.0 Credits

Special topics in political science at the intermediate level. See department for details of current offerings.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSCI T380 Special Topics III 0.5-12.0 Credits

Special topics in political science at the intermediate/advanced level. See department for details of current offerings.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSCI T480 Special Topics IV 0.5-12.0 Credits

Special topics in political science at the advanced level. See department for details of current offerings.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Portuguese

Courses

PORT 101 Introduction to Portuguese I 4.0 Credits

Portuguese 101 introduces the basic elements of Portuguese. Students will develop essential communicative language skills in terms of speaking, listening, reading, and writing, with focus on the acquisition of oral skills. Students will develop cultural awareness regarding various Portuguese speaking communities.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PORT 102 Introduction to Portuguese II 4.0 Credits

Portuguese 102 builds upon PORT 101. This course introduces new vocabulary, complex sentence structures and expressions. Students will learn more about the regions where the language is spoken and will be introduced to more cultural facets of Portuguese.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PORT 101 [Min Grade: C]

PORT 103 Introduction to Portuguese III 4.0 Credits

This course constitutes the last of the introductory-level courses. Students will enhance their listening, reading and writing skills. Course will bring together the basic elements they need to communicate satisfactorily in everyday practical situations. Students will be familiarized with more aspects of Portuguese society. This course builds upon the skills learned in PORT 101 and 102.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PORT 102 [Min Grade: C]

PORT T180 Special Topics in Portuguese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PORT T280 Special Topics in Portuguese 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PORT T380 Special Topics in Portuguese 9.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PORT T480 Special Topics in Portuguese 9.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Printing Technology Management

Courses

PTM I199 Independent Study in Printing Technology Management 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PTM I299 Independent Study in Printing Technology Management 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PTM I399 Independent Study in Printing Technology Management 0.5-12.0 Credits

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PTM I499 Independent Study in Printing Technology Management 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PTM T180 Special Topics in Printing Technology Management 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PTM T280 Special Topics in Printing Technology Management 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PTM T380 Special Topics in Printing Technology Management 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PTM T480 Special Topics in Printing Technology Management 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Product Design

Courses

PROD 101 History and Analysis of Product Design 3.0 Credits

This class studies the chronological context of the development of the product design profession, relating it to the social, cultural and economic events that helped shape our modern day society. Studies are focuses on major industrial designers and innovations. This course has both a project and written analysis paper component.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

PROD 205 Applied Making I 3.0 Credits

This course introduces the development of rapid study models and mid-fidelity prototypes related to product design. Students, through a series of exercises, build study models of products to professional standards of accuracy and finish, with an emphasis on rapid development. Aspects of workshop practice and safety are emphasized.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PROD 101 [Min Grade: D]

PROD 210 Introduction to Product Design 3.0 Credits

This course introduces students to basic product design techniques. It combines lectures, demonstrations, discussions and problem solving exercises exploring product design as a creative process in the production of simple objects. Students develop a command of product development, skills in modeling and communication of their novel solutions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PROD 101 [Min Grade: D]

PROD 215 Design Thinking in Product Design 4.0 Credits

This course is a studio-seminar introducing principles and theories of product design, systematic design process, problem-solving, decision making and design as authorship. The course uses design research methods, and topical design issues to explore and experience design thinking.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

PROD 220 Product Design Form Studio 4.0 Credits

This course uses principles of design in the visual organization of physical elements and analysis of form. Building on abstract relationships including additive and subtractive forms as well as gestalt. Students develop a sensitivity to form language, semantics and aesthetics of volumes and synthesize this abstract language into functional objects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PROD 210 [Min Grade: D] and PROD 205 [Min Grade: D] and PROD 235 [Min Grade: D]

PROD 225 Computer Aided Imaging in Product Design 3.0 Credits

This is an applied computer class in which students pursue the development of design projects using current product design photo-realistic rendering software for object design and three-dimensional modeling of products applicable to rapid prototyping.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PROD.

Prerequisites: MEM 201 [Min Grade: D]

PROD 230 Product Design Process Studio 4.0 Credits

In this course students are presented complex design issues in mass-produced objects. Students develop an understanding of the product development process focusing on the designers skills and technical knowledge to formulate appropriate design solutions. Students practice collaboration of ideas with engineers, marketing, users and shareholders.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PROD 210 [Min Grade: D]

PROD 235 Applied Design Visualization 3.0 Credits

This course will provide students with schemas and strategies for using visualization as a thinking tool, as well as persuasive techniques for communicating design intent. It will put into practice the essential techniques that product designers use to think and communicate visually.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

PROD 245 Seminar Professional Landscape 3.0 Credits

In this course students explore current trends in the product design profession today. Students will research and present insights into important design issues, trends, and criticism in contemporary product design. Through extensive readings and discussions, students develop an understanding of the relationship of product design to society and culture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PROD.

Prerequisites: PROD 220 [Min Grade: D]

PROD 255 Applied Materials in Product Design 3.0 Credits

The course emphasizes the practical relationship between product design and the manufacturing industry and the technical considerations that influence the choice of material and process for small batch and mass production.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PROD.

Prerequisites: PROD 235 [Min Grade: D] and ENGR 220 [Min Grade: D]

PROD 340 Interdisciplinary Product Design Studio 4.0 Credits

Through a focused design project, students of various backgrounds and departments collaborate on complex design issues as they seek to create an appropriate and novel solution to the assigned design problem. Bringing both the PROD majors and PROD minors together, students work as teams through the product development cycle.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PROD 230 [Min Grade: D]

PROD 345 Applied Human Centered Design 3.0 Credits

This course explores the physical, psychological, perceptual, and behavioral characteristics of humans. Through a series of lectures and projects, this information is applied to the field of product design to develop safe and effective products.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: PSY 101 [Min Grade: D]

PROD 350 Sponsored Product Design Studio 4.0 Credits

Students undertake projects that are sponsored by industry partners to investigate a broad range of design, marketing and production issues. In this course, students, working in a team environment, research user needs, human factors, aesthetic issues, manufacturing requirements, and market demands to identify user needs and product opportunities.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PROD.

Prerequisites: PROD 340 [Min Grade: D]

PROD 399 Independent Study in Product Design 3.0 Credits

Provides individualized study in product design in a specialized area of study. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Can enroll if major is PROD and classification is Junior or Senior.

Prerequisites: PROD 340 [Min Grade: D]

PROD 425 Applied Design Research 3.0 Credits

This course covers diverse theories and methods for conducting product design research. Emphasis is given to understanding quantitative and qualitative research methods and the role the designer in synthesizing and applying research as a critical part of the design process. This course combines writing and short projects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PROD.

Prerequisites: COM 220 [Min Grade: D] and PROD 345 [Min Grade: D]

PROD 460 Research Synthesis Studio 4.0 Credits

In this first of two senior studios, students apply their skills to initiate research on an opportunity of their selection. Under supervision, students demonstrate control of applied design research and synthesis. This course focuses on the information gathering, study, and analysis that product designers do to inspire and inform themselves.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PROD.

Prerequisites: PROD 340 [Min Grade: D]

PROD 465 Special Topics in Product Design 0.5-4.0 Credits

Provides study in product design on a special topic or on an experimental basis. May be repeated 6 times for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 28 credits

Restrictions: Can enroll if major is PROD.

PROD 470 Create Build Studio 4.0 Credits

In this second of two studios, students apply their skills to develop a solution based on the research conducted in the previous studio. Under supervision, students will demonstrate control of the product design process in the production of a novel and appropriate user-focused solution.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PROD.

Prerequisites: PROD 460 [Min Grade: D]

PROD 475 Professional Practice in Product Design 3.0 Credits

This course provides information about career planning and job seeking, including the development of cover letters, resumes, online and physical portfolios and the interview process. Practicing design professionals serve as guest speakers and conduct mock interviews to address topics relevant to the practice of product design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PROD.

Prerequisites: PROD 460 [Min Grade: D]

PROD 480 Exhibition Studio 4.0 Credits

This final studio is a culmination of the educational experience in the production of a senior exhibition highlighting the students' accomplishments. Under supervision, students work together to demonstrate control of all aspects of the design process and visual communication in the production of a graduation exhibition.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PROD.

Prerequisites: PROD 470 [Min Grade: D]

PROD I199 Independent Study in Product Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PROD I299 Independent Study in Product Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PROD I399 Independent Study in Product Design 3.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 6 credits

PROD I499 Independent Study in Product Design 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PROD T180 Special Topics in Product Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PROD T280 Special Topics in Product Design 4.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PROD T380 Special Topics in Product Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

PROD T480 Special Topics in Product Design 0.5-4.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 24 credits

Restrictions: Can enroll if major is PROD.

Professional Studies

Courses

PRST 211 Computer Applications for Professionals 3.0 Credits

Through lecture-demonstrations, hands-on labs, independent study assignments, and case study analysis, students are challenged to use critical-thinking, data analysis and problem-solving techniques to develop cost-efficient and effective solutions to realistic professional problems using computer-based business application software. Students should possess a basic level of computer proficiency before taking this course.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

PRST 212 Creative Studies in the World Wide Web 3.0 Credits

This course prepares professionals with an understanding of the process of developing creative, functional Web sites. Concentrating on the creative flow of the design process, the course uses Adobe Dreamweaver as the medium for development. Students should possess a basic level of computer proficiency before taking this course.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

PRST 303 Interpersonal Skills for Virtual Teams 3.0 Credits

This course will introduce students to the dynamics of virtual teamwork and will allow students to experience first-hand the opportunities and challenges associated with operating in a virtual environment.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PRST 330 Career & Professional Development 3.0 Credits

This course explores the literature of careers including preparation, organizational entry, orientation, nontraditional careers, and early, mid, and later career issues. The course provides students with opportunities for assessment of interests and capabilities, initiation and implementation of a personal development plan (PDP), and feedback on personal and career development.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PRST 380 Advanced Special Topics in PRST 1.0-4.0 Credit

Covers special topics of interest in Professional Studies. This course may be repeated for credit.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated 11 times for 12 credits

PRST 440 Policy Analysis 3.0 Credits

The course analyzes the entire process of policy agenda-setting, initiation, decision-making, implementation, evaluation and assessment. Students will be equipped with tools to analyze and understand the entire process of policy formation in any public or private enterprise. The skills developed in this course can be used in many professional fields.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

PRST 450 Creative Leadership for Professionals 3.0 Credits

This course presents leadership as a collaborative focus for transforming change. Topics include the leadership crisis, differences between leadership and management, how leaders create and change culture, and ways in which leaders build creative, enduring organizations. In addition, the course is designed to help students develop their own leadership potential.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

PRST 491 [WI] Professional Portfolio I 3.0 Credits

The professional portfolio is a two-course capstone project that provides Professional Studies majors with an opportunity to demonstrate achievement in their major and to engage in self-reflection. Components include reflective essays and carefully chosen samples of academic and relevant professional work completed during the college experience. This is a writing intensive course.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PRST.

Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

Prerequisites: COM 270 [Min Grade: D] and CAT 301 [Min Grade: D] and CRTV 301 [Min Grade: D] and CRTV 302 [Min Grade: D] and CRTV 303 [Min Grade: D] and PRST 440 [Min Grade: D] and PRST 450 [Min Grade: D]

PRST 492 [WI] Professional Portfolio II 3.0 Credits

Requires completion of the professional portfolio begun on PRST 491. Components of Professional Portfolio II include creative expression, future directions, and reflect on the major and the experience of creating a portfolio. This is a writing intensive course.

College/Department: Goodwin College of Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PRST.

Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

Prerequisites: COM 230 [Min Grade: C] and CAT 360 [Min Grade: C] and PRST 491 [Min Grade: C]

PRST I199 Independent Study in PRST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

PRST I299 Independent Study in PRST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

PRST I399 Independent Study in PRST 0.5-6.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated 11 times for 6 credits

PRST I499 Independent Study in PRST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

PRST T180 Special Topics in PRST 1.0-4.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated 11 times for 12 credits

PRST T280 Special Topics in PRST 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

PRST T380 Special Topics in PRST 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

PRST T480 Special Topics in PRST 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated multiple times for credit

Project Management

Courses

PROJ 101 Project Management for All 3.0 Credits

Essentials of managing projects and application of planning, monitoring and controlling techniques throughout the project life-cycle. Students learn the hands-on fundamentals of project management that enhance their ability to support projects in their current or future organizations in any field. Open to students in all disciplines.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PROJ 401 Introduction to Project Management 3.0 Credits

This course examines design, appraisal, planning, and implementation of a project. It provides in-depth analysis of approaches to managing projects in both public and private sectors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D]

PROJ 402 Essentials of Project Planning & Scheduling 3.0 Credits

This course will prepare students to apply relevant concepts in project planning, scheduling and control. Project scheduling methods are covered including: bar (Gantt) charts, network diagrams, critical path method, three-point estimates, critical chain concepts, resource allocation, resource leveling, and earned value management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 401 [Min Grade: C]

PROJ 403 Essentials of Project Leadership and Teamwork 3.0 Credits

This course will examine the organizational environment required for building and maintaining successful project teams. It prepares and provides guidance to project team members and managers to use human resources effectively through good management, wise leadership, and meaningful communications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 401 [Min Grade: C]

PROJ 410 Essentials of Project Quality Management 3.0 Credits

This course will examine basic quality concepts, tools, and techniques, and explore the sub-processes of quality management: quality planning, quality assurance, and quality control as they relate to project management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 401 [Min Grade: C]

PROJ 415 Essentials of Project Estimation & Cost Management 3.0 Credits

This course will provide an overview of basic project financial and economic principles involved in managing projects. It is intended to familiarize project team members and managers with relevant methods, tools, and techniques in project cost estimation, budgeting, cost forecasting, and cost control.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 401 [Min Grade: C]

PROJ 420 Essentials of Project Risk Assessment & Management 3.0 Credits

This course will examine the major risk factors throughout various phases of the project life cycle. It considers the overall project planning process, describes key concepts of project risk planning, highlights relevant tools and techniques for risk identification, explores the use of risk assessment methods, and emphasizes risk and opportunity response strategies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 401 [Min Grade: C]

PROJ 430 Essentials of Managing Multiple Projects 3.0 Credits

This course will examine the management principles, tools, and techniques required to manage multiple projects. Emphasis is placed on functions of the project management office (PMO) and practices of project and program portfolio management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 401 [Min Grade: C]

PROJ 435 Essentials of International Project Management 3.0 Credits

This course will examine the adaptation of project management principles and methods when operating in an international environment. It investigates cultural, legal, ethical, and financial factors in the context of managing international projects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 401 [Min Grade: C]

PROJ I199 Independent Study in PROJ 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PROJ I299 Independent Study in PROJ 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PROJ I399 Independent Study in PROJ 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PROJ I499 Independent Study in PROJ 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PROJ T180 Special Topics in PROJ 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PROJ T280 Special Topics in PROJ 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PROJ T380 Special Topics in PROJ 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PROJ T480 Special Topics in PROJ 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Property Management

Courses

PRMT 110 Introduction to Property Management 3.0 Credits

An introduction to the multidisciplinary world of property management. This course provides an overview of facilities, construction, marketing, leadership, human resource management, finance, law, sociology, and how to interact with a variety of key stakeholders, such as property owners, investors, tenants, and the government.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PRMT 210 Rental Property & Fair Housing Law 3.0 Credits

Rental Property Law including lease essentials, tenancies, implied warranty of habitability, security deposits, tort liability, leasehold improvements, default, eviction, landlord's and tenant's rights, duties and remedies. The course covers the basics of Fair Housing law, the Americans with Disabilities Act, and anti-discrimination law. Current issues and cases are featured.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PRMT 310 Property Financing & Valuation 3.0 Credits

This course provides the financial tools to calculate and analyze the cash flows, tax implications and risks of various projects. Decision-making models, lease valuation, and sensitivity analysis are employed in real situations. Alternative financing choices, cost of funds, tax incentive options, capitalization rates, and current market conditions are considered.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: FIN 301 [Min Grade: D]

PRMT 315 Property Risk Management 3.0 Credits

This course focuses on strategies managers and owners employ to maximize protection of property and tenants and minimize exposure to liability and costs. The course includes emergency management, security, and insurance protection. Agency duties are explored including fair housing and environmental issues. The essentials of various insurance policies are presented.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PRMT 320 Sustainable Property Management 3.0 Credits

An introduction to the study of sustainable housing where energy issues and environmental resource efficiencies are considered in the planning, development, design, renovation, environmental protection, waste minimization, and overall management of a property. The impact of Green Property design on property management especially facility management is featured.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PRMT 325 Human Resource Strategies - Property Management 3.0 Credits

This course focuses on specialized strategies to successfully manage employees and subcontractors involved in property management companies and projects. A variety of areas are covered: recruiting top talent, retention, diversity policies, employee coaching, negotiations, conflict resolution, training and development, outsourcing, and housing law.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PRMT 330 Property Management Technology 3.0 Credits

The focus of this course is the role that technology plays in the management and marketing of property. Important issues discussed include the latest software innovations, auto-pay systems, tenant website systems, software integration, communications strategy, security systems, television and data systems, and incorporating technology into a property's marketing plan.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PRMT 110 [Min Grade: D]

PRMT 333 Social Responsibility and Ethics in Real Estate Management 3.0 Credits

This course explores the application of ethical decision-making and social responsibility concepts, and the resulting challenges that professionals are subject to, within real estate management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: PRMT 110 [Min Grade: C] and PRMT 335 [Min Grade: C] and PRMT 360 [Min Grade: C]

PRMT 335 Marketing and Operations: Multifamily Properties 3.0 Credits

This course covers the marketing and operations of multifamily rental properties to acquire new tenants and retain existing ones. Market analysis is used as a foundation to create a marketing plan. Buyer motivation, customer service, and tenant retention strategies are discussed. Students have the opportunity to employ the successful techniques learned in the class through experiential learning opportunities. Best practice marketing campaigns and strategies and presentations by industry leaders are featured.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PRMT 110 [Min Grade: C]

PRMT 345 Managing & Marketing Housing for an Aging Population 3.0 Credits

This course covers the management and marketing of housing for later life starting with a market analysis. Students discover challenges to be overcome and opportunities available in this unique segment of the housing market. The course covers successful management and marketing strategies involving active adult communities and senior living facilities.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PRMT 110 [Min Grade: D]

PRMT 350 Affordable Housing Management 3.0 Credits

An introduction to the challenges of managing affordable housing. Managing affordable housing requires the interaction of important players: legislators, government policymakers, citizen advocacy groups, and citizens/tenants. This course features presentations from industry leaders, visits to affordable developments, and completion of an analysis paper covering the development, marketing and management process.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PRMT 110 [Min Grade: D]

PRMT 355 Student Housing Management 3.0 Credits

This course focuses on the effective management of student housing. Successful student housing managers need to have specialized education in a variety of areas including federal laws, emergency management requirements, security and communications planning, marketing to the student population, town-gown relations and awareness of current cases and issues.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PRMT 110 [Min Grade: D]

PRMT 356 Military Housing Management 3.0 Credits

This course focuses on the effective management of military housing. The successful management of military housing requires specialized study in a variety of areas including federal laws, emergency management requirements, security and communications planning, military regulations, Department of Defense initiatives and regulations, and awareness of current cases and issues.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PRMT 110 [Min Grade: D]

PRMT 360 Marketing and Operations: Commercial Properties 3.0 Credits

An introduction to managing and marketing commercial property using office buildings, warehouses, medical buildings, factories and industrial properties as the basis for discussion and analysis. Issues include maintenance, marketing, location analysis, lease provisions, risk management, leasehold improvements, and government and tax incentive programs. Students discuss best practice examples and analyze and visit properties to meet industry leaders.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PRMT 110 [Min Grade: D]

PRMT 363 Commercial Property Financial Reports 3.0 Credits

Covers the administration, preparation, and interpretation of operating and capital budgets, profit and loss statements, balance sheets, arrears reports, vacancy reports, and collection reports. Topics include tenant charges for operating costs, calculating a lease commission, and understanding components of net operating income and cash flow.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: FIN 301 [Min Grade: D] and PRMT 110 [Min Grade: D]

PRMT 491 Senior Project in Property Management 3.0 Credits

In this capstone course students participate in discussions and conduct research of key issues facing property managers. A major part of the class is a community analysis project using guidelines provided by the National Apartment Association and a professional property manager as a mentor through the process.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PRMT and classification is Senior.

PRMT I199 Independent Study in PRMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PRMT I299 Independent Study in PRMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PRMT I399 Independent Study in PRMT 1.0-6.0 Credit

Provides individual study or research in Property Management under faculty supervision. This course may be repeated for credit.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is PRMT.

PRMT I499 Independent Study in PRMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PRMT T180 Special Topics in PRMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PRMT T280 Special Topics in PRMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PRMT T380 Special Topics in PRMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

PRMT T480 Special Topics in PRMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Psychology

Courses

PSY 101 General Psychology I 3.0 Credits

Reviews the fundamental principles, concepts, and methods of psychology, with emphasis on the concepts of motivation, learning, and perception, and their psychological foundations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 111 Pre-Professional General Psychology I 3.0 Credits

Preprofessional General Psychology is designed for majors and for other preprofessionals who are interested in Psychology as a minor. A scientific approach to the study of psychology is taken. An overview of the fundamental principles of psychology across a variety of sub-disciplines is offered. Part one is part of a two-part sequence and focuses on the experimental bases of psychology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 112 Pre-Professional General Psychology II 3.0 Credits

Preprofessional General Psychology is designed for preprofessionals who are interested in psychology or related fields, especially designed for majors, and may be taken by minors of psychology. It follows Preprofessional General Psychology I and includes a laboratory component to enhance the scientific approach to psychology. Part two focuses on the application of scientific principles of psychology to human behavior.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 111 [Min Grade: D]

PSY 120 Developmental Psychology 3.0 Credits

Examines the nature of developmental processes-perceptual, intellectual, emotional, and social-and the factors influencing and limiting them.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 140 Approaches to Personality 3.0 Credits

Discusses the major concepts of Freud, neo-Freudians, behaviorists, humanists, trait theorists, and others. Emphasizes understanding of self and others for psychotherapy and research. Fall.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 150 Introduction to Social Psychology 3.0 Credits

Examines theoretical and research findings in personal experiences of interacting with others in family and group settings, and with society in general.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 210 Evolutionary Psychology 3.0 Credits

Covers principles of genetics and evolution as applied to the behavior of the important types of living beings, from plants and unicellular organisms to the primates (including humans).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 212 Physiological Psychology 3.0 Credits

Reviews neural foundations of behavior, including the study of nerve activity and brain function.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 213 Sensation and Perception 3.0 Credits

Examines the structure and function of the senses, including vision, hearing, touch, temperature, pain, olfaction, gustation, taste, and kinesthesia. Considers interaction of the senses and their role in determining behavior.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 222 Psychological Problems of Modern Youth 3.0 Credits

Examines psychological problem areas frequently encountered by young adults in today's society, including identity crisis, family conflict, the new sexuality, drugs, and the search for intimacy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 225 Child Psychopathology 3.0 Credits

This class will focus on the symptoms, etiology, and primary methods of treating common psychological disorders and problems of children and adolescence. The course will focus on diagnosis; assessment; specific therapeutic treatments; ethical issues; and gender, cultural, and developmental differences in symptoms, diagnosis, and response to treatment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 240 [WI] Abnormal Psychology 3.0 Credits

Offers advanced course in the general study of personality. Focuses on the way our society defines, explains, and handles behavior perceived as deviant and "normal." Requires field trip. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 242 Psychology of Disability 3.0 Credits

Psychological and social consequences of physical disability for the disabled person and his or her family and social network. Emphasis on disabilities of the sensory and nervous systems. Practicum component.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 244 Culture and Personality 3.0 Credits

This course focuses on comparing specific human behaviors (e.g. aggression, health), roles (e.g. gender), and psychological processes (e.g. cognition, emotion, perception) across cultures in order to ascertain similarities and differences among cultures around the globe. This course has an interdisciplinary focus.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 245 [WI] Sports Psychology 3.0 Credits

Covers sports psychology, which is the science of understanding, modifying, and predicting athletic performance or sports participation. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 250 [WI] Industrial Psychology 3.0 Credits

Covers theories, experiments, and problem-solving efforts of behavioral scientists in industrial settings for students interested in interpersonal relations, management, leadership, personnel, and applied psychology. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 252 Death and Dying 3.0 Credits

Explores death and dying from various perspectives, including the philosophical, psychological, sociocultural, and personal.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 254 Psychology of Sexual Behavior 3.0 Credits

Examines psychology of the individual coping with the sexual aspects of life.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 264 Computer-Assisted Data Analysis I 3.0 Credits

Covers data analysis using a mainframe statistical package covering basic elementary techniques of data reduction, manipulation, and statistical analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 265 Computer-Assisted Data Analysis II 3.0 Credits

Covers more advanced statistical techniques, such as regression, correlation, analysis of variance, and multiple regression.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]) and PSY 264 [Min Grade: D]

PSY 280 Psychological Research I 3.0 Credits

This course provides an introduction to the issues, techniques and methodologies associated with conducting psychological research. Topics to be covered include the logic of research in psychology, important issues in deciding how to study various psychological phenomena, ethical issues and guidelines in conducting psychological research, design and analysis of psychological research, assessing threats to internal and external validity, methods used in the interpretation of psychological data, and writing research reports in the style used by research psychologists.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 264 [Min Grade: D] and PSY 265 [Min Grade: D]

PSY 285 Writing in Psychology 3.0 Credits

This course will build on students existing knowledge of psychology while helping them better evaluate and create various types of written documents commonly used to communicate information in the field of psychology (e.g., research articles, literature reviews, position papers). Emphasis is placed on a skills-based approach to acquiring knowledge of how to communicate information and applying that knowledge in various contexts.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 101 [Min Grade: C] or PSY 112 [Min Grade: C]

PSY 290 History and Systems of Psychology 3.0 Credits

Examines the historical foundations of modern psychology, with emphasis on the growth, contributions, and decline of major systems and theories.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 305 Science and Pseudoscience in Psychology 3.0 Credits

Science and Pseudoscience in Psychology. Fosters critical thinking skills regarding the evaluation of paranormal, unusual, or extraordinary phenomena (e.g. ESP, recovered memories of abuse). Examines ways that a human cognition leads to strange beliefs despite contradictory data. The distinctions between science and pseudoscience are highlighted.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 310 Drugs & Human Behavior 3.0 Credits

Covers the fundamentals of drug effects on the nervous system and behavior, with emphasis on abused substances and drugs used in the treatment of behavioral disorders.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D])

PSY 312 Cognitive Neuroscience 3.0 Credits

Cognitive neuroscience is the bridge between cognitive psychology and neuroscience: how the "hardware" of our brains produces the "software" of thought. This course will introduce the neural basis of core cognitive processes such as perception, attention, memory, language, and executive functions. From movies to eye-catching headlines, cognitive neuroscience is all around us. The goal of this course is to immerse students in the research behind the splashy stories, so that they can become a better consumer (and perhaps creator) of the growing knowledge of the human brain.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 320 [WI] Educational Psychology 3.0 Credits

Covers role and relevance of psychology in the teacher-learner relationship, with independent application of research techniques in an individual field study. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 322 Advanced Developmental Psychology 3.0 Credits

Provides in-depth exploration of child and adolescent physical, cognitive/intellectual, and psychosocial development. Students have the opportunity to observe children and their caregivers through videotaped vignettes created to bring developmental principles to life.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: (PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]) and PSY 120 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 325 Psychology of Learning 3.0 Credits

Introduces basic principles of the science of learning. Emphasizes I. P. Pavlov's classical conditioning, B. F. Skinner's operant conditioning, and applications to counseling and therapy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 330 Cognitive Psychology 3.0 Credits

Covers human thought processes, including perception and pattern recognition, learning and memory, language, problem-solving, and decision-making.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 332 Human Factors and Cognitive Engineering 3.0 Credits

Discusses ways of designing machines, operations, and work environments so that they match human capacities and limitations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 335 Pediatric Psychology 3.0 Credits

The focus of this seminar is the examination of psychosocial and medical issues during the period of infancy, childhood, and adolescence including relevant biological, cognitive, social, emotional, and cultural aspects.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 336 Psychology of Language 3.0 Credits

This course is a survey of the theories and methodologies in the psychology of language. It covers topics such as language acquisition, comprehension, and production, as well as the relation between language and thought and the question of the uniqueness of language in the animal kingdom.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 337 Human-Computer Interaction 3.0 Credits

Applies cognitive and experimental psychology to understanding how to improve the design and usability of interactive computing systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 342 Counseling Psychology 3.0 Credits

Covers theory and practice of establishing helping relationships. Includes role-playing, analyzing, and observations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 345 Narrative Psychology 3.0 Credits

This course explores the historic contributions to the narrative tradition in psychology and its current research and theoretical concerns. We will discuss contributions to the construction of meaning from bioethics and medical humanities, qualitative research, the neuroscience of memory, literary theory, and social, cognitive, and developmental psychology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 350 Advanced Social Psychology 3.0 Credits

Provides in-depth exploration of topics in the social influence process, including current research in social cognition, attitude change, and group dynamics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 150 [Min Grade: D]

PSY 352 Environmental Psychology 3.0 Credits

Multidisciplinary study of the interrelationship between human behavior and the natural, built, and social environments.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 355 Health Psychology 3.0 Credits

Health Psychology is designed to: concentrate on the application of psychological theories and variables to compromising and health enhancing behaviors; demonstrate the psychological management of chronic illness; and the role of psychologists written medical and health settings. For example, it focuses on the effects of stress on the body, the mind-body connection, and how psychology can affect physical well-being.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 356 Women's Health Psychology 3.0 Credits

Explores the major psychological and behavioral factors influencing health and illness among women. Topics, such as lifecycle challenges (PMS and reproductive health), chronic diseases, and new directions in health promotion are addressed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 357 The Psychology of Eating Disorders and Obesity 3.0 Credits

Covers determinants of eating behavior and body weight as well as psychological treatments for them. Factors influencing eating regulation will be reviewed. The causes, consequences, and treatments for anorexia and bulimia nervosa and binge eating disorder will be reviewed. Finally, the courses will review the causes, consequences and treatments for obesity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 360 [WI] Experimental Psychology 3.0 Credits

Provides a study of the basic scientific fundamentals of the experiment with emphasis upon the critical thinking this method represents in establishing psychological principles. Contrasts are made to such modern pseudosciences as parapsychology. A final experiment is required of all students in this course. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 265 [Min Grade: D]

PSY 365 Computer-Assisted Data Analysis II 3.0 Credits

Covers more advanced statistical techniques, such as regression, correlation, analysis of variance, and multiple regression.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 364 [Min Grade: D] and (PSY 112 [Min Grade: D] or PSY 101 [Min Grade: D])

PSY 368 Critical Psychology 3.0 Credits

In this course we examine underlying values and beliefs of the field and place them in the context such as inequity, social justice, power relations, and what type of knowledge counts, to arrive at a more critical understanding of the practices and theories in psychology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 370 Forensic Psychology 3.0 Credits

This course describes the psychological processes involved in the legal system. The material delves into the growing field of psychological study and application in the legal field.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 371 Law and Psychology 3.0 Credits

Law and Psychology will provide basic and more specific information regarding this area of specialization in psychology. It will include a definition, description of the scope of the field, overview of important questions, relevant research approaches, and applications. Important question/topics will include criminal and juvenile offending; the psychology of police; the process between arrest, trial, and incarceration; eyewitness identification; confessions; psychological evaluations in criminal and civil law; jury selection and decision-making; the psychology of victims of crime and violence; punishment and sentencing; and juvenile and adult corrections.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 101 [Min Grade: D] or PSY 111 [Min Grade: D]

PSY 380 Psychological Testing and Assessment 3.0 Credits

Enables the student to gain an understanding of the proper uses and applications of psychological evaluation by focusing on psychometric properties and reviewing selected tests and evaluation procedures commonly employed by psychologists in research and clinical practice.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 280 [Min Grade: D] and PSY 360 [Min Grade: D]

PSY 410 Neuropsychology 3.0 Credits

Provides a study of the relationship between human brain function and behavior. Examines basic anatomy of the brain and focuses on principles of human neuropsychological functioning. Studies cortical and "higher cognitive functioning" in depth through a focus on both normal and brain-injured individuals.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 440 Advanced Personality Seminar 3.0 Credits

Examines historical and contemporary trends and methods in personality research and assessment. Students have an opportunity to evaluate strengths and limitations of these trends and methods, as well as develop their own ideas.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 140 [Min Grade: D] and (PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D])

PSY 442 Theories & Practices in Clinical Psychology 3.0 Credits

Provides an overview of clinical psychology theory and practice including professional issues, assessment strategies, and psychotherapy theories. Students have the opportunity to develop their own philosophy of clinical psychology and to apply theories to case examples.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 445 Positive Psychology 3.0 Credits

The course provides an overview of the emerging subfield of psychology known as "positive psychology". This area focuses on investigating and understanding positive aspects of well-being and health, including various human strengths, such as resilience, optimism, spirituality, hope, and problem-solving.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: PSY 101 [Min Grade: D] or PSY 112 [Min Grade: D]

PSY 450 Autism Spectrum Disorders 3.0 Credits

This course introduces students to research and issues involving individuals with autism spectrum disorders. Topics include societal perceptions of the disorder, epidemiology, advocacy, assessment and evaluation, adult issues, and legal issues. Course includes an overview of common interventions. Students plan and carry out interviews with individuals with autism as part of the final project.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: PSY 120 [Min Grade: C]

PSY 460 Advanced Experimental Psychology: Laboratory Applications and Techniques 3.0 Credits

Introduction to variety of laboratory techniques; survey of how basic psychological theories and knowledge influence actual practice in the psychological laboratory. Laboratory exercises will focus on development of the research skills necessary for independent research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 477 Senior Seminar I 3.0 Credits

In-depth exploration of selected topics. Projects selected by students in consultation with professor.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 478 Senior Seminar II 3.0 Credits

Continuation of PSYCH 477.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

PSY 490 [WI] Psychology Senior Thesis I 4.0 Credits

An in-depth exploration of selected topics. Projects are selected by students in consultation with a faculty member. The students conduct these projects over the course of three terms in which they take PSY 490, 491, and 492. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY and classification is Senior.

PSY 491 [WI] Psychology Senior Thesis II 4.0 Credits

An in-depth exploration of selected topics. Projects are selected by students in consultation with a faculty member. The students conduct these projects over the course of three terms in which they take PSY 490, 491, and 492. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY and classification is Senior.

Prerequisites: PSY 490 [Min Grade: D]

PSY 492 [WI] Psychology Senior Thesis III 4.0 Credits

An in-depth exploration of selected topics. Projects are selected by students in consultation with a faculty member. The students conduct these projects over the course of three terms in which they take PSY 490, 491, and 492. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY and classification is Senior.

Prerequisites: PSY 491 [Min Grade: D]

PSY I199 Independent Study in PSY 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSY I299 Independent Study in PSY 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSY I399 Independent Study in PSY 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSY I499 Independent Study in PSY 1.0-3.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSY T180 Special Topics in Psychology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSY T280 Special Topics in Psychology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSY T380 Special Topics in Psychology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PSY T480 Special Topics in Psychology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Public Health

Courses

PBHL 101 Public Health 101 3.0 Credits

Introduction to Public Health is a broad overview class designed to give an introduction to the core tenets of Public Health. Basic concepts covered in the class are the basic definitions and concepts related to public health. Specific areas that will be further explored in the class include, what it means to be healthy, what is public health, what are social determinants of health, what is disease prevention and health promotion and what are health inequalities among others.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

PBHL 301 Epidemiology in Public Health 3.0 Credits

This is an introductory course designed to teach undergraduate students the basic principles and concepts of epidemiology. The course highlights the approaches used in the field of epidemiology to study disease in populations, incorporating concepts of disease causation and control.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 302 Introduction to the History of Public Health 3.0 Credits

This course considers the origins of contemporary public health by examining major currents in the history of public health in the United States from Colonial times to the present, with an emphasis on the 20th century.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 303 Overview of Issues in Global Health 3.0 Credits

This introductory course will cover the major issues and considerations involved in global health. It is a survey course that is designed to familiarize students with the major topics in the global health. The goal of the course is to provide students with an overview of concepts such as the determinants of health, the measurements of health status and global burden of the disease.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 304 Introduction to Health & Human Rights 3.0 Credits

This introductory course highlights the intrinsic link between one's health and his/her fundamental human rights. When such rights (access to medical care, housing, food, standard of living) are violated, this can lead to adverse health outcomes.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 305 Women and Children: Health & Society 3.0 Credits

This course is designed to give students a broad overview of pertinent issues surrounding the health and well being of mothers and children. The course emphasizes the inter-relationship among women's health, reproductive health and child health.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

PBHL 306 Introduction to Community Health 3.0 Credits

This three credit course will provide the foundation for studying the root causes affecting community health in the United States, as well as broad efforts to improve world health. This course is designed to enhance oral and written communications on public health issues, advocacy, and public policy, while enhancing content, process skills, and other essential competencies.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: D]

PBHL 307 Injury Prevention and Control 3.0 Credits

This course examines the history of injury as one of the core public health problems in the United States. The subsequent costs and burdens to the healthcare system are explored using current information from the academic literature, local and national interest groups, and government agencies. Policy and behavioral interventions are addressed. Where possible, extensions to international settings are made.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

PBHL 308 The U.S. Public Health System 3.0 Credits

This course will provide students with an understanding of the organizational components of the public health system in the United States. Among the topics covered are the roles of different levels of government in the financing, delivery, and regulation of public health services and the complementary private, non-profit components of the public health system. The course addresses several current, critical public health policy issues and how different political and economic interests and actors interact in shaping public policy on these issues.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 309 Public Health Ethics 3.0 Credits

This course will explore the emergence of the public health field, its philosophical, historical, and political development, its relationship to the field of human rights and its future. Emphasis will be placed on developing a mastery of the current literature on the subject and on formulating novel approaches in public health ethics. This is a reading and writing intensive course, and students should be prepared to engage in serious dialogue each week in class.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 310 Burden of Disease 3.0 Credits

This course will cover selected topics of the burden of disease with critical review of the current public health literature. Students will have the opportunity to learn the basic concepts and methods of exploring risk factors and assessing the burden of disease at regional, national and global levels, through class lectures, group exercise and individual projects.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

PBHL 311 Public Health Biology 3.0 Credits

This course is designed to introduce students to the biologic basics of the causes, natural history, and prevention of diseases of public health importance. An integrated perspective will be used to demonstrate the connection between exposures and cellular effects, disease processes in individuals, and population impacts. Coverage will include infectious disease transmission and prevention; cancer biology regarding etiology, prevention, and treatment; nutritional influences in obesity, diabetes and heart disease.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: BIO 107 [Min Grade: C] and BIO 108 [Min Grade: C] and PBHL 101 [Min Grade: C]

PBHL 312 Public Health Data Analysis 3.0 Credits

This course will introduce students to the basic concepts and methods of biostatistics as they relate to applications in public health practice and research.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 313 The Social Determinants of Health and Well-Being 3.0 Credits

The goal of this course is to introduce students to the patterning of health and well-being among social groups within and between societies, and how a social science approach can improve our understanding of health and illness at a population level, and identify possible public health strategies for reducing health disparities.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 314 Environmental and Occupational Health 3.0 Credits

The goal of this course is to provide students with basic knowledge of EOH as it applies to the practice of public health from individual, community and political perspectives. Students will also gain skills needed to understand and conduct scientific research related to EOH. Students will be expected to critically analyze EOH issues and explore appropriate responses.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 315 Public Health Leadership 3.0 Credits

This course provides students with an introduction to the environment and organizations in public health leadership. This course introduces leadership skills to lead changes in public health organizations. The cases and lectures throughout the course have been designed to develop leadership approaches for public health agencies.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 316 Drugs, Society, and Public Health 3.0 Credits

This course will examine problems associated with drug use through the prism of public health. The first half of the course will be devoted to understanding biological, psychological, social, and cultural aspects of key licit and illicit substances. The second half will focus on relevant public health aspects of drug use, including preventions, intervention, treatment, and policy. Intersecting issues include homelessness, HIV/AIDS, mental health & violence. Students will be exposed to key books and peer-reviewed articles that address these issues from a range of theoretical & analytical approaches.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

PBHL 317 The World's Water 3.0 Credits

This course will discuss the approaches that may be taken to improve access to water and sanitation and improve public health. The course will also cover water remediation and safeguard techniques for the improvement of water quality, as well as gender and development perspectives.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 318 Violence and Trauma in Public Health 3.0 Credits

This course will focus on the public health policy and practice aspects of trauma violence and adversity. The course will begin by laying a foundation of trauma theory and then will examine the impact of emerging knowledge on individuals, communities and systems. The course will examine trauma informed models, which have been applied to individuals, communities and systems and will analyze the policy and practice implications of these models as well as the translation from research to practice.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

PBHL 320 Exploring the HIV/AIDS Pandemic 3.0 Credits

This course examines the natural history, diagnosis and surveillance of HIV/AIDS. While this is an epidemiology based course, the students will also learn the basic virology of HIV, including the life cycle and genetic diversity of the virus in order to more fully describe the epidemiology of the pandemic. In addition to learning about the biology and epidemiology of the pandemic which can limit its control. Students will be responsible for reporting on a country of their choice, describing the history, epidemiology, and methods of control utilized by that country.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: BIO 107 [Min Grade: C-] and PBHL 302 [Min Grade: C-] and PBHL 311 [Min Grade: C-]

PBHL 321 Disease Outbreak Investigations 3.0 Credits

The emergence of new pathogens and drug resistance, as well as increased transmission opportunities caused by globalization has led to a rising prevalence of new infectious diseases as well as reemergence of older diseases. This course will focus on the surveillance, identification, control, and prevention of selected infectious diseases of Public Health importance both globally and within the U.S. Specific areas that will be addressed include the causative agents, the routes of transmission, the host responses, environmental factors, unique risk factors, outbreak investigations, surveillance and strategies for control and prevention. We will incorporate the history of communicable disease control efforts where relevant and discuss the role of increased globalization in the spread of infectious diseases.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: BIO 107 [Min Grade: C-] and PBHL 301 [Min Grade: C-] and PBHL 311 [Min Grade: C-]

PBHL 332 Autism as a Public Health Challenge 3.0 Credits

Demonstrates how to apply public health concepts to an important societal challenge that is quite distinct from those more commonly thought of as public health problems (like infectious diseases, chronic diseases, and injuries). Students will be introduced to autism spectrum disorders from a variety of perspectives and will gain skill and experience distilling and communicating information relevant to understanding and explaining the public health challenges related to autism spectrum disorders and the ways we are working toward solutions.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 301 [Min Grade: C] and PBHL 302 [Min Grade: C]

PBHL 333 Health Inequality 3.0 Credits

This course addresses questions related to health inequalities—the systematic and avoidable differences in the health of social groups (e.g., racial, ethnic, gender, socioeconomic, sexual orientation) in a society. This multidisciplinary course integrates knowledge from the fields of public health, biology, medicine, sociology, psychology, political science, and history to provide students with a cohesive understanding of the magnitude of health inequalities in societies, the processes through which they are produced, the methods.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 101 [Min Grade: C]

PBHL 497 Capstone Experience I 3.0 Credits

The senior capstone is a progressive 3-quarter experience with cross cutting competencies for graduating public health major seniors to provide them with an individualized learning experience of breadth and depth. Students will work with faculty members to design a project that will fulfill both his/her public health interests as well as the broader capstone objectives. Students will participate in in-class learning with other public health majors to acquire foundational concepts, which they can apply to their individualized project.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: PBHL 301 [Min Grade: C-] and PBHL 302 [Min Grade: C-] and PBHL 303 [Min Grade: C-] and PBHL 304 [Min Grade: C-] and PBHL 306 [Min Grade: C-] and PBHL 308 [Min Grade: C-] and PBHL 309 [Min Grade: C-] and PBHL 311 [Min Grade: C-] and PBHL 312 [Min Grade: C-] and PBHL 313 [Min Grade: C-] and PBHL 314 [Min Grade: C-] and PBHL 315 [Min Grade: C-] and PBHL 317 [Min Grade: C-]

PBHL 498 Capstone Experience II 3.0 Credits

The senior capstone is a progressive 3-quarter experience with cross cutting competencies for graduating public health major seniors to provide them with an individualized learning experience of breadth and depth. Students will work with faculty members to design a project that will fulfill both his/her public health interests as well as the broader capstone objectives. Students will participate in in-class learning with other public health majors to acquire foundational concepts, which they can apply to their individualized project.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: PBHL 301 [Min Grade: C-] and PBHL 302 [Min Grade: C-] and PBHL 303 [Min Grade: C-] and PBHL 304 [Min Grade: C-] and PBHL 306 [Min Grade: C-] and PBHL 308 [Min Grade: C-] and PBHL 309 [Min Grade: C-] and PBHL 311 [Min Grade: C-] and PBHL 312 [Min Grade: C-] and PBHL 313 [Min Grade: C-] and PBHL 314 [Min Grade: C-] and PBHL 315 [Min Grade: C-] and PBHL 317 [Min Grade: C-]

PBHL 499 Capstone Experience III 3.0 Credits

The senior capstone is a progressive 3-quarter experience with cross cutting competencies for graduating public health major seniors to provide them with an individualized learning experience of breadth and depth. Students will work with faculty members to design a project that will fulfill both his/her public health interests as well as the broader capstone objectives. Students will participate in in-class learning with other public health majors to acquire foundational concepts, which they can apply to their individualized project.

College/Department: School of Public Health

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: PBHL 301 [Min Grade: C-] and PBHL 302 [Min Grade: C-] and PBHL 303 [Min Grade: C-] and PBHL 304 [Min Grade: C-] and PBHL 306 [Min Grade: C-] and PBHL 308 [Min Grade: C-] and PBHL 309 [Min Grade: C-] and PBHL 311 [Min Grade: C-] and PBHL 312 [Min Grade: C-] and PBHL 313 [Min Grade: C-] and PBHL 314 [Min Grade: C-] and PBHL 315 [Min Grade: C-] and PBHL 317 [Min Grade: C-]

PBHL I199 Independent Study in PBHL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL I299 Independent Study PBHL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL I399 Independent Study in PBHL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL I499 Independent Study in PBHL 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL T180 Special Topics in PBHL 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL T280 Special Topics in PBHL 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL T380 Special Topics in PBHL 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL T480 Special Topics in PBHL 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Public Health

Repeat Status: Can be repeated multiple times for credit

Radiologic Sciences

Courses

Real Estate

Courses

REAL 310 Introduction to Real Estate 3.0 Credits

This course provides the foundation for understanding the Real Estate business with a survey of development, land use, planning, property rights, leases, deeds, contracts, mortgages, time value of money and insurance.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: ACCT 115 [Min Grade: D] or ACCT 110 [Min Grade: D]

REAL 320 Real Estate Law - Principle & Practice 3.0 Credits

This course will explore the unique legal requirements of the real estate business including property rights, involuntary transfers, easements, private restrictions, public restrictions, zoning and land development laws.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

REAL 330 Facilities & Property Management 3.0 Credits

This course will explore fundamental issues, principles, and practices of facilities and property management to develop and maintain built environments that are productive, safe, comfortable, sustainable, and maximize the return on fixed assets and resources.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

REAL 470 Real Estate Investments - Market & Feasibility Analysis 3.0 Credits

This course will introduce and explore the market analysis and feasibility methods in framing and supporting investment decision making for real estate projects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

REAL 471 Advanced Real Estate in Investment & Analysis 3.0 Credits

This course will explore the market analysis and feasibility methods in framing and supporting investment decision making for real estate projects. Detailed market analysis strategies will be employed and case studies will be analyzed to deepen the students's knowledge and judgement for investment decision making.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: REAL 470 [Min Grade: D]

REAL 472 Advanced Market Research & Analysis 3.0 Credits

This course will explore the market research methods used to understand and dissect geographical and demographical real estate markets. Detailed market research strategies will be employed and case studies will be analyzed to deepen the student's knowledge of market research techniques and resources.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: REAL 470 [Min Grade: D]

REAL 473 Sales & Marketing of Real Estate 3.0 Credits

This course will explore the strategies for successful marketing of real property bases on market research and development strategies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

REAL 474 Real Estate Economics in Urban Markets 3.0 Credits

This course will offer a unique and detailed perspective on urban real estate development and the special sub-markets in which they exist. Attention will be given to the characteristics of the particular economic factors relevant in urban real estate markets.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

REAL 475 Real Estate Finance 3.0 Credits

This course will focus on the options and implications of different financing methods with the unique trade offs associated with each considered.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

REAL 476 Real Estate Valuation & Analysis 3.0 Credits

This course will introduce the concepts of real estate valuation, appraisals, and the relationship of these to financing and cash requirements.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

REAL I199 Independent Study in Real 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

REAL I299 Independent Study in Real 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

REAL I399 Independent Study in Real 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

REAL I499 Independent Study in Real 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

REAL T180 Special Topics in REAL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

REAL T280 Special Topics in REAL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

REAL T380 Special Topics in REAL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

REAL T480 Special Topics in REAL 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Retail Leadership

Courses

RETL 315 Power of Retail Brands 3.0 Credits

This course provides an in-depth analysis of theoretical and applied branding techniques. Retail marketing, merchandising, and in-store brand representatives will be analyzed to recognize the detailing necessary to create a successful retail brand. Students will read branding studies to comprehend why the phenomena of branding has encompassed our consumer society.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

RETL 325 Applied In-Store Visual Strategies 3.0 Credits

Provides students with an understanding of how retailers use visual display to gain retail market share. Students will examine various types of visual display and how this impacts the retail environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

RETL 400 Retail Leadership Capstone 3.0 Credits

This course will provide students practical experience leading all aspects of a retail establishment. Topics covered include customer service, human resources, planogram/floorset, visual merchandising/display, sales and completing the sale, merchandising the store, quality of merchandise/product, leadership responsibilities, and future goals.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSMR 231 [Min Grade: C] and DSMR 232 [Min Grade: C]

RETL I199 Independent Study in RETL 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

RETL I299 Independent Study in RETL 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

RETL I399 Independent Study in RETL 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

RETL I499 Independent Study in RETL 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

RETL T180 Special Topics in Retail Leadership 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

RETL T280 Special Topics in Retail Leadership 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

RETL T380 Special Topics in Retail Leadership 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

RETL T480 Special Topics in Retail Leadership 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Russian

Courses

RUSS 101 Russian I 4.0 Credits

Introductory Russian. Includes listening, speaking, and reading, with individual audiolingual practice. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

RUSS 102 Russian II 4.0 Credits

Continues RUSS 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: RUSS 101 [Min Grade: C]

RUSS 103 Russian III 4.0 Credits

Continues RUSS 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: RUSS 102 [Min Grade: C]

RUSS 201 Russian IV 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on Russian 103.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: RUSS 103 [Min Grade: C]

RUSS 202 Russian V 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on Russian 201.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: RUSS 201 [Min Grade: C]

RUSS 203 Russian VI 3.0 Credits

This course includes listening, speaking, reading, and writing practice, with a focus on cultural competency and conversational skills. Builds on Russian 202.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: RUSS 202 [Min Grade: C]

RUSS 301 Russian VII 3.0 Credits

Advanced Russian. Provides reading, writing, and extensive conversational practice. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: RUSS 203 [Min Grade: C]

RUSS 302 Russian VIII 3.0 Credits

Provides advanced practice in translation, comprehension, and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: RUSS 301 [Min Grade: C]

RUSS 303 Russian IX 3.0 Credits

Continues RUSS 302. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: RUSS 302 [Min Grade: C]

RUSS 411 Introduction to Russian Stylistics 3.0 Credits

Fourth year of Russian. Provides advanced practice in translation, comprehension, and written and oral communication. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: RUSS 303 [Min Grade: C]

RUSS 431 Introduction to Russian Literature 3.0 Credits

Provides intensive reading, writing, and conversational practice in Russian, based on selected texts in Russian literature. Offered twice each year.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: RUSS 303 [Min Grade: C]

RUSS 451 Introduction to Business & Professional Russian 3.0 Credits

Fourth year of Russian. Provides intensive oral practice and written work in business, professional, and commercial Russian. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: RUSS 303 [Min Grade: C]

RUSS 480 Russian Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

RUSS I199 Independent Study in RUSS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

RUSS I299 Independent Study in RUSS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

RUSS I399 Independent Study in RUSS 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

RUSS I499 Independent Study in RUSS 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

RUSS T180 Special Topics in Russian 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

RUSS T280 Special Topics in Russian 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

RUSS T380 Special Topics in Russian 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

RUSS T480 Special Topics in Russian 0.5-12.0 Credits

Recommended for Russian minors and for students with proficiency status.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

STEM Teacher Education

Courses

ESTM 201 DragonsTeach: Step 1 1.5 Credit

This course is an introduction to mathematics, computer science, and science teaching as a career. Discussions include standards-based lesson design and various teaching and behavior management strategies. Fieldwork consists of planning and teaching four inquiry-based lessons to students in grades three to six in local elementary schools. At least 10 hours of fieldwork in local schools is required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

ESTM 210 DragonsTeach: Step 2 1.5 Credit

Topics include routes to teacher certification in mathematics, computer science, and science teaching; various teaching methods that are designed to meet instructional goals; and learner outcomes. Students develop and teach three inquiry-based lessons in their field in a middle school, and participate in peer coaching. At least 20 hours of fieldwork in local schools is required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

ESTM 301 Knowing and Learning in Mathematics and Science 3.0 Credits

The course focuses on what it means to know and learn mathematics and science, how this knowledge changes over time and how it develops in learners. Topics include foundations of STEM education; problem solving in mathematics and science education utilizing technology; principles of expertise and novice understanding of subject matter. The course also serves to set the stage for field experiences in ESTM 302 and will involve fieldwork in local schools.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: ESTM 210 [Min Grade: B] (Can be taken

Concurrently)ESTM 201 [Min Grade: B]

ESTM 302 Classroom Interactions 3.0 Credits

Classroom Interactions builds on previous DragonsTeach courses and continues the process of preparing students to teach mathematics and science in upper elementary and secondary settings by providing opportunities to see how theories explored in Knowing and Learning play out in instructional settings. Students design and implement instructional activities informed by their own understanding of what it means to know and learn mathematics and science, and then evaluate the outcomes of those activities on the basis of student artifacts (i.e., what students say, do, or create). The course will involve fieldwork in local schools.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: ESTM 301 [Min Grade: B]

ESTM 303 Research and Practice in Science and Mathematics Education 3.0 Credits

The course focuses on research and practice in science and mathematics education and supports students as they connect the two in the context of their classroom. Typical topics include assessment and evaluation, technology, equitable STEM instruction and learning environments and additional current topics in STEM Education. Students will gain experience as practitioner-researchers through observation and fieldwork in local schools.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: ESTM 302 [Min Grade: B]

ESTM 350 Problem-Based Instruction 4.0 Credits

Project-based instruction engages learners in exploring authentic, important, and meaningful questions of real concern to students. Through a dynamic process of investigation and collaboration and using the same processes and technologies that scientists, mathematicians, and engineers use, students work in teams to formulate questions, make predictions, design investigations, collect and analyze data, make products and share ideas. Students learn fundamental concepts and principles that they apply to their daily lives. Project-based instruction promotes equitable and diverse participation and engages students in learning. In this class you will develop a complete unit as opposed to individual lessons in preparation for apprentice teaching. This course involves fieldwork in local schools.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: ESTM 303 [Min Grade: B] (Can be taken Concurrently)ESTM 201 [Min Grade: B] and ESTM 210 [Min Grade: B]

ESTM 410 DragonsTeach Student Teaching 6.0 Credits

DragonsTeach Student Teaching is the capstone course of the DragonsTeach program, providing the opportunity for STEM majors to earn both their degree and Pennsylvania Instructional I certification to teach at the secondary level (middle or high school). Student teaching allows will experience the day-to-day responsibilities of the professional middle or high school math or science teacher and demonstrate the competencies needed for certification. In addition to extensive fieldwork, student teachers meet as a group for a weekly seminar.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: ESTM 350 [Min Grade: B]

ESTM I199 Independent Study in ESTM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

ESTM I299 Independent Study in ESTM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

ESTM I399 Independent Study in ESTM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

ESTM I499 Independent Study in ESTM 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

ESTM T180 Special topics in ESTM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

ESTM T280 Special topics in ESTM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

ESTM T380 Special topics in ESTM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

ESTM T480 Special topics in ESTM 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

Screenwriting & Playwriting

Courses

SCRP 220 Playwriting I 3.0 Credits

Introduces the basic tenets of playwriting and applies their use towards the writing of a 10-minute play.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

SCRP 225 Playwriting II 3.0 Credits

Builds on the writing tenets learned in Playwriting I. Requires students to write a one-act play.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 220 [Min Grade: D]

SCRP 230 Page to Stage 3.0 Credits

Students will write a short play and then go through the rewrite process while working with a director and student actors. The final scenes will be performed in front of an audience.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 9 credits

Prerequisites: SCRCP 225 [Min Grade: C]

SCRP 241 Writing TV Comedy 3.0 Credits

Teaches the essentials of situation comedy writing for TV. Students will be expected to conceive and write their own thirty-minute pilot script plus a 'bible' for their show.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 270 [Min Grade: D]

SCRP 242 Writing TV Drama 3.0 Credits

Teaches the essentials of writing the one-hour television drama. Students will be expected to conceive and write their own thirty-minute pilot script plus a 'bible' for their show.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 270 [Min Grade: D]

SCRP 250 Creating Stand-up Comedy 3.0 Credits

Deals with the conception, writing and performance of a stand-up comedy routine. Includes exploration of creating a comic persona, structuring an act, construction of jokes, and aspects relating to performance. "Final exam" will be given before a live audience at a public venue.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

SCRP 260 Writing Comics 3.0 Credits

This course will introduce the student to the history, theory, language and disciplines of writing the American comic book and graphic novel. Students will learn about comic script-writing formats, the collaborative relationship between writer and artist, and techniques to strengthen both their writing and critiquing abilities.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 270 [Min Grade: C]

SCRP 263 Comic Book Editing 3.0 Credits

Students will write original work and serve as editors for other students on their creative project -- all while learning the histories of the creative disciplines that facilitate the creation of a modern comic book.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCRCP 260 [Min Grade: C]

SCRP 266 Graphic Novel Art and Industry 3.0 Credits

This course serves as an comprehensive look at the medium of graphic novels: their history, how they're made, their diversity, how they are designed, sold and marketed. The course will mix reading and analysis of select titles, lecture and discussions with industry experts, including an artist, author, agent, editor, publisher, retailer, and designer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 260 [Min Grade: C]

SCRP 270 [WI] Screenwriting I 3.0 Credits

Workshop course that covers the fundamentals of writing scripts for film and television. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: HUM 106 [Min Grade: D] or ENGL 101 [Min Grade: D] or ENGL 105 [Min Grade: D]

SCRP 275 [WI] Screenwriting II 3.0 Credits

Workshop course that builds on the fundamentals of screenwriting learned in Screenwriting I. Each student develops and completes a short dramatic screenplay. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 270 [Min Grade: D]

SCRP 280 [WI] Writing the Short Film 3.0 Credits

This course will focus on creating scripts for films under thirty minutes in length. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 270 [Min Grade: D]

SCRP 290 Game: Universe & Story 3.0 Credits

A non-technical course which examines the differences between film & TV works vs. games and interactive fiction forms, and the creative changes inherent in translating one to the other. Emphasis given to the creation of a vibrant, seductive, logically consistent game world. Course culminates in the design of a game based on an existing work of fiction.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 270 [Min Grade: C]

SCRP 295 Future of Narrative Games 3.0 Credits

Encourages students to use their knowledge of the current state of the art in gaming, and their technical and writing interests and expertise, to imagine games that go beyond those currently available. Of particular interest are ways to create branching narratives that deliver the story satisfaction and character development expected from traditional media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 270 [Min Grade: C]

SCRP 310 Literature for Screenwriters 3.0 Credits

This course provides exposure to literary traditions from the classics to pop culture, analyzing how the selected books have affected the film industry, both in terms of direct adaptations and by influencing generations of filmmakers and screenwriters.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 270 [Min Grade: D] or FMVD 270 [Min Grade: D]

SCRP 350 TV Comedy Practicum 3.0 Credits

Students will write episodes of an ongoing TV comedy series produced at Drexel. Following the network primetime model and working in collaboration, students will work under budget, production and deadline constraints similar to those in the real world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: SCR 241 [Min Grade: C]

SCRP 353 TV Drama Practicum 3.0 Credits

Students will write episodes of an ongoing TV drama series to be produced at Drexel. Following the network primetime model and working in collaboration, students will work under budget, production and deadline constraints similar to those in the real world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: SCR 242 [Min Grade: C]

SCRP 370 Screenplay Story Development 3.0 Credits

This course provides a thorough understanding of methods used to develop story ideas from initial concept to complete screen story, including pitching, structuring, and creating treatments. Students pitch and develop several stories which can then be used to create full-length scripts in advanced workshops.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 270 [Min Grade: D]

SCRP 377 Game Writing Workshop I 3.0 Credits

This course embeds Screenwriting students on a team developing a computer game from concept to design document and through production. Screenwriting majors will be expected to contribute heavily to the narrative, character and other non-technical aspects of game creation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 290 [Min Grade: C] and SCR 295 [Min Grade: C]

SCRP 378 Game Writing Workshop II 3.0 Credits

This course embeds Screenwriting students on a team developing a computer game from concept to design document and through production. Screenwriting majors will be expected to contribute heavily to the narrative, character and other non-technical aspects of game creation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 377 [Min Grade: C]

SCRP 380 Screenwriting Workshop I 3.0 Credits

The first of a two-course sequence in which students write a feature film script, telefilm, or television pilot.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 275 [Min Grade: D]

SCRP 381 Screenwriting Workshop II 3.0 Credits

The second of a two-course sequence in which students write a feature film script, telefilm, or television pilot.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 380 [Min Grade: D]

SCRP 382 Playwriting Workshop I 3.0 Credits

The first of a two-course sequence in which students write a 90-minute, two-act play.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SCR 225 [Min Grade: D]

SCRP 383 Playwriting Workshop II 3.0 Credits

The second of a two-course sequence in which students write a 90-minute, two-act play.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: SCR 382 [Min Grade: D]

SCRP 384 Comic/Graphic Novel Writing Workshop I 3.0 Credits

This two-term workshop will lead you through the process of developing and writing at least one draft of the script for either several issues of an original comic or a complete graphic novel. The finished script will be expected to conform to professional standards in everything from length to plot structure to formatting. You will be expected to utilize skills taught in the prerequisite course, SCR 260 (Comic Book Writing), as well as narrative skills learned in SCR 270 (Screenwriting I), including, but not limited to, thinking visually, establishing characters through behavior, writing effective dialogue, the basics of story structure, and related topics.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 266 [Min Grade: C]

SCRP 385 Comic/Graphic Novel Writing Workshop II 3.0 Credits

This two-term workshop will lead you through the process of developing and writing at least one draft of the script for either several issues of an original comic or a complete graphic novel. The finished script will be expected to conform to professional standards in everything from length to plot structure to formatting. You will be expected to utilize skills taught in the prerequisite course, SCR 260 (Comic Book Writing), as well as narrative skills learned in SCR 270 (Screenwriting I), including, but not limited to, thinking visually, establishing characters through behavior, writing effective dialogue, the basics of story structure, and related topics.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 384 [Min Grade: C]

SCRP 399 Independent Study in SCR 0.5-12.0 Credits

Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRP 465 Special Topics in SCR 3.0 Credits

Examines a particular genre in dramatic writing (comedy, the thriller, etc.) or issues of particular interest to students interested in writing for the stage or screen (e.g., Literature for Screenwriters). The course, but not the same topics, may be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

SCRP 495 Senior Project in Dramatic Writing I 3.0 Credits

The first of a three-course sequence in which students write a feature film script, telefilm, full-length stage play, television pilot, at least two spec episodes of an existing one-hour TV drama or four of an existing TV comedy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 381 [Min Grade: D] or SCR 383 [Min Grade: D]

SCRP 496 Senior Project in Dramatic Writing II 3.0 Credits

The second of a three-course sequence in which students write a feature film script, telefilm, television pilot, at least two spec episodes of an existing one-hour TV drama or four of an existing TV comedy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 495 [Min Grade: D]

SCRP 497 Senior Project in Dramatic Writing III 3.0 Credits

The third of a three-course sequence in which students write a feature film script, telefilm, full-length stage play, television pilot, at least two spec episodes of an existing one-hour TV drama or four of an existing TV comedy.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: SCR 496 [Min Grade: D]

SCRP I199 Independent Study in Screenwriting & Playwriting 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

SCRP I299 Independent Study in Screenwriting & Playwriting 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

**SCRIP I399 Independent Study in Screenwriting & Playwriting
0.5-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

SCRIP I499 Independent Study in Screenwriting & Playwriting 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

SCRIP T180 Special Topics in Screenwriting & Playwriting 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

SCRIP T280 Special Topics in Screenwriting & Playwriting 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

SCRIP T380 Special Topics in Screenwriting & Playwriting 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

SCRIP T480 Special Topics in Screenwriting & Playwriting 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

Sociology

Courses

SOC 101 Introduction to Sociology 3.0 Credits

Introduction to what sociology is and what it studies. Topics will include socialization, group dynamics, gender roles, structural inequality, race and ethnic group relations, stratification, deviance, and population studies. Special attention will be paid to core social institutions (e.g. family, education, religion, political and economic systems) as well as theories and methods that guide sociological investigation.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 115 Social Problems 4.0 Credits

Provides a sociological analysis into the causes and possible cures for a variety of social problems. Focuses on topics such as unemployment, crime, poverty, corporate concentration of wealth and power, racism, immigration, health care, and environmental degradation.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 205 Criminology & Criminal Justice 3.0 Credits

Introduces the scientific study of crime and criminals. Analyzes the theoretical and empirical literature on causation and control. Examines our criminal justice system and approaches to corrections.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 210 Race, Ethnicity and Social Inequality 4.0 Credits

Examines cultural diversity, racial and ethnic identity; racism, discrimination and prejudice, as well as minority-majority group relations both globally and at home. Special attention will be paid to the history and present status of various major racial and ethnic groups in the United States including African Americans, Latinos, Asian Americans as well as "white" ethnicities.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 215 Sociology of Work 4.0 Credits

Examines the transformation of work in 21st century America. Focuses on problems of the "post industrial" workforce: big service sector, shrinking real wages, huge growth in temporary and part-time jobs. Special attention to global factors affecting the career path of recent college graduates.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 220 Wealth and Power 4.0 Credits

Examines the extent of differences in wealth and political power in modern society and looks at the origins and implications of those differences.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 221 Sociology of the Family 4.0 Credits

Examines structure and functions of the family and the roles, relationships, problems, and opportunities of family living from a variety of perspectives. Uses lectures, field experiences, and discussion.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 222 Sex and Society 4.0 Credits

This course examines how sexualities are socially produced and re-produced. Topics of study include gender and sexuality; changing social meanings of variant sexual orientations and practices; the effect of birth-control technologies, sexually transmitted infections and sexual violence on sexual norms; the commodification of sex and the social control of sex.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 230 Gender and Society 4.0 Credits

Explores the status and roles of modern women and men, with emphasis on changes in family relationships, career options, and lifestyle alternatives.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 235 Sociology of Health and Illness 4.0 Credits

Examines the history, economics, and politics of our health-care system and the effects of technology on the quality of health care.

College/Department: College of Arts and Sciences
Repeat Status: Not repeatable for credit

SOC 240 Urban Sociology 4.0 Credits

Provides an overview of the contemporary process of urban change and of key problems and policy issues. Concentrates on five concerns: the evolution of urban economics; life and culture in the city today; race, ethnicity, gender, and class of urban populations; urban politics and social forces; and new directions in urban development.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 245 Sociology of the Future 4.0 Credits

Examines current theories, trends and projections for social change in the coming decades. Focuses on the role played by such factors as technological advancement, climate change, global capitalism and social movements in shaping the future.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SOC 250 Research Methods I 4.0 Credits

Covers research design, measurement, sampling, survey research, field experiments, content analysis, interviewing techniques and ethics pertaining to research on human subjects. Prepares students to carry out simple empirical research projects as well as to become more sophisticated readers of sociological research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 268 Sociology of Sport 4.0 Credits

The course examines the cultural and social aspects of sport. Students will be introduced to sport as a ubiquitous institution in American society as well as the essential characteristics and functions of sport from both a sociological and historic perspective.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SOC 271 Sociology of Aging 4.0 Credits

Introduces the multidisciplinary scientific study of the causes and consequences of aging, its history, methods of research, major theoretical approaches, and empirical findings.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SOC 276 Global Climate Change 3.0 Credits

This course will examine the environmental issue of global warming from a number of disciplinary perspectives. The course starts with an overview of the scientific evidence for global warming. It then provides an overview of the impacts of global warming on natural systems, biodiversity, and human health. It also defines the notion of "dangerous anthropogenic climate change, and the possibilities for preventing this from occurring. It explores policy options regarding both the mitigation of CO2 emissions and adaptation of societal practices and infrastructure to a continually warming globe. The course then examines the political and cultural dynamics of society's response to global warming. The course concludes with a consideration of the political actions now underway by social movements to mobilize politica.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SOC 310 Topics in Political Sociology 4.0 Credits

Examines social bases of politics; political power, bureaucracy, and social structure; sources and development of democracy and dictatorship; and political attitudes, movements, and parties.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 4 times for 12 credits

Restrictions: Cannot enroll if classification is Freshman

SOC 312 Topics in Sociology of Science and Technology 4.0 Credits

Examines the sociological basis of scientific theorizing, knowledge production and research as well as the organization and social function of scientific labor and the impact of applied science on social institutions and groups.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 4 times for 12 credits

SOC 315 HIV/AIDS and Africa 4.0 Credits

This course focuses on the social construction of HIV/AIDS – it explores the culture, social, epidemiologic, political, psychological, philosophical, economic, public health, and public policy dimensions of HIV/AIDS on a global level, especially in sub-Saharan Africa. Students examine case studies, interviews and documentaries on HIV/AIDS in Africa.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SOC 101 [Min Grade: D]

SOC 320 Sociology of Deviant Behavior 4.0 Credits

Examines theories of deviance, focusing on their attribution of causation and the implications for correction and/or control at both the individual and societal levels. Includes topics such as alcoholism, mental illness, criminality, and other deviant behaviors.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 325 Introduction to Urban and Environmental Planning 4.0 Credits

This course serves to introduce students to the field of urban and environmental planning. In doing so, this course seeks to expose students to the skill sets used by planners: including the planning process; citizens participation models; community needs assessment; data analysis and presentation; plan implementation and evaluation; and professional ethics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 326 Cities and Sustainability 4.0 Credits

This course will provide an overview of the issue of sustainability planning and policy for cities. Topics include how we define sustainability for cities, and how we measure its progress and impacts. The course will also cover how land reuse planning impacts the development of green space, including parks, gardens and urban agriculture, as well as green building, the green economy and the impact of sustainability planning on public health outcomes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 330 Development and Underdevelopment in the Global South 4.0 Credits

Focuses on the ways in which the international economy affects the class structure, politics, and development of developing nations. Focuses particularly on multinational corporations and on the successes and failures of import-substitution and export-oriented industrialization programs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 335 Sociology of Education 3.0 Credits

Provides a general introduction to the sociology of education through the study of social, political, and cultural forces operating on public education in the United States and Britain. Examines theories, methods, and case studies to explore issues of identity formation, inequality, and class reproduction in an attempt to understand the role of schooling in contemporary life.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SOC 340 Globalization 4.0 Credits

This course investigates the causal factors for the emergence of what is known as globalization, global economy, global village, etc. It covers the effects of global changes on national political systems, on ecology and on local cultures. The role of the US and reactions to the new world order will also be considered.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 341 Environmental Movements in America 4.0 Credits

Focuses on key collective actors and institutions that are involved in the creation of U.S. environmental policies, including historical and cultural processes of change involving social movements, environmental advocacy organizations, foundations, and the media.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 345 Sociology of the Environment 4.0 Credits

Examines acts of nature vs. acts of man, food and health, environmental politics, social movements and environmental issues, environmental and development policies, and environmental and global change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 346 Environmental Justice 4.0 Credits

Focuses on the political economy of environmental injustice and the impact of social movements addressing it; impact of chemical pollutants on human health; and the scientific and legal issues surrounding the study and regulation of pollutants.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SOC 347 Introduction to Environmental Policy Analysis 4.0 Credits

Introduction the development and implementation of U.S. environmental policy, including historical development, political process, methods of analysis and creation of laws, regulations and budgets.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 349 Sociology of Disasters 4.0 Credits

Focuses on social aspects of disasters, such as: collective behaviors (panic, crime, improvisation); warning, evacuation and perception of risk; social responses to natural and technical disasters; scientific uncertainties and technical disasters; social produced age, gender, racial/ethnic and social class vulnerabilities to disaster; terrorism-caused disasters; and disaster preparedness and prevention.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 350 Research Methods II 4.0 Credits

Building on Research Methods (SOC 250) this course provides the student with the opportunity to apply research methods by implementing their own individual and group projects. Focus is on research design, developing research questions and hypotheses, instrument construction, data collection, simple data analysis and reporting.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SOC 250 [Min Grade: D]

SOC 355 [WI] Classical Social Theory 4.0 Credits

Critically examines the ideas of the classical sociological theorists (e.g., Marx, DuBois, Durkheim, and Weber). This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SOC 356 Contemporary Social Theory 4.0 Credits

Covers a broad range of theories that guide contemporary sociological thought. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SOC 355 [Min Grade: D] or SOC 260 [Min Grade: D]

SOC 364 Computer-Assisted Data Analysis 4.0 Credits

This course focuses on using specialized software for organizing and manipulating empirical databases as well as performing basic applied statistical analyses. Attention will be paid to the selection, set up, execution and interpretation of procedures for both univariate and bivariate analysis. These procedures will include, but not be limited to, univariate measures of central tendency and dispersion; categorical data analysis; t-tests and crosstabulation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SOC 250 [Min Grade: D]

SOC 365 Computer-Assisted Data Analysis II 4.0 Credits

Building on SOC 364, this course covers more advanced statistical techniques such as regression, correlation, analysis of variance and multiple regression.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SOC 364 [Min Grade: D]

SOC 370 Practicum in Applied and Community Sociology 4.0 Credits

This course is central to the newly adopted emphasis of the sociology major on participatory research. These courses are intended as the practicum and supervised project-oriented research work for community organizations and agencies.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 395 Seminar in Sociology 4.0 Credits

The sociology majors' seminar can be taken each year for repeating credit. A peer monitored seminar in which students discuss and support each other's research and scholarship. It features guest faculty and non faculty discussants, and provides majors with a focused exposure to the process of research and scholarship.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 5 times for 24 credits

Restrictions: Can enroll if major is SOC.

SOC 430 Politics of Life 4.0 Credits

This course will explore the sociological implications of advancements that have been made in genetic engineering, biotechnologies and other areas of biomedical research. Starting with earlier examples of "power over life" from the 18th and 19th centuries, it will explore themes, dilemmas and complications embedded in the scientific control over life. Topics to be explored include biopower and biocapital, eugenics, race and class, stewardship and bioengineering, new reproductive technologies and reproductive choice, among much, much more. Consideration to feminist, queer and critical race theories will frame much of class discussion.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 444 Social Movements 4.0 Credits

Focuses on movements for social change through the lens of sociological theory and research. Topics include the rise of social movements; the dynamics of mobilization, organization, commitment and collective identity; movement opponents and targets; violent and terrorist social movements; the role of governments and political elites in repressing or facilitating movement activity; and how movements change society.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SOC 490 Sociology Research Seminar I: Research Design 4.0 Credits

An in-depth exploration of selected topics. Projects are selected by students in consultation with a faculty member.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Junior or Senior.

Prerequisites: SOC 250 [Min Grade: D] and SOC 350 [Min Grade: D]

SOC 491 Sociology Research Seminar II: Data Acquisition and Analysis 4.0 Credits

Continuation of SOC 490.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: SOC 490 [Min Grade: D]

SOC 492 Sociology Research Seminar III: Practicum in Sociological Research 4.0 Credits

Continuation of SOC 491.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SOC 491 [Min Grade: D]

SOC I199 Independent Study in SOC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SOC I299 Independent Study in SOC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SOC I399 Independent Study in SOC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SOC I499 Independent Study in SOC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SOC T180 Special Topics in Sociology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SOC T280 Special Topics in Sociology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SOC T380 Special Topics in SOC 12.0 Credits

This course will explore current issues and debates in Sociology. It will be conducted as a seminar. The topic will vary each term.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SOC T480 Special Topics in Sociology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Software Engineering

Courses

SE 101 Foundations of Software Engineering I 3.0 Credits

Teaches students basic programming concepts within a software engineering process that involves specification, documentation, and testing. Programming coverage includes basic programming concepts such as the declaration and assignment of variables, standard data types, constants, conditional statements, loops, introduction to classes and methods, standard and file input/output, arrays, and strings. Process concepts emphasize good internal documentation practices, specifying functional requirements, defect tracking and analysis, and "black-box" testing.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Corequisite: EXAM 080

SE 102 Foundations of Software Engineering II 3.0 Credits

Introduces students to additional programming concepts. Teaches students how to design, implement, and test object-oriented software applications using simple reusable components. Introduces basic techniques for creating reusable software components. Provides an overview of the software engineering as a discipline.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: SE 101 [Min Grade: D]

Corequisite: EXAM 080

SE 103 Foundations of Software Engineering III 3.0 Credits

Introduces students to issues and practices for working with medium-size software systems. Teaches students basic techniques for using application frameworks. Introduces students to software development in teams and provides an overview of the software engineering professional practice.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: SE 102 [Min Grade: D]

SE 210 Software Specification and Design I 3.0 Credits

Study of the principles, practices, and techniques used to gather system requirements and document them in a requirements specification. Includes techniques for requirements discovery such as user interviews and prototyping. Introduces approaches for organizing and expressing software requirements in a requirements specification.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: SE 103 [Min Grade: D] or CS 133 [Min Grade: D] or CS 172 [Min Grade: D]

SE 211 Software Specification and Design II 3.0 Credits

Continues study of requirements with increasing emphasis on converting requirements into a software system design. Presents alternate approaches, techniques for evaluating specifications, specification and design tools, and use of specifications to develop system-level tests.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: SE 210 [Min Grade: D]

SE 280 Special Topics in Software Engineering 4.0 Credits

This course covers topics in software engineering. Different topics may be considered in different quarters.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

SE 310 Software Architecture I 3.0 Credits

Study of macro-level software system architectures with an emphasis on approaches to interconnection and distribution of current and emerging architectural styles.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: SE 211 [Min Grade: D] and CS 265 [Min Grade: D] and CS 260 [Min Grade: D]

SE 311 Software Architecture II 3.0 Credits

Continues discussion of software architecture with a focus on micro-level architecture including patterns, frameworks, and component-based software engineering, and commercial off-the-shelf software.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: SE 310 [Min Grade: D] or CS 350 [Min Grade: D]

SE 320 Software Verification and Validation 3.0 Credits

Presents theory and practice of software testing. Covers structural testing including such topics as path testing, dataflow testing, logic based testing, syntax testing, program slicing, mutation testing, fault injection, program perturbation, and testing tools. Discusses techniques for test construction and test suite evaluation, and validation against requirements and design models. Also covers methods of inspection and review at various phases of the software lifecycle.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D]

SE 410 Software Evolution 3.0 Credits

Covers issues related to change in software systems. Addresses principles and techniques of corrective software maintenance, software enhancements, and software product family. Introduces students to issues of change in large software systems including configuration control, change and product management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 260 [Min Grade: D]

SE 480 Advanced Topics in Software Engineering 4.0 Credits

This course covers topics in Software Engineering selected from advanced topics from research in this field. Different topics may be considered in different quarters.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

SE I199 Independent Study in SE 12.0 Credits

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

SE I299 Independent Study in SE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

SE I399 Independent Study in SE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

SE I499 Independent Study in SE 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

Spanish

Courses

SPAN 101 Spanish I 4.0 Credits

Introductory Spanish. Includes listening, speaking, reading, and writing. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SPAN 102 Spanish II 4.0 Credits

Continues SPAN 101. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 101 [Min Grade: C]

SPAN 103 Spanish III 4.0 Credits

Continues SPAN 102. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 102 [Min Grade: C]

SPAN 201 Spanish IV 4.0 Credits

Intermediate Spanish. Includes grammar review, listening, speaking, and reading. Recommended for students who wish to attain oral competence. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 103 [Min Grade: C]

SPAN 202 Spanish V 4.0 Credits

Continues SPAN 201. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 201 [Min Grade: C]

SPAN 203 Spanish VI: Conversation & Comprehension 4.0 Credits

Provides intensive practice in comprehension and written and oral communication. Emphasizes development of writing skills and increased oral competence in everyday situations. Offered all terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 202 [Min Grade: C]

SPAN 310 Advanced Writing and Speaking 4.0 Credits

This course provides advanced practice in written and oral communication including journalistic, professional, and creative writing. Examines contemporary cultural contexts through media and news. This course has a community-based component that will require students to work with members of our community including, but not restricted to Spanish-speaking communities in the area. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 202 [Min Grade: C]

SPAN 311 [WI] Introduction to Spanish Stylistics 3.0 Credits

Provides advanced practice in comprehension and written and oral communication, based primarily on periodicals and contemporary media. Offered all terms. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 203 [Min Grade: C]

SPAN 312 [WI] Spanish Stylistics 3.0 Credits

Continues SPAN 311. Provides extensive study of the techniques of translation and communication. Offered all terms. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 311 [Min Grade: C]

SPAN 313 [WI] Advanced Spanish Stylistics 3.0 Credits

Continues SPAN 312. Provides advanced training in oral and written communication in Spanish. Particularly recommended for students who have pre-proficiency status, Spanish minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 320 Introduction to Language for the Professions 3.0 Credits

This course covers Introduction to Spanish communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. The content of this course may change every term it is offered and is repeatable for credit. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: SPAN 310 [Min Grade: C]

SPAN 330 Introduction to Identities and Communities 3.0 Credits

This course provides an introduction to the analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of this course may change every term it is offered and is repeatable for credit. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: SPAN 310 [Min Grade: C]

SPAN 331 Introduction to Spanish Literature Studies 3.0 Credits

Advanced Spanish. Reading, writing, and extensive conversational practice based on masterpieces of Spanish literature.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 332 Studies in Spanish and Spanish American Literature 3.0 Credits

Includes reading and oral and written analysis of representative texts in Spanish and Spanish-American literature, including familiarization with the historical and cultural contexts. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 333 Advanced Spanish and Spanish American Literature 3.0 Credits

Continues SPAN 332. Provides advanced study of Spanish and Spanish-American literature. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 340 Introduction to Power and Resistance 3.0 Credits

This course provides an introduction to the analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of this course may change every term it is offered and is repeatable for credit. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: SPAN 310 [Min Grade: C]

SPAN 350 Introduction to Language, Media, and Society 3.0 Credits

This course provides an introduction to the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of this course may change every term it is offered and is repeatable for credit. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: SPAN 310 [Min Grade: C]

SPAN 351 Introduction to Business & Professional Spanish 3.0 Credits

Advanced year. Provides intensive oral practice and written work in business, professional, and commercial Spanish. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 352 Business & Professional Spanish 3.0 Credits

Advanced business and professional Spanish. Advanced practice in oral and written Spanish for business and the professions. Based on advanced texts, periodicals, and technical journals.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 353 Advanced Business & Professional Spanish 3.0 Credits

Provides advanced study in business and professional terminology, with emphasis on the structure and protocols of the business world. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 371 Special Studies in Spanish Civilization & Culture 3.0 Credits

Presents an integrated approach in Spanish to the civilization, culture, history, and literature specific to the areas in which the language is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 410 Advanced Grammar and Translation 3.0 Credits

This course provides advanced grammar instruction and fosters translation and communication skills within a contemporary cultural context. The content of this course may change every term it is offered and is repeatable for credit. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: SPAN 310 [Min Grade: C] and (SPAN 320 [Min Grade: C] or SPAN 330 [Min Grade: C] or SPAN 340 [Min Grade: C] or SPAN 350 [Min Grade: C])

SPAN 411 [WI] Special Studies in Advanced Spanish Stylistics 3.0 Credits

Continues SPAN 313. Particularly recommended for students who have proficiency status, Spanish minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 420 Advanced Studies in Language for the Professions 3.0 Credits

Spanish 420 provides advanced communication skills in areas such as contemporary business, health, and law in a culturally sensitive fashion. The content of SPAN 420 may change every term it is offered and is repeatable for credit. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: SPAN 310 [Min Grade: C] and (SPAN 320 [Min Grade: C] or SPAN 330 [Min Grade: C] or SPAN 340 [Min Grade: C] or SPAN 350 [Min Grade: C])

SPAN 430 Advanced Studies in Identities and Communities 3.0 Credits

This course provides an advanced analysis of individual and collective identities, including issues of gender, sexual orientation, race, ethnicity, class, nationality, and religion. The content of this course may change every term it is offered and is repeatable for credit. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: SPAN 310 [Min Grade: C] and (SPAN 320 [Min Grade: C] or SPAN 330 [Min Grade: C] or SPAN 340 [Min Grade: C] or SPAN 350 [Min Grade: C])

SPAN 431 [WI] Special Studies in Advanced Spanish and Latin American Literature 3.0 Credits

Continues SPAN 333. Particularly recommended for students who have proficiency status, Spanish minors, and students interested in graduate study and/or international careers. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 440 Advanced Studies in Power and Resistance 3.0 Credits

This course provides an advanced analysis of power relations and issues of (in)equality rooted in contemporary political and socio-economic systems. The content of this course may change every term it is offered and is repeatable for credit. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: SPAN 310 [Min Grade: C] and (SPAN 320 [Min Grade: C] or SPAN 330 [Min Grade: C] or SPAN 340 [Min Grade: C] or SPAN 350 [Min Grade: C])

SPAN 450 Advanced Studies in Language, Media, and Society 3.0 Credits

This course provides an advanced analysis of the role of language and media in society, including sociolinguistics, gender, media studies, and communication. The content of this course may change every term it is offered and is repeatable for credit. Taught in Spanish.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 27 credits

Prerequisites: SPAN 310 [Min Grade: C] and (SPAN 320 [Min Grade: C] or SPAN 330 [Min Grade: C] or SPAN 340 [Min Grade: C] or SPAN 350 [Min Grade: C])

SPAN 451 Special Studies in Advanced Spanish for Business and the Professions 3.0 Credits

Continues SPAN 353, with emphasis on the structure and protocols of the European Union. Particularly recommended for students who have proficiency status, Spanish minors, and students interested in graduate study and/or international careers. Offered as needed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 471 [WI] Special Studies in Spanish and Latin American Civilization 3.0 Credits

Presents an integrated approach, at the advanced level, to the civilization, culture, history, and literature of a given period specific to the areas in which Spanish is spoken, with emphasis on the development and evaluation of cultural values. Offered as needed. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 8 times for 24 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SPAN 312 [Min Grade: C]

SPAN 480 Spanish Minor Thesis Course 0.5-4.0 Credits

Independent research study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study. At the end of the course, the student is required to produce a paper and oral defense on the topic of his paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SPAN I199 Independent Study in SPAN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SPAN I299 Independent Study in SPAN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SPAN I399 Independent Study in SPAN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SPAN I499 Independent Study in SPAN 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SPAN T180 Special Topics in Spanish 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SPAN T280 Special Topics in Spanish 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SPAN T380 Special Topics in Spanish 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SPAN T480 Special Topics in Spanish 0.5-12.0 Credits

Recommended for Spanish minors and for students with proficiency status. Offered all terms. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Special Education

Courses

EDEX 142 Special Education Foundations: Referral and Assessment 3.0 Credits

This course is an introduction to special education with specific emphasis placed on the history of special education, legal and ethical means of assessment, translating data into the Multi-Disciplinary Evaluation (MDE) and Individualized Education Program (IEP) processes and critical legal issues related to special education.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 244 Inclusionary Practices for Exceptional Students 3.0 Credits

This course will introduce how to manage instruction for students with diverse learning and behavioral profiles in the inclusive classroom. It will address curricular, instructional, environmental adaptations/modifications and the use of technology to address students' needs. Other topics explored include collaboration, co-teaching and practical/philosophical approaches to inclusion. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B]

EDEX 246 [WI] Literacy and Content Skill Development PreK-8 3.0 Credits

This course offers a developmental approach for early identification of at-risk individuals and proceeds through literacy stages. Also, research, theory and practical research-supported instructional strategies will be provided for working with students. Literacy skills related to content areas will also be explored. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 266 [WI] Literacy and Content Skill Development 7-12 3.0 Credits

The focus of this course is literacy skill development of adolescents at-risk for reading disabilities and adolescents currently identified with reading disabilities. The course will teach a variety of instructional interventions and strategies for improving student comprehension in the content areas. The course will also focus on improving vocabulary, fluency, and motivation in adolescents who struggle with reading. Writing strategies and common core standards will be addressed. The course ends with progress monitoring tools in order to determine the success of the interventions and strategies.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 347 Special Education Processes PreK-8 3.0 Credits

This course focuses on special education processes available for students with disabilities in pre-kindergarten through grade 8. Specifically, this course provides an overview of child find, evaluation and education and IEP/IFSP development, implementation and monitoring concepts, as mandated by IDEA and Section 504 of the Rehabilitation Act of 1973. Students will apply special education process strategies such as collaboration, problem solving, progress monitoring and early dispute resolution techniques. Specific legal cases will be reviewed throughout the term.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 348 Emotional and Behavioral Support of Individuals with Disabilities 3.0 Credits

This course focuses on both low and high-incidence emotional and behavioral problems encountered in general and special education environments. Specific emphasis will be on an understanding of characteristics and interventions that support these types of students.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 349 High Incident Disabilities 3.0 Credits

This course focuses on high-incidence disabilities, specifically learning disabilities and language disorders encountered in general and special education environments. Additional emphasis is placed on an understanding of characteristics and interventions that support these types of students. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 350 Teaching Individuals with Low Incident Disabilities 3.0 Credits

The focus of this course is on curriculum development approaches, instructional strategies, and accommodations for students with low incident and moderate/severe disabilities such as: low vision and blindness, hearing impairments and deafness, deaf-blindness, severe health and physical disabilities, and traumatic brain injuries.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 351 Pervasive Developmental Disorders 3.0 Credits

The focus of this course will be pervasive developmental disorders (PDD), specifically understanding characteristics, instructional strategies and effective interventions. The course will also emphasize behavior reduction strategies that are consistent with a positive behavioral support approach for students with PDD. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 352 Integrating Technology for Learning & Achievement 3.0 Credits

This course is designed to teach educators how to integrate technology into instruction in general education and special education classes, specifically to support reading, writing and mathematics achievement. It also focuses on the use of technology for universal design for learning and using assistive technology with students with disabilities. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 353 Special Education: Methods & Practices PreK-8 3.0 Credits

This course will focus on effective instructional strategies to meet the learning needs of students with disabilities. Specific emphasis will be placed upon lesson planning, unit planning, grouping strategies and collaboration with other teachers and staff in all delivery settings.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 363 Special Education Methods & Practices 7-12 3.0 Credits

The focus of this course is on instructional strategies to meet the unique learning needs of secondary students with disabilities. Lesson planning, unit planning and grouping strategies are key elements in this course. Collaboration with other teaching and non-teaching staff members in all delivery settings is emphasized. Students choose, evaluate, construct and implement instructional materials. Emphasis will be placed on student transition post high school.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 367 Special Education Processes 7-12 3.0 Credits

This course focuses on the special education processes available for students with disabilities in grades 7 through 12. Specifically, the course provides an overview of the child find system, evaluation, education and transition processes in the development of an Individualized Education Program (IEP), and implementation and monitoring concepts as mandated by IDEA and Section 504 of the Rehabilitation Act of 1973. Students will apply special education process strategies such as collaboration, problem solving, progress monitoring and early dispute resolution techniques. Specific legal cases will be reviewed.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B]

EDEX 414 [WI] Special Education Field Placement Seminar 9.0 Credits

This course is designed to develop special education teaching knowledge, skills and abilities through field placement, supervision and reflective practice. Activities include journaling, best practice workshops and reflecting on relevant case studies.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 348 [Min Grade: B] and EDEX 349 [Min Grade: B] and EDEX 350 [Min Grade: B] and EDEX 351 [Min Grade: B] and EDEX 352 [Min Grade: B] and EDEX 142 [Min Grade: B] and EDEX 244 [Min Grade: B] and (EDEX 353 [Min Grade: B] or EDEX 363 [Min Grade: B]) and (EDEX 347 [Min Grade: B] or EDEX 367 [Min Grade: B]) and (EDEX 246 [Min Grade: B] or EDEX 266 [Min Grade: B])

EDEX I199 Independent Study in EDEX 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDEX I299 Independent Study in EDEX 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDEX I399 Independent Study in EDEX 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDEX I499 Independent Study in EDEX 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDEX T180 Special topics in EDEX 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDEX T280 Special topics in EDEX 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDEX T380 Special topics in EDEX 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDEX T480 Special topics in EDEX 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

Sport Coaching Leadership

Courses

SCL 101 Principles of Coaching 3.0 Credits

This course will include setting performance goals in coaching, the various roles of the coach, ethical conduct in coaching, the psychology of coaching, coach-athlete compatibility, coaching burnout, personality of the coach, and coaching youth sports. An emphasis is placed on conducting practices and competitions to enhance the social-emotional growth of athletes.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 102 Principles of Coaching II 3.0 Credits

This course will examine the administrative side of coaching by approaching the profession from a business manager's standpoint. Students will be introduced to the business concepts and techniques applicable to coaching athletics.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 201 Sport-Based Youth Development 3.0 Credits

This course is designed to provide students with an understanding of the field of sport-based youth development (SBYD). Students will learn about sport-based youth development best practices, establishing program goals, key components to successful programs, strategies for financially supporting SBYD programs, and established guidelines for program assessment and growth.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 203 Sports Conditioning 3.0 Credits

This course will take a multi-faceted approach to the general science of strength training and sports conditioning. Students will gain a basic understanding behind training principles by covering the following topics: exercise physiology concepts and applications, testing and evaluation, flexibility and exercise techniques, program design, periodization, aerobic and anaerobic training considerations. This course will provide a practical challenge to the students to apply scientific concepts and principles to the development of a sport specific program in a sport of their choice. Developing and administering a training plan is a key component to coaching and students will become adept at this skill after completing this course.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 210 Prevention and Care of Athletic Injuries 3.0 Credits

This course is designed to introduce the student to the care and prevention of athletic injuries. The course content will include a review of pertinent anatomical structures and their relationship to injuries. The course will also cover mechanisms of injuries, intrinsic and extrinsic variables of injuries, and basic preventative and treatment measures for common sports related injuries. In addition, students will complete the requirements of American Sport Education Program (ASEP) curriculum for Sport First Aid certification and complete the on-line Sport First Aid Test.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 280 Kinesiology 3.0 Credits

This course provides an introduction and overview to the science of human movement. Identifies uses of the field of kinesiology in relation to science, medicine, human behavior, athletics, and overall fitness. Applies knowledge and concepts to the areas of physical activity, athletics, and recreation/fitness. Students will actively participate in and observe human movement in human performance labs.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 314 Sport Performance and Energy Systems 3.0 Credits

This course covers nutrient categories and how they function in the body, with a particular emphasis on how to instill in athletes the advantages of healthy eating, and how to impart good information regarding food and food choices to a group of athletes in a team environment.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 315 Athletic Recruiting 3.0 Credits

This course is designed to provide students with the necessary tools to become effective recruiters of athletic talent. Students will learn how to identify and recruit talent that will have a high impact within their athletic programs. Students will understand how to be compliant with NCAA, NAIA, and NJCAA rules when recruiting. A major deliverable of this course will be a comprehensive recruiting plan.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 325 Athlete Leadership Development 3.0 Credits

This course is designed to provide students with an understanding of athlete leadership development and its importance in sport programming. Various athlete leadership models at the youth, scholastic, collegiate, and professional levels will be reviewed and students will have the opportunity to create their own athlete leadership development program.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 345 Evaluating Athletes and Teams 3.0 Credits

This course is designed to provide students with the necessary tools to become effective evaluators of athletes, teams, and coaches. Students will learn how to create a comprehensive evaluation strategy and to communicate and share this strategy with key constituents to effectively manage overall improvement. A major deliverable of this course will be a comprehensive evaluation plan.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 401 Professional Coaching Portfolio 3.0 Credits

The professional portfolio is a capstone course that provides Sport Coaching Leadership majors with an opportunity to demonstrate achievement in their major and to engage in self-reflection. Components include reflective essays and carefully chosen samples of academic and relevant professional work completed during the college experience.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 419 Global Coaching Seminar 6.0 Credits

This course is designed to expose coaches to a variety of international coaching methods and concepts via a study abroad experience for 7-10 days. This seminar is offered each summer and locations vary by year. Each student in the Sport Coaching Leadership program will attend this study abroad experience. An emphasis is placed on athlete interaction and engagement, practice planning, recruiting, and sport for development.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SCL 101 [Min Grade: C] and SCL 102 [Min Grade: C]

SCL 495 Coaching Practicum I 3.0 Credits

The practicum is designed to develop greater breadth and depth of students' understanding and experience within the coaching industry. This course provides an opportunity for students to apply the knowledge and skills acquired in the Sport Coaching Leadership program in a practical setting. This is the first practicum in a series of three coaching practicums. This practicum experience will focus on using basic coaching theory and principles under the guidance of the current coaching or administrative staff.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 496 Coaching Practicum II 3.0 Credits

The practicum is designed to develop greater breadth and depth of students' understanding and experience within the coaching industry. This course provides an opportunity for students to apply the knowledge and skills acquired in the Sport Coaching Leadership program in a practical setting. This is the second practicum in a series of three coaching practicums. This practicum experience will focus on gaining experience in the administrative aspects of coaching under the guidance of the current coaching or administrative staff.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SCL 497 Coaching Practicum III & Project 6.0 Credits

The practicum is designed to develop greater breadth and depth of students' understanding and experience within the coaching industry. This course provides an opportunity for students to apply the knowledge and skills acquired in the Sport Coaching Leadership program in a practical setting. This is the final practicum in a series of three coaching practicums. This practicum experience will focus on designing and completing a coaching project for a particular team under the guidance of the current coaching or administrative staff.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SCL 495 [Min Grade: CR] and SCL 496 [Min Grade: CR]

Sport Management

Courses

SMT 110 The Business of Sport 4.0 Credits

This course will introduce students to the billion-dollar international sports industry and identify the vast, creative, and substantial role business plays in professional, collegiate and amateur sports. Sports business applications are explored in the following areas: sponsorship, promotions, marketing, fundraising, finance, media, ticketing, public relations, law, facilities, and sport careers.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SMT 152 Leadership in Sports & Society 3.0 Credits

This course helps the students realize and understand their impact as role models in the community and leaders for youth in American society. The students and coaches will learn about theory and identify and develop their leadership styles.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SMT 200 Introduction to Sport Facility and Event Management 3.0 Credits

Introduction to Sport Facility and Event Management. An introduction to the planning, running, maintaining and evaluating of sporting facilities and events. This course will introduce students to topics pertinent to the operation of sports facilities and to the management and organization of sports events. Financial considerations for both the private and public sector will be emphasized.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D]

SMT 201 Sports Marketing, Promotion, and Public Relations 4.0 Credits

Students will build an integrated marketing plan for a sporting event by first describing how the four Ps of marketing are applied in sports. Students learn about the uses of the essential elements of marketing. Students will be able to identify the conventions of sport promotions and public relations.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D] and MKTG 201 [Min Grade: D]

SMT 205 Sport Media Relations 4.0 Credits

This course is an overview of media relations and its role in the field of sport management. This course will cover skill sets and roles a media relations specialist must demonstrate in order to be successful. There will be emphasis on writing, communication, planning, and organizational skills.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D]

SMT 215 Sports Ticket Sales & Operations 3.0 Credits

Course will examine the diverse and changing environment of ticket and operation sales in the sport industry. Course will expose students to the standards, principles and practices that can be applied to multitude of areas that ticketing touches within the sports industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D]

SMT 220 Recreation, Wellness & Society 3.0 Credits

This course chronicles the history and trends in recreation in modern society. It identifies the major operations of the recreation industry and demonstrates its economic impact; compares and contrasts the purposes and practices of recreation, leisure, and sport. Emphasis will be placed on asking to what degree increased recreation impacts the health and wellness of a society.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SMT 225 Sports Budgeting 3.0 Credits

Basic theory in finance and accounting applied to managerial control of sport organizations. Includes forms of ownership, taxation, financial analysis, capital budgeting, and economic impact studies.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: ACCT 110 [Min Grade: D]

SMT 227 Sport Entrepreneurship 3.0 Credits

This course will introduce students to the field of sport entrepreneurship by coupling entrepreneurship as a generic activity with the many opportunities the sports industry presents. It explores the challenges faced by individuals starting up new ventures and the probable paths of career development for students pursuing entrepreneurship.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D] and ENTP 205 [Min Grade: D]

SMT 230 Sports and the Law 4.0 Credits

Reviews the legal and regularity aspects, elements, and relationships for all constituents participating in sports: administrators, coaches, athletes, agents, vendors, sponsors, faculty managers and owners, and spectators. Seminal court cases are discussed. Students examine the inextricable links between the law and business ethics.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D]

SMT 235 Sports Administration and Governance 3.0 Credits

Sports create governance structures, policies, and procedures, even at the most rudimentary level. This course examines the purpose and practice of sports governance and how it relates to sports administration from little league, to the Olympic Games, to international federations, to professional sports.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D]

SMT 240 Olympic Games 3.0 Credits

Provides an overview of modern Olympic Games focusing on the organization, politics, economic implications and the bidding process of the Games. Topics of sponsorship, media coverage and ethical considerations will be discussed. The course will also address how the spirit of the Olympic Games has changed over time.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

SMT 245 NCAA Compliance 3.0 Credits

This course will overview basic regulatory, legal and due process rules that govern NCAA competition. Course will cover elements of NCAA regulations, rules interpretations, enforcement decisions and sanctions. An understanding of NCAA rules compliance will be gained through legal cases and actual NCAA enforcement proceedings.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D]

SMT 250 [WI] Technology and Sport 4.0 Credits

Students will identify the major areas where technology has enhanced the performance of athletes and the participation in sports spectatorship. They will be introduced to the essential technologies used in sport management with an emphasis on communication technology. This is a Writing Intensive course.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D]

SMT 254 Women & Minority Opportunities in Sport 3.0 Credits

This course chronicles the major events and strategies used for women and minorities to have equal opportunities to participate in sports at all levels. It points out the social and legal issues surrounding the dramatic rise in women and minority participation at all levels of play.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

SMT 255 Legal Foundations of Title IX 4.0 Credits

This course will overview the basic legal concepts surrounding Title IX and its applications to intercollegiate athletics programs. The basic elements of Title IX and how various tests are applied by the court system will be included. Course will focus on actual legal cases, investigations and remedial plans.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D] and SMT 230 [Min Grade: D]

SMT 260 Sports Agents & Labor Relations 4.0 Credits

This course examines the controversial nature of being a sports agent. Students will be exposed to legal and ethical issues that surround sports agents. Additionally, students will review the labor relations laws and collective bargaining agreements that govern professional sports through a variety of lectures, readings and assignments.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EAM or major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 230 [Min Grade: D] and BLAW 201 [Min Grade: D]

SMT 262 Digital Sports Storytelling 3.0 Credits

This course is designed to introduce students to digital storytelling in sports. Topics will include locating and defining a sports story, framing a sports story for audience and platform, and storyboarding. Students will learn the power behind stories and how to use them to enhance and develop fan engagement, drive attendance and increase sponsorship. Students will write, produce and edit digital stories on mobile platforms.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D]

SMT 270 Sports Facility Planning & Management 3.0 Credits

This course is designed to provide learning experiences in managing sport facility operations, planning new sport facilities, and renovating and maintaining new facilities. An understanding of sports facilities, their design, and management will be gained through field study, speakers, and standard classroom material.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

SMT 275 Sports Event Management 3.0 Credits

This course provides the student with exposure to comprehensive event planning, funding and managing sports events including those for professional, amateur and collegiate sports events, and commercial, recreational, and club sports.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

SMT 285 Sport, Industry, and Society 4.0 Credits

The focus of this course is on the social forces that shape the sport industry in the United States and internationally and the influence the sport industry has on society. Students are encouraged to critically examine common understandings of sport from economic, historical, political, and sociological perspectives.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D]

SMT 290 Digital Media in Sport 3.0 Credits

This course is designed to introduce students to the digital landscape of sport business. Topics include current issues in digital sports media, digital media and sports facilities, digital media and professional sports teams, mobile applications in sport, and selling digital sport products and services.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D]

SMT 300 Quantitative Analysis and Statistics for Sports 3.0 Credits

This is an intensive course presented for the non-specialist in statistical analysis and statistical models applicable in the sports industry. The emphasis is on proper application of classical descriptive and inferential techniques to design-making using sample data. Covers statistical techniques that can be applied to further studies in the sports.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: SMT 110 [Min Grade: D] and (MATH 101 [Min Grade: D] or MATH 181 [Min Grade: D])

SMT 305 Fundraising in Sports 3.0 Credits

Course will examine skills, strategies and techniques needed for successful revenue generation in the sport industry. Areas to be addressed include characteristics of a donor, preparing direct mail solicitation, understanding major gift fundraising, and importance of donor research. Ethical issues and trends in athletic development will also be addressed.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D] and SMT 201 [Min Grade: D]

SMT 307 Corporate Sponsorship in Sports 3.0 Credits

Course will examine corporate sponsorship and its impact on the sport industry from a sales and marketing perspective. Students will gain an understanding of sponsorship inventory, pricing, negotiation, and activation of sponsorship agreements.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D] and SMT 201 [Min Grade: D]

SMT 309 Capital Campaigns in Athletics 3.0 Credits

Course will examine strategies organizations use to develop and launch successful athletic capital campaigns. Areas addressed include understanding a capital campaign and setting fundraising goals. Organizational readiness, feasibility study and campaign failures will also be addressed.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D] and SMT 201 [Min Grade: D]

SMT 310 Sports Contracts 3.0 Credits

Course will cover basic legal issues and strategies surrounding contract issues in sports. Students will be introduced to basic elements of contract law and see it applied by the court system in the context of the sports industry.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 230 [Min Grade: D] and BLAW 201 [Min Grade: D]

SMT 315 Sports Publications & Graphics 3.0 Credits

Course will examine sports publications such as tickets, fund raising and marketing brochures, media guides, annual reports and website publications. Students will submit writings to the sport management online digest.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 205 [Min Grade: D]

SMT 320 Sport Economics 4.0 Credits

An introduction to the economics of sports. Topics include sports markets: demand, supply and pricing; organization, monopoly power and market failure; labor relations, labor market problems and remedies, public finance of sports, the law and economics of sports, and the economics of college sports.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: ECON 201 [Min Grade: D] and ECON 202 [Min Grade: D]

SMT 335 Sport Governance & Policy 4.0 Credits

Basic theories of organization and leadership applied to sport organizations. Included are professional team-sport leagues, intercollegiate athletics, the Olympic movement, and international sport associations.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: (ORGB 300 [Min Grade: D])

SMT 337 Risk Management in Sports 3.0 Credits

Course will cover basic issues and strategies surrounding risk management in athletics. Students will be introduced to types of legal obligations and liability exposure inherent in sports and the tools used to minimize risk. Emphasis will be on safety review and risk assessment.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 230 [Min Grade: D] and BLAW 201 [Min Grade: D]

SMT 340 [WI] International Aspects of Sport 3.0 Credits

Continuing with the true spirit of the Olympic Games, sports can be a rich avenue for building an international community. This course compares and contrasts how sports are perceived, organized, and played in many countries. It examines the social, political, and economic aspects of sports in other countries. Students will learn about major international sporting events. This is a writing intensive course.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D]

SMT 345 Fan Experience Management 3.0 Credits

Course will explore impact of fan experience on the sports industry. Course will examine customer service philosophies and techniques to improve overall experience of consumers. Course will also review research methods used to measure fan/ sponsor experience and determine impact on retention, entertaining spend and per capita spending.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT.

Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D] and SMT 201 [Min Grade: D]

SMT 347 Sport Tourism 3.0 Credits

Students will investigate international sport tourism organizations and their services, and analyze issues including: Sport tourism facility and event financing; sport tourism impacts; and globalization and sport tourism.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D]

SMT 360 Sport Ticket Operations 3.0 Credits

This course will introduce students to the discipline of ticket operations by studying policy development, ticket distribution, customer service, ticketing technology, priority systems, legal issues in ticketing, ticket pricing, and the secondary ticket market.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D]

SMT 362 Sport Ticket Sales 3.0 Credits

This course provides training in all aspects of ticket sales including networking, prospecting and qualifying, creating sales proposals, overcoming objections, and closing sales. Specific techniques such as role playing will be used to prepare students for careers in sport ticket sales.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D]

SMT 365 Operations Management in Sport 3.0 Credits

This course tracks the growing network of media outlets devoted to sports coverage and shows the essential conventions of sports coverage. Students discover how sports news is gathered, designed, and disseminated to many audiences and observe the dynamics between and among athletes, athletic events, businesses of sports, and the media.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D] and SMT 250 [Min Grade: D] and ORGB 300 [Min Grade: D]

SMT 380 Sports Analytics 4.0 Credits

Theory, development, and application of analytics in sport. The application of analytics in sport for purposes of evaluating player performance, managerial decisions, pricing, and other areas in sport industry operations.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: STAT 201 [Min Grade: C]

SMT 382 Decision Making in Sport Business 3.0 Credits

This course introduces students to the decision-making process they will face in policy making and policy enforcement while working as an administrator in the sports field.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Prerequisites: SMT 110 [Min Grade: D]

SMT 401 Professional Portfolio 3.0 Credits

The professional portfolio is a capstone course that provides sport management majors an opportunity to demonstrate achievement in their major and engage in self-reflection. Components include reflective essays and samples of relevant professional work completed during the college experience.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is SMT and classification is Senior.

Prerequisites: SMT 225 [Min Grade: D] and SMT 250 [Min Grade: D] and SMT 305 [Min Grade: D] and SMT 310 [Min Grade: D]

SMT 475 Sports Industry Practicum 3.0 Credits

The practicum is designed to develop greater breadth and depth of students' understanding and experience within the industry. The practical application of knowledge and skill acquired in class will help students extend their expertise by working in a sport management related organization. Suggested for non-co-op students.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: SMT 110 [Min Grade: D] or SMT 101 [Min Grade: D]

SMT I199 Independent Study in SMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

SMT I299 Independent Study in SMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

SMT I399 Independent Study in SMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is SMT.

SMT I499 Independent Study in SMT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

SMT T180 Special topics in SMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

SMT T280 Special topics in SMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

SMT T380 Special topics in SMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

SMT T480 Special topics in SMT 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Center for Hospitality and Sport Management

Repeat Status: Can be repeated multiple times for credit

Statistics

Courses

STS 345 Statistics for the Health Sciences 4.0 Credits

This course is designed to provide students with a foundation of basic statistical knowledge to aid in reading and understanding research results in the health science literature. Topics will include: variable types, sampling, scales of measurement, reliability and validity of measurement, study designs, descriptive statistics, classical statistical inference, correlation, chi-square, parametric and nonparametric tests for group comparisons.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

STS 350 Advanced Statistics for Clinical Science 4.0 Credits

This course focuses on the statistical methods that are appropriate for clinical research. The subject of medical research and common clinical trials designed are introduced. The use of statistical software is initiated during a review of basic statistical methods. Advanced statistical methods used in clinical trials are also covered.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: STS 345 [Min Grade: D]

Study Abroad - Performing Arts

Courses

SAPA 395 Performing Arts in Liverpool 0.5-12.0 Credits

Provides opportunities to study at the Liverpool Institute for Performing Arts. Courses available in performing arts, popular music, enterprise management, acting, community arts, dance, performance design, and sound technology.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Systems Engineering

Courses

SYSE 488 Systems Engineering Analysis 3.0 Credits

Introduces multiple System Engineering Analysis practices used to execute systems engineering processes. Provides foundation to execute, monitor, and manage the traditional practices and also develops ability to modify and establish new practices based on this massive foundation. Instills confidence so student can contribute, lead, monitor or manage any systems effort.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 465 [Min Grade: C]

TV Industry & Enterprise

Courses

TVIE 180 TV Industry Overview 3.0 Credits

The TV industry (broadcast, cable, satellite and internet) is explored. Topics examined include station and network relations, production, support systems, sales and promotion, revenue streams (advertiser, subscriber and hybrid), financial and legal systems that control TV, and program formats including TV content distributed by Internet, Wifi and mobile.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVIE 250 TV Sports Program Strategies 3.0 Credits

The course will analyze the "big 4" major sports franchises (NFL, MLB, NBA, NHL) by looking at the rights holders, the marketing, the ratings, and the coverage. We will also examine the creation and growth of Regional and National Sports Networks, and study the innovators and their contributions to the business of sports on television. We will examine how sports teams generate revenue with television, how advertising and sponsorships are bought and sold, and how television rights are negotiated and awarded.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVIE 280 Research, Sales and Programming 3.0 Credits

Research, sales and programming are the core of the TV industry. Students examine the selling environment; the research process; the meaning of "audience"; metrics; the sales process; market analysis; program promotion; and broadcast, cable, radio, and interactive media sales. Formats, day parts, scheduling, linkages and promotions are also explored.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVIE 285 Media Law and Ethics 3.0 Credits

This course studies the intersection of media law and ethics. Included are: current legal issues in old and new media industries, the First Amendment, Congress and the FCC, licensing and regulation of media businesses, intellectual property and rights acquisition, and the foundation for ethical actions that result from multiple cross-pressures.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVIE 180 [Min Grade: D] or EAM 130 [Min Grade: D]

TVIE 290 Introduction to Money and the Media 3.0 Credits

This course focuses on the economics of various segments of the media business, with an emphasis on television through its past, present and future incarnations. Instruction will focus on the business models for various media, and case studies of financial decisions faced by media companies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVIE 365 Special Topics: TVIE 1.0-3.0 Credit

This is a Special Topic course in the TV Industry & Enterprise Track that will have rotating topics that address current interests in the field.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 21 credits

TVIE 390 Practicum: Promotions 3.0 Credits

Students learn the art of promotions through industry placements, including DUTV. Students will produce promos for TV shows, create on-air branding elements for stations, design promotion materials, and complete other tasks related to promotions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D] and TVIE 180 [Min Grade: D] and TVIE 280 [Min Grade: D]

TVIE 391 Practicum: Programming 3.0 Credits

Students learn the art of programming a television station through industry placements, including DUTV. Students will aid in programming negotiation and acquisition, log and systems preparation, and other programming related duties.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated 6 times for 18 credits

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D] and TVIE 180 [Min Grade: D] and TVIE 280 [Min Grade: D]

TVIE 392 Practicum: New Media Management 3.0 Credits

Students learn the operation of new media enterprises through industry placements, including DUTV. Students will develop ways to develop, promote, and disseminate new media content related to the television industry.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated 6 times for 18 credits

Prerequisites: DIGM 100 [Min Grade: D] and DIGM 240 [Min Grade: D] and FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D] and TVIE 180 [Min Grade: D] and TVIE 280 [Min Grade: D]

TVIE 399 Independent Project in TV Industry and Enterprise 0.5-12.0 Credits

This course offers students the opportunity to do an Independent Project in TV Industry & Enterprise.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated 6 times for 18 credits

TVIE 480 TV Professions and Business 3.0 Credits

An exploration of professions and opportunities for entrepreneurship in the TV industry through readings and guest lectures. After student assess their research, skills, and talents, they will research professional and business opportunities that match their future aspirations.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

TVIE 495 Senior Project: TV Enterprise I 3.0 Credits

This is the first course in a 3 course sequence for senior project in the TV Industry & Enterprise Track. Students will survey market opportunities, look at the competition and design a plan for new product development.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is TELE and classification is Senior.

TVIE 496 Senior Project: TV Enterprise II 3.0 Credits

This is the second course in a 3 course sequence for senior project in the TV Industry & Enterprise Track. Students will survey market opportunities, look at the competition and design a plan for new product development.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is TELE and classification is Senior.

TVIE 497 Senior Project: TV Enterprise III 3.0 Credits

This is the third course in a 3 course sequence for senior project in the TV Industry & Enterprise Track. Students will survey market opportunities, look at the competition and design a plan for new product development.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is TELE and classification is Senior.

TVIE I199 Independent Study in TV Industry & Enterprise 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

TVIE I299 Independent Study in TV Industry & Enterprise 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

TVIE I399 Independent Study in TV Industry & Enterprise 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated 6 times for 18 credits

TVIE I499 Independent Study in TV Industry & Enterprise 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

TVIE T180 Special Topics in TV Industry & Enterprise 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

TVIE T280 Special Topics in TV Industry & Enterprise 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

TVIE T380 Special Topics in TV Industry & Enterprise 1.0-3.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated 6 times for 21 credits

TVIE T480 Special Topics in TV Industry & Enterprise 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

TV Information & Technology

Courses

TVIT 270 Digital Content Delivery 3.0 Credits

Business models, technologies and opportunities defining digital content creation and delivery are presented as are content creation for mobile devices and electronic signage. Digital cinema and user interfaces that characterize the "N-Screen" environment are examined including revenue generation in Video on Demand, Pay Per View, and Pay Per Click platforms.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVIT 275 Introduction to Information Technology for TV 3.0 Credits

Functions of IT in broadcast, cable, satellite and network operations and re-purposing of TV content through web-streaming and mobile devices are studied. Digital Asset Management, legal, technical and revenue implications of IT for traffic and station management are evaluated. IT is studied as a potential profit center in TV operations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVIT 365 Special Topics: TVIT 3.0 Credits

This is a Special Topic course in the TV Industry and TVPR Track that will have rotating topics that address current interests in the field.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVIT 370 Monetizing TV Web Content 3.0 Credits

The course addresses streaming TV & digital media businesses, start-up funding, and venture capital firms, as well as, digital TV content delivery networks, platforms and metrics. Further topics include project management rights acquisition, intellectual property, encryption, pricing models, enterprise web casting, viral video, product placement, niche content, and user-generated video.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVIT 270 [Min Grade: D] and TVIT 275 [Min Grade: D]

TVIT 375 Web Streaming Project 3.0 Credits

Students create a web-streaming product and the plan to monetize it. Development strategy, objectives, methodologies, project management, video, web and workflow design are central. Design and implementation of a delivery plan and a short term version of the content complete the project.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVIT 370 [Min Grade: D]

TVIT 399 Independent Project in TV Information and Technology 0.5-12.0 Credits

This course offers students the opportunity to do an Independent Project in Information Technology (IT) for Television.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIT I199 Independent Study in TV Information & Technology 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIT I299 Independent Study in TV Information & Technology 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIT I399 Independent Study in TV Information & Technology 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIT I499 Independent Study in TV Information & Technology 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIT T180 Special Topics in TV Information & Technology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIT T280 Special Topics in TV Information & Technology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVIT T380 Special Topics in TV Information & Technology 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

TVIT T480 Special Topics in TV Information & Technology 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TV Production

Courses

TVPR 100 TV Studio: Basic Operations 3.0 Credits

This course will focus on developing operational skills for all studio production facilities including camera operations and composition, microphones and audio mixers, basic lighting, teleprompter, video switcher and graphics playback.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVPR 200 TV Studio: Live Directing 3.0 Credits

This course is an Introduction to directing live and taped multi-camera television productions in a studio setting. The emphasis will be on developing solid, basic directing technique that will be built upon in subsequent additional directing courses. Students will direct simple programs in almost every class.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVPR 100 [Min Grade: D]

TVPR 201 TV Studio: Comedy 3.0 Credits

This course gives students instruction and experience in producing, interpreting, staging, directing, shooting, and live-cutting scenes in a studio. Students also experience the challenge of managing a cast and crew while simultaneously dealing with the kind of time, resource, and technical limitations that exist in the professional world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVPR 100 [Min Grade: D]

TVPR 202 TV Studio: Drama 3.0 Credits

This course gives students instruction and experience in producing, interpreting, staging, directing, shooting, and live-cutting and producing dramatic scenes in a studio. Students also experience the challenge of managing a cast and crew while simultaneously dealing with the kind of time, resource, and technical limitations that exist in the professional world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVPR 100 [Min Grade: D]

TVPR 205 TV Studio: Advanced Live Directing 3.0 Credits

This course is designed to build on skills acquired in TVPR 200 TV Studio: Live Directing. Students will direct increasingly more complex programs, primarily news and information shows. Additional directing opportunities for the production of programming for DUTV will be offered to students taking this course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVPR 100 [Min Grade: D] and TVPR 200 [Min Grade: D]

TVPR 210 TV Studio: Narrative 3.0 Credits

This course gives students instruction and experience in producing, interpreting, staging, directing, shooting, and live-cutting scenes in a studio. Students will experience the challenge of managing a cast and crew while simultaneously dealing with the kind of time, resource, and creative challenges that exist in the professional world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVPR 212 TV Commercials and Promos 3.0 Credits

Students will analyze and produce a wide variety of television commercials and promos. Fundamental concepts of brand marketing will be presented and utilized in the production of student's own script-to-screen commercials and promos. This history of commercials, both in the United States and worldwide, will also be studied.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVPR 220 TV News Writing 3.0 Credits

This is a basic introduction to writing for television news broadcasts.

Students will learn to conceptualize, confirm and write stories on deadline, and develop basic interviewing skills. Issue of journalistic ethics will be presented and discussed. Weekly story assignments will be given to augment classroom work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVPR 221 TV News Production 3.0 Credits

This course is an introduction to single camera field production for TV news, exposing students to the basics of writing, shooting, field lighting and remote news production logistics. Students will learn techniques of video and audio acquisition as well as satellite, microwave and STL type operations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D]

TVPR 230 Scripted TV Production 3.0 Credits

This course gives students instruction and experience in scouting, prepping, producing, interpreting, staging, directing, and shooting dramatic scenes on location. Students also experience the challenge of managing a cast and crew while simultaneously dealing with the kind of time, resource and technical limitations that exist in the professional world.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVPR 232 TV Field: Industrials 3.0 Credits

Students will learn to write, produce, and direct industrials, marketing, point of purchase and sales presentation video presentations. Strategizing, writing, shooting and editing skills will all be utilized as students produce 2 finished productions over the course of 10 weeks.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVPR 236 Reality TV Production 3.0 Credits

This course gives students instruction and experience in doing Reality TV shows in the field.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVPR 240 Producing for Television 3.0 Credits

This course introduces students to the art and craft of producing for television and examines every aspect of the producer's role in the developing, selling, pre-production, production, post-production, delivery, and marketing of a show. Students will also learn the functions of all other jobs involved in a production.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVPR 242 TV On-Camera Performance 3.0 Credits

Students will receive practical experience in all aspects of television performance, including anchoring, reporting, announcing, hosting, and acting. This class is designed specifically for those production students with little or no acting or on-camera experience, but who will benefit from a greater understanding of the performance process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVPR 291 Television Internship 1.0-3.0 Credit

The student does a non-paying internship in the field of television for academic credit, working a minimum of 100 hours in a 10-week term for 3 credits. The student provides an initial informational sheet on the internship and submits a final paper on the experience. May be repeated for credit. The first time the course may be taken for 3 credits. After that, the course may be repeated, but for 1 credit each time. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 12 credits

TVPR 300 TV Series Editing 1.0-6.0 Credit

This course moves beyond the technical aspects of editing to introduce students to the process of communication that is at the heart of the relationship between editors and the directors and producers of a television series.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVPR 100

TVPR 315 Episodic Webisode Production 3.0 Credits

The students will experiment with many options for developing programming for streaming on the web. They will then create finished episodes that can run on Drexel's website, other on-line outlets or podcasts. The students will also develop viral marketing strategies to promote their work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVPR 340 Remote TV Production 3.0 Credits

Students will learn all of the skills necessary to become effective crewmembers on remote multi-camera shoots produced by the Paul F. Harron Studios and DUTV. Relevant electrical, electronic and video engineering subjects will also be covered. Safety procedures will be taught, stressed and required of all class participants.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVPR 100 [Min Grade: D]

TVPR 347 Advanced TV Lighting 3.0 Credits

This course is designed to build on lighting skills presented in TVPR 100 TV Studio: Basic Operations. Students will design and execute progressively more complex and demanding lighting plots and participate in lighting setups. Remote lighting concepts for both single and multi-cam production will also be presented.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: TVPR 100 [Min Grade: D]

TVPR 348 TV Directing Workshop 3.0 Credits

This course provides real world experience directing television programming in both studio and remote multi-camera environments.

Students will be assigned to direct a wide variety of program and promotional material for DUTV, including talk shows, news broadcasts, sports coverage, musical production, narrative programs, theater and dance.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Prerequisites: TVPR 205 [Min Grade: D]

TVPR 351 TV Comedy Series I 0.5-6.0 Credits

Students will start with scripts for multiple episodes written in SCRP 350. They will do all pre-production including casting, location, scouting, budgeting, scheduling, and production design. They will then shoot every page of script, getting all the coverage needed to produce finished episodes for DUTV.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 9 credits

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVPR 352 TV Comedy Series II 0.5-6.0 Credits

This course is a continuation of "TV Comedy Series I" and will focus on post-production of the episodes. The students will log, organize, and prep the raw footage for editing. Teams of students will then work together to edit each episode. Completed episodes will be broadcast on DUTV.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 9 credits

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVPR 354 TV Series I 0.5-6.0 Credits

Students will start with scripts for multiple episodes written in SCRP 353. They will do all pre-production including casting, location scouting, budgeting, scheduling, and production design. They will then shoot every page of script, getting all the coverage needed to produce finished episodes for DUTV.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVPR 355 TV Series II 0.5-6.0 Credits

This course is a continuation of "TV Series I" and will focus on post-production of the episodes. The students will log, organize, and prep the raw footage for editing. Teams of students will then work together to edit each episode. Completed episodes will be broadcast on DUTV.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: FMVD 110 [Min Grade: D] and FMVD 115 [Min Grade: D] and FMVD 120 [Min Grade: D]

TVPR 356 DNews 0.5-6.0 Credits

This course takes students through the experience of producing a 30 minute version of "60 Minutes" style magazine program, including studio segments, bumpers, field pieces, and final assembly. Special emphasis will be given to aspects of time management.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 18 credits

TVPR 357 DNews II 0.5-6.0 Credits

DNews takes students through the experience of producing a 30 minute style magazine program. Students complete packages for the show and put together field and studio transitional elements. Selected programs may be shown on DUTV.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 18 credits

TVPR 365 Special Topics: TVPR 0.5-6.0 Credits

This is a Special Topic course in TV Production that will have rotating topics that address current interests in the field.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

TVPR 399 Independent Project in TV Production 0.5-12.0 Credits

This course offers students the opportunity to do an Independent Project in TV Production.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVPR 495 Senior Project: TV Production I 3.0 Credits

Both production tracks in the Television major, TV Comedy & Drama Production and TV News & Nonfiction Production, take this first course in a 3-course sequence for senior project. Students will take on significant roles, such as producer, writer, director, videographer, or editor in the production of television programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is TELE and classification is Senior.

TVPR 496 Senior Project: TV Production II 3.0 Credits

Both production tracks in the Television major, TV Comedy & Drama Production and TV News & Nonfiction Production, take this second course in a 3-course sequence for senior project. Students will take on significant roles, such as producer, writer, director, videographer, or editor in the production of television programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is TELE and classification is Senior.

TVPR 497 Senior Project: TV Production III 3.0 Credits

Both production tracks in the Television major, TV Comedy & Drama Production and TV News & Nonfiction Production, take this third course in a 3-course sequence for senior project. Students will take on significant roles, such as producer, writer, director, videographer, or editor in the production of television programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is TELE and classification is Senior.

TVPR I199 Independent Study in TV Production 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVPR I299 Independent Study in TV Production 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVPR I399 Independent Study in TV Production 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVPR I499 Independent Study in TV Production 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVPR T180 Special Topics in TV Production 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVPR T280 Special Topics in TV Production 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVPR T380 Special Topics in TV Production 0.5-6.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

TVPR T480 Special Topics in TV Production 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TV Studies

Courses

TVST 260 History of Television 3.0 Credits

This course explores the history of television as art and communication.

Topics include: the origins and development of television programming, the regulatory environment and the history of the business of television.

Television programs, both fictional and non-fictional, will be viewed from the fifties through the present time.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVST 261 History of TV Journalism 3.0 Credits

This course presents a history of broadcast introduction in the United States. It includes an introduction to the origins, portocals, and principles of journalism on television. It also acquaints students with the prominent trends, programs, and reporting styles throught the decades leading to present-day norms and motivations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVST 361 Art of TV Comedy 3.0 Credits

This course explores the history of television comedy and examines its role as both programming staple and artistic form. By examining how sitcoms reflect our society and its most important social issues, the course seeks to enable students to gauge where both culture and the sitcom are headed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVST 362 Art of TV Drama 3.0 Credits

Students will view and analyze prime-time, hour-long, dramatic TV shows, starting with television's golden age of the fifties and moving to television's "second golden age" starting in the eighties. Students will examine the relationship of the series to other programs, contemporary culture, and television history.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVST 363 Science Fiction Television 3.0 Credits

Students will view a progression of science fiction television shows from the fifties to the present time. Students will examine how each show uses an imagined world as a vehicle for exploring facets of our own world. The concepts and the production values will be discussed for each show.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVST 364 Teen Drama 3.0 Credits

This course looks at acclaimed television programs from the fifties to the present, which present the experience of teenagers as central to the overall show. Students will discuss the content and form of each show, in terms of the directing, the cinematography, the editing, the production design, the sound track, as well as the acting.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVST 365 Special Topics: TVST 3.0 Credits

This is a Special Topic course in television studies that will have rotating topics that address current interests in the field.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

TVST 399 Independent Project: TVST 0.5-12.0 Credits

This course offers students the opportunity to do an Independent Project in Television Studies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVST I199 Independent Study in TV Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVST I299 Independent Study in TV Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVST I399 Independent Study in TV Studies 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVST I499 Independent Study in TV Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVST T180 Special Topics in TV Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVST T280 Special Topics in TV Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVST T380 Special Topics in TV Studies 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 6 times for 18 credits

TVST T480 Special Topics in TV Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Taxation

Courses

TAX 341 Individual Income Taxes 4.0 Credits

Surveys the tax structure of the United States, with emphasis on those portions of the Internal Revenue Code that affect the federal income tax liabilities of individuals.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ACCT 115 [Min Grade: C]

TAX 342 Business Income Taxes 4.0 Credits

Introduces the federal taxation of income earned by corporations, partnerships, and fiduciaries. Considers federal gift and estate taxes.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: TAX 341 [Min Grade: C]

TAX 353 Personal Income Taxes 4.0 Credits

Non-accounting majors only. Introduces the federal tax system, with emphasis on the individual income tax. Uses tax preparation software.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if major is ACCT or classification is Freshman

TAX 360 State and Local Taxation 4.0 Credits

This course provides a basic introduction to state and local taxation, with an emphasis on income and franchise taxes imposed on businesses. The course is designed to encompass all of the major topics relevant to multistate taxation, including recent legislative developments and state tax policy trends.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

TAX 390 Financial Planning and Taxes 4.0 Credits

The Financial Planning and Tax course introduces students to increase personal wealth due to the influence of tax on business and personal decision making. This influence of tax illustrated through class discussions and case assignments, which are real world personal financial and investments opportunities.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 341 [Min Grade: C]

TAX I199 Independent Study in TAX 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

TAX I299 Independent Study in TAX 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

TAX I399 Independent Study in TAX 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

TAX I499 Independent Study in TAX 0.5-4.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

TAX T180 Special Topics in TAX 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

TAX T280 Special Topics in TAX 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

TAX T380 Special Topics in TAX 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

TAX T480 Special Topics in TAX 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Teacher Education

Courses

EDUC 101 Foundations in Education I: A Historical and Philosophical Perspective 3.0 Credits

In this course students are introduced to pedagogical and philosophical concepts, theories, methods and procedures in the historical context of education in America. Students develop an understanding of how schools work and of the teaching/learning dynamic through required mentoring activities.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 102 Foundations in Education II: Contemporary Issues 3.0 Credits

In this course students continue their exploration into the pedagogical and philosophical concepts, theories, methods and procedures in the context of contemporary education in America. Students develop an understanding of how schools work and of the teaching/learning dynamic through required mentoring activities.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 105 Freshman Pedagogy Seminar 1.0 Credit

Education majors only. Addresses observation skills focusing on classroom dynamics, i.e., what is teaching/learning, changing roles of teachers, learning styles, study skills, mentoring, journal writing/analysis, and the use of portfolios.

College/Department: School of Education

Repeat Status: Can be repeated 4 times for 4 credits

Restrictions: Can enroll if major is EDUC and classification is Freshman.

EDUC 112 Integrative Instruction: Focus on World Geography 3.0 Credits

Through the study of geography, encourages students to find a meaningful framework for understanding the system of human culture as it exists over the surface of Earth. Explores the use of technology in education.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EDUC.

EDUC 113 Organizational Structure of Secondary Schools 3.0 Credits

Students will explore the organizational structure of high school programs and acquire competence in designing learner-oriented communities of practice in the classroom to foster student achievement and overall well-being.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 123 [Min Grade: D]

EDUC 115 Reasoning about Numbers and Quantity (4-8) 3.0 Credits

Students will investigate number and quantity concepts, state and national teaching standards and appropriate pedagogical approaches to teaching such topics as; quantities, place value, whole number, fractions and additive reasoning.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 120 Child Development I: Typical Development 3.0 Credits

This course addresses the multifaceted complexities of child development, through discussion of classic and emerging theories. Students will recognize and apply developmental domains of theory and research in the field of child development.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 121 Child Development II: Atypical Development 3.0 Credits

Students will apply knowledge of typical growth and development in childhood to those children whose development is atypical. Key topics include newborn screening, patterns in development and cognitive testing. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 120 [Min Grade: D]

EDUC 123 Adolescent Development 3.0 Credits

This course addresses the complexities of adolescent development, through discussion of theories. It uses research-based, real-world, and cross-cultural examples. It aims to foster the student's ability to recognize and apply connections among developmental domains, theory, and research with the field of human development. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 201 Instructional Issues 3.0 Credits

This course explores and offers in-depth analysis of relevant theories relating to contemporary application of instructional issues, systems and design. The purpose is to provide theoretical, experimental and critical perspectives on instructional issues and design as it is applied in a number of educational venues.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 203 Design of Instructional Materials 3.0 Credits

This course provides an examination of instructional materials and their use in instructional programs for topics of their choosing. Discussion of current media and instructional equipment for effectiveness, specification and purchasing is included.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 205 Sophomore Pedagogy Seminar 1.0 Credit

Education majors only. Builds on the freshman seminar and incorporates service learning as an instructional strategy.

College/Department: School of Education

Repeat Status: Can be repeated 3 times for 4 credits

Restrictions: Can enroll if major is EDUC and classification is Pre-Junior or Sophomore .

EDUC 210 Early Language Development 3.0 Credits

Provides preservice teachers an overview of language development in the early years of a child's life from birth to age five, in the home and school settings. Topics include; phonological awareness, acquisition of phonetic knowledge, semantic understanding and syntactic use. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 216 Diversity and Today's Teacher 3.0 Credits

This course explores major issues related to the increasing diversity of students in elementary and secondary classrooms in the United States. The multifaceted challenges of teaching heterogeneous student populations.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 223 Teaching the Middle School Child 3.0 Credits

This course will explore the middle school environment, developmentally appropriate middle school programs, strategies for supporting students through the transition to middle school, and the impact of peer pressure on the middle school child. The course requires the candidate to apply theories learned in EDUC 123: Adolescent Development to the classroom setting.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 123 [Min Grade: D]

EDUC 236 Early Literacy I 3.0 Credits

This course examines research-validated literacy instruction and literacy interventions. Topics will include phonics, fluency, comprehension, vocabulary, and the reading-writing connection. Emphasis is placed on the socio-cultural aspects of reading. Focus is also placed on literacy instruction across the curriculum.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 240 Proportional Reasoning in Middle School 3.0 Credits

This course provides middle grade teachers with key mathematical ideas of proportional reasoning. Topics explored in this course include: measurement, quantities, relative thinking, unitizing, sharing and comparing, reasoning up and down, and rational number interpretations.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 256 Teaching Writing Grades 4-8 3.0 Credits

This course prepares the candidate to teach and assess writing effectively in grades 4-8. Formative and summative assessments in multi-genre writing will be learned and applied, including the use of Writing Folders and Portfolios.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 257 Content Area Reading (Grades 4-8) 3.0 Credits

This course prepares the pre-service teacher to teach and assess adolescents who are learning to read across multiple subject areas in grades 4-8. Students will explore textbooks, trade books, electronic texts and internet resources. Additional field experience hours are required for this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 258 Reading in the Content Areas 3.0 Credits

This introductory course is designed to help all (7-12) teacher candidates improve their students' reading, writing, research and discussion skills in school and for lifetime learning. The course will focus on important formats and strategies for learning to read and write well and to learn in any subject.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 265 Instructing English Language Learners 3.0 Credits

This course explores principles and theory of second language and literacy acquisition, bilingualism, academic language competence and linguistics, and instructional approaches based on these principles. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 284 Teaching Life Science in the Middle School 3.0 Credits

Course designed to provide the developing middle grades teacher with skills to introduce life science content topics to middle school children, assess children's content knowledge, and develop a variety of hands-on strategies, effective pedagogy, and activities, mini-labs, and conceptual problems that can be implemented in middle grade classrooms.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: (BIO 161 [Min Grade: D] and BIO 162 [Min Grade: D]) or (BIO 102 [Min Grade: D] and BIO 104 [Min Grade: D])

EDUC 285 Teaching Physical Science in the Middle School 3.0 Credits

This course provides the developing candidate with an introduction to how content topics including physical and chemical changes and properties of matter, motion and forces, sound, light, electricity, and magnetism are taught and assessed in the middle school. Candidates learn how to implement activities such as mini-labs and conceptual problems in the middle school setting.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 286 Teaching Earth & Space Science for Middle School 3.0 Credits

This course is designed to provide an introduction to how content topics of earth, plate tectonics, earthquakes, earth's atmosphere/weather and climate are taught and assessed in the middle school. Students will learn how to design age appropriate activities for the middle school setting.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 292 Science Methods for Middle School 3.0 Credits

This course examines planning science instruction to include inquiry and integrated concepts, developing authentic assessments, involving a variety of tools, creating and maintaining a safe laboratory and a learning environment that meets the needs of diverse learners in science education. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 284 [Min Grade: D] and EDUC 285 [Min Grade: D] and EDUC 286 [Min Grade: D]

EDUC 301 Introduction to Personalized Systems of Instruction 3.0 Credits

The student should be coaching or tutoring while taking this course. Covers the theory and practice of the Personalized System of Instruction and the Heuristic Diagnostic Learning approach. Includes emphasis on empowering students in teaching and learning by studying coaching strategies, instructional strategies, learning styles, student-coach interactions, current research, and applying PSI. Requires three hours per week of service comprised of one-to-one academic coaching. Students keep a weekly log of their coaching activities and a reflective journal about the academic coaching experience.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 302 Advanced Seminar In Personalized Systems of Instruction 3.0 Credits

An advanced seminar for students with coaching experience. Covers content knowledge, pedagogical knowledge, and curricular knowledge issues; management of students and problems encountered in coaching; instructional planning design; and issues such as individual differences in learning and motivation. Students maintain a weekly journal of their teaching experience and engage in a critical analysis of their teaching/coaching experiences.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 301 [Min Grade: B]

EDUC 305 [WI] Junior Pedagogy Seminar 1.0 Credit

Education majors only. Continues further exploration of relationships among service learning, content knowledge, pedagogy knowledge, learner characteristics utilizing generic influences, special needs students, and motivation techniques.

College/Department: School of Education

Repeat Status: Can be repeated 2 times for 3 credits

Restrictions: Can enroll if major is EDUC and classification is Junior.

EDUC 306 Assessment of Young Children I 3.0 Credits

Students will gain an understanding of the role of the assessment process in early education. Students will explore evaluation procedures and classroom-based data collection strategies for young children in inclusive education settings. Course covers 3 major functions of assessment: program planning, program monitoring and program evaluation.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 307 Assessment of Young Children II 4.0 Credits

This course will provide candidates with an in-depth view of formal and informal evaluation procedures for young children and their families. Such procedures will be explored in the context of the function of assessment; screening, diagnosis/eligibility, program planning, and program evaluation.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 306 [Min Grade: D]

EDUC 308 Creating a Positive Classroom Climate 3.0 Credits

This course focuses on the practical aspects of classroom management, school safety and other critical social issues that relate to providing a positive and productive learning environment, particularly in under-served classroom settings. Specific focus in this course will be dedicated "knowing the learner", identifying individual student needs, building rapport and constructing a "democratic classroom". Additional emphasis will be placed on teacher leadership and how each pre-service candidate will develop his/her own approach to leading and managing a PK-12 classroom.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 310 Computer Applications in Teaching 3.0 Credits

Studies the unique characteristics of the microcomputer as an instructional tool in elementary and secondary school instruction. Provides students with an understanding of the instructional versatility and limitations of microcomputing through hands-on experience with applications in their subject-matter fields. Addresses issues concerning techniques for integrating computing into instruction.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 311 Computer Applications in Curriculum Development 3.0 Credits

This course presents major instructional design concepts that students will use in developing their own curricular materials. It describes various kinds of teacher-developed instructional tools in relation to appropriate instructional task or learning environment.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 310 [Min Grade: B]

EDUC 312 Educational Policy, Law & Advocacy 3.0 Credits

This course introduces students to the complexities of the law and policy that shape public schooling in the U.S. Emphasis is placed on how education law and policy impact and are impacted by teachers' evolving roles, relationships, and practices. Additionally, the course provides students with foundational information and tools they will need in order to advocate, as teachers, for students and for themselves.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 314 Science Teaching Methods 3.0 Credits

This course bridges theory and practice, providing hands-on experience in the application of constructivist learning theory to designing and delivering effective classroom experiences in the area of science.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 315 Secondary Science Teaching Methods 3.0 Credits

Methods for teaching middle and secondary school science are explored including strategies and technologies to support student learning as defined by the state and national science standards. Inquiry-based model of learning and assessment emphasized. Theory and practice bridged to provide hands-on experiences in application of constructivist learning theory and effective classroom experiences.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 316 Teaching in Urban Contexts 3.0 Credits

This course enables students to understand the complex conditions that have led to issues that impact urban education. The course will explore recent reform efforts focused on changing the organizational structure and curriculum. Specific emphasis will be placed on the teacher's disposition towards the learner, the impact of racism and knowledge and skills related to teaching in urban settings. This course will introduce historical references for the current condition of urban schools as well as the aspects of teaching that lead to a classroom of respect and rapport for the urban learner and his/her family.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 317 Math Methods and Content: Early Childhood 3.0 Credits

Students will know and effectively deliver standards-based academic math content, based on age appropriate understanding, and individual and groups needs including a respect for the unique needs of all types of learners. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Corequisite: EDUC 217

EDUC 318 Math Methods & Content 3.0 Credits

Course emphasizes diagnostic instruction in mathematics by allowing students to complete problems that their students will be expected to work, noting the error and correction process, as well as gaining an awareness of student difficulties in mathematics.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 319 Teaching Secondary Mathematics 3.0 Credits

This course emphasizes the major issues in learning and teaching mathematics in the secondary school. Topics will include instructional practices, learning theories, philosophies of assessment, and curriculum in the secondary school. Throughout the course, emphasis will be placed on the appropriate use of technology.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 320 [WI] Professional Studies in Instruction 6.0 Credits

This course offers field placement with practitioners in classroom environments appropriate to the student's certification area to provide instruction and experience in methodology, classroom management, and the opportunity to apply results of current research on effective teaching. This is a writing intensive course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

EDUC 321 Non-Field Experience Professional Studies in Instruction 3.0 Credits

Study of learning and developmental theories, developmental reading and reading in the content areas, student motivation, and the interrelationships among diverse populations within the school setting, and identification of instructional resources.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 322 Evaluation of Instruction 3.0 Credits

Permits students to acquire competence in new evaluation techniques, including portfolios, journals, performance assessments, individual and collaborative projects, and presentations. Covers qualitative and quantitative assessment used in measuring student achievement. Teaches techniques for grading and reporting pupils' classroom performance in cognitive, affective, and (where appropriate) motor tasks. The course is directed toward instruction in elementary and high school settings.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

EDUC 323 [WI] Diagnostic Teaching 4.0 Credits

Requires students to integrate and apply theories of learning, curriculum, and pedagogy to instruction and heuristic diagnostic teaching. Focuses on the individual learner. Covers processes involved in learning mathematics and science in particular, and studies their applications in relation to individual differences among learners. Emphasizes developing strategies that prevent learning problems. This is a writing intensive course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: EDUC 320 [Min Grade: B]

EDUC 324 Current Research in Curriculum & Instruction 3.0 Credits

Examines the theories and assumptions underlying various approaches to instruction for elementary and high school teaching. Included are areas such as a) knowledge acquisition and critical reasoning in mathematics and science, b) teaching general and specific skills as related to content material, c) study skills and abilities to learn, and d) the roles of memory and metacognition in learning. Explores these processes of human cognition and learning with particular attention to how conditions that foster them might be built into materials, pedagogy, and learning environments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 325 Multimedia in Instructional Design 3.0 Credits

Imparts skills in selecting, using, and evaluating a range of instructional media, including interactive multimedia formats, in relation to educational goals and learner characteristics. Emphasizes presentation skills when using a variety of media to deliver instruction. Students design and write a software prototype as a group design project.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: EDUC 310 [Min Grade: B]

EDUC 326 [WI] Language Arts Processes 3.0 Credits

Studies the nature of language, including phonetic, semantic, and syntactic aspects of language development, and theories of language development. Applies contemporary research to processes and problems in teaching oral and written communication. Assumes that listening, speaking, writing, and reading in the content area are integrated processes and should be taught as such. This is a writing intensive course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

EDUC 327 Learning Disabilities 3.0 Credits

Course will address issues such as definition of learning disability, various types of learning disabilities and the general approaches to the assessment and treatment of learning disabilities.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 328 Language Arts Processes 4-8 3.0 Credits

This course develops knowledge and competencies for teaching adolescent literacy in grades 4-8. Students will use supportive contexts, diverse texts, ongoing assessments, and technology to engage learners in developing self-directed, life-long literacy skills across all disciplines.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 335 Engaging the Learner 3.0 Credits

This course provides multiple approaches to the critical linked processes of assessment, curriculum development, and inclusive instruction of all young children. Topics of study include: planning and preparation, using appropriate materials, scope and sequence and strategies for student-centered assessments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 336 Early Literacy II 3.0 Credits

This course focuses on teaching strategies that are effective in developing students' writing abilities within a literacy rich environment. The interrelationship between reading and writing will be emphasized. Additional field experience hours are required for this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 236 [Min Grade: D]

EDUC 337 Learning Disabilities II 3.0 Credits

The focus of this course is to teach teachers how to manage instruction for students with special needs in the inclusive classroom. Inclusion of students with special needs is now the norm. The course will address curricular and instructional modifications and the use of technology in addressing learning needs. Legal issues pertaining to special education law will be a critical component.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 338 Expressive Arts for PK-4 3.0 Credits

The focus of this course is to teach educators to develop and incorporate relevant curriculum for the expressive arts (dance, music, theatre and visual arts) into the PK-4 classroom(s). Students will explore instructional strategies, modern technologies, stages of artistic development and multicultural art forms.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 355 Social Studies Teaching Methods 3.0 Credits

This course focuses on the effective, responsible and ethical teaching of social studies in the elementary classroom. Topics include; perspectives of social studies, curriculum standards, unit development, assessment design, integrated curriculum and technology, and teacher decision-making.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 356 Secondary Social Studies Methods 3.0 Credits

Students will be able to identify content and appropriate pedagogy strategies for the various National Council for the Social Studies disciplinary standards for history, geography, civics, economics and psychology. Major curriculum movements and teaching diverse learners are also explored. Classroom-based experiences are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 405 Senior Pedagogy Seminar 1.0 Credit

Education majors only. Focuses on the teacher as a researcher. Presents descriptions of collaborations between university faculty and faculty from K-12 schools and discusses student involvement in learning and pedagogy issues.

College/Department: School of Education

Repeat Status: Can be repeated 2 times for 3 credits

Restrictions: Can enroll if major is EDUC and classification is Senior.

EDUC 409 Student Teaching Seminar I 9.0 Credits

This course is part one of a two-course requirement specifically aligned with the teacher candidate's full-time, twenty-four week Student Teaching experience. The course is designed to develop one's teaching knowledge and strengths through classroom practice, supervision and reflective practice. In this seminar, students will share experiences through reflective journaling, discuss best practices in instruction, learn about resources, reflect on what is being encountered in the field and begin to construct professional teaching portfolios. Through this course candidates will be evaluated according to the four domains of effective teaching and learning, which include; planning and preparation, instructional delivery, the classroom environment and professionalism.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 410 [WI] Student Teaching 9.0 Credits

A 12-week field experience that approximates full time classroom teaching and related activities; it is designed to allow the candidate to demonstrate competencies necessary for certification. This is a writing intensive course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: EDUC 323 [Min Grade: B]

EDUC 411 Family and Community Partnerships 3.0 Credits

This course focuses on the process of family assessment and intervention, issues of family and professional collaboration and diversity, and methods of promoting adult communication and management strategies. It applies knowledge of socio-cultural and political contexts as they relate to the family, culture and society.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 412 [WI] Student Teaching 12.0 Credits

A 12-week field experience that approximates full-time classroom teaching and related activities; it is designed to allow the candidate to demonstrate competencies necessary for certification. This is a writing intensive course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EDUC and classification is Senior.

Prerequisites: EDUC 323 [Min Grade: B]

EDUC 414 Special Education: Field Placement Seminar 9.0 Credits

This course is designed to develop special education teaching knowledge, skills and abilities through field placement, supervision and reflective practice. Activities include; journaling, best practice workshops and reflecting on relevant case studies.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 142 [Min Grade: D] and EDUC 244 [Min Grade: D] and EDUC 346 [Min Grade: D] and EDUC 347 [Min Grade: D] and EDUC 348 [Min Grade: D] and EDUC 349 [Min Grade: D] and EDUC 350 [Min Grade: D] and EDUC 351 [Min Grade: D] and EDUC 352 [Min Grade: D] and EDUC 353 [Min Grade: D]

EDUC 416 Introduction to Math Teaching Methods (4-8) 3.0 Credits

This course provides an introduction to learning and teaching mathematics to students in grades 4-8. Emphasis will be on fundamental ideas of number, operation and measurement. This course requires additional field experience.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 417 Advanced Math Teaching Methods (4-8) 3.0 Credits

In this course, students will view mathematics from the perspective of a teacher; how to represent topics to learners in meaningful ways, analyze a learner's reactions to mathematics instruction, and how to select activities that allow the learners to construct meaning, rather than memorize rules and procedures. This course requires additional field-based hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 416 [Min Grade: D]

EDUC 428 Cultural and Historical Significance of Mathematics 3.0 Credits

This course provides mathematics content and pedagogy for the teacher preparation program. Course is part of a state approved certification program.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 432 Algebraic Reasoning 3.0 Credits

This course provides middle school teachers with mathematical ideas of algebraic reasoning. Topics include understanding of multiplicative reasoning, integer addition and rational multiplication as algebraic operations, identity and inverse properties. Emphasis will be placed on the processes of thinking, doing, explaining writing and revising.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 433 Functions in Middle School Math 3.0 Credits

This course is structured to introduce specific content knowledge using a variety of activities and conceptual problems that can be implemented in the middle school classroom. Emphasis will be placed on the process of thinking, doing, explaining, writing and revising mathematics.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 436 Distance Learning 3.0 Credits

This course is intended to address issues surrounding distance learning and pedagogy, and help teachers become more intelligent creators of, more informed participants in, and all-around better users of distance education tools.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC I199 Independent Study in EDUC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDUC I299 Independent Study in EDUC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDUC I399 Independent Study in EDUC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDUC I499 Independent Study in EDUC 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

EDUC T180 Special topics in EDUC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDUC T280 Special topics in EDUC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDUC T380 Special topics in EDUC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDUC T480 Special topics in EDUC 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

Theatre

Courses

THTR 110 Voice and Articulation 3.0 Credits

A beginning course in speech for the stage. The study of standard American speech, techniques for vocal projection, oral interpretation and the effective use of the voice on stage.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

THTR 115 Theatrical Experience 3.0 Credits

This course explores the Theatrical Experience from a non-practitioner's perspective. Through lectures, demonstrations, slides and videos students will examine the roles of theatre artists and how they combine their efforts in creating a unique Theatrical Experience.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

THTR 116 Philadelphia Theatre Let's Go! 3.0 Credits

Philadelphia Theatre Let's Go! exposes students to the variety of theatrical opportunities available in the Philadelphia region. Through research, discussion and attendance at theatrical productions, students will enhance their abilities to discuss, evaluate and enjoy theatre.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

THTR 121 [WI] Dramatic Analysis 3.0 Credits

Through the reading of play-scripts, this course will expose students to a variety of methods of play analysis that can be applied to the various theatre disciplines (production, performance, and design). It will also provide students with the methodology to be used in the Theatre History and upper theatre courses. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

THTR 130 Introduction to Theater Production Practicum 1.0 Credit

Provides an introduction to the tools, equipment and basic procedures required to enable students to participate in the technical aspects of a theatrical production.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

THTR 131 Theatre Performance Practicum 1.0 Credit

Provides practical experience in acting for the stage. Requires student to play a role in a Department of Performing Arts theatre production. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR 132 Theatre Production Practicum 1.0 Credit

Provides practical experience in theatre production. Requires students to participate in planning, preparation, and completion of a realized production as a crew head or crew member. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: THTR 130 [Min Grade: D]

THTR 133 Theatre Management Practicum 1.0 Credit

This class provides practical experience in Theatre Management including Production Management, Stage Management, Box Office Management, and other Administrative Management areas for live theatrical events. Students are required to participate in a production for the Theatre Program.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR 134 Open Mic Management Practicum 1.0 Credit

Students will gain hands on experience running a performance venue on campus. Students are responsible for daily operations of Late Night Series Productions including: financial operations, strategic planning, artistic management, volunteer coordination, strategic partnerships, artist recruitment and management, marketing, and internet presence. Also all production elements including: sound design and operation, light design and operation, and stage management and run crew.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR 141 Theatre Performance Ensemble 1.0 Credit

The Theater Performance Ensemble focuses on a specific area of performance training, creation, and research to supplement the standard theater curriculum in performance. Each quarter focuses on a specific area with emphasis on learning as an ensemble and a priority on developing new skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR 142 Director's Lab Practicum 1.0 Credit

This course provides practical experience in acting for the stage through participation in a student directed one-act play in conjunction with the Play Directing Class.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR 143 Musical Theatre Cabaret 1.0 Credit

An introductory course for singers and non-singers emphasizing applying acting techniques to the performance of a song. Focus will be placed on lyrics, and advancing dramatic action through the song. The class will conclude with a public performance of the material students have worked on in class.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR 144 NewWorks Festival Performance Practicum 1.0 Credit

This course provides practical experience in acting and dramaturgy for the stage through the participation, development, and performance of student written plays.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR 209 Improvisation for the Theatre 3.0 Credits

This course is designed to develop spontaneity and increase listening skills. It will begin with exercises in trust building, listening and ensemble building. It will then progress to scenes to increase skill, and by the end of the quarter students will learn long form work that will lead to performance.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

THTR 210 Acting: Fundamentals 3.0 Credits

Introductory acting course. Covers basic exercises, improvisations, fundamentals of voice production, and stage movement.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

THTR 211 Acting: Scene Study 2.0 Credits

Continues THTR 210. Intermediate course in acting, focusing on application of the techniques of acting through scene study.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated 5 times for 10 credits
Prerequisites: THTR 210 [Min Grade: D]

THTR 212 Sketch Comedy 3.0 Credits

This course explores the various techniques employed by sketch comedians to imagine and create scripts which spring from a specific point of view. Through exercises and assignments, sketch comedy will be explored as it relates to collaborates writing, improvisation, character development and the rehearsal process.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

THTR 221 [WI] Theatre History I 3.0 Credits

This course will expose students to the origins of drama from antiquity through the Jacobean period. Through the reading of plays and text, students will explore the relationship of the drama to the social, political, and trends within a given period and how they influenced one another. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Prerequisites: THTR 121 [Min Grade: D] or HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 108 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A] or ENGL 103 [Min Grade: D]

THTR 222 [WI] Theatre History II 3.0 Credits

This course continues the study of drama beginning with the Restoration and continuing through the modern era. Through the reading of plays and texts, students will explore the relationship of the drama to the social, political, and economic trends within a given period and how they influenced one another. This is a writing intensive course.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

THTR 231 Introduction to Musical Theatre 3.0 Credits

The Musical is one of America's greatest contributions to the world of theatre. Through class discussions, viewing live performance, audio/video examples, and readings students will explore the development of the American Musical from the Minstrel show through the Golden Age of the Musical.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

THTR 232 Contemporary Musical Theatre 3.0 Credits

The Musical is one of America's greatest contributions to the world of theatre. Through class discussions, viewing live performance, audio/video examples, and readings students will analyze the changes in the American Musical form beginning in the 1960s to the present and predict its future direction.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

THTR 240 Theatre Production I 3.0 Credits

Uses lectures, discussions, and practical experience to introduce the processes and equipment used in the production of plays, including scenery construction, lighting, sound, and costuming.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

THTR 241 Theatre Production II 3.0 Credits

Covers advanced applications of techniques of stagecraft, including drafting, stage machinery, lighting, painting, and property construction.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Prerequisites: THTR 240 [Min Grade: D]

THTR 260 Production Design 3.0 Credits

This course will allow students to expand on principles learned in Dramatic Writing enabling them to develop and communicate, through a variety of means, a unified production concept for a playscript. Students will present their designs in the areas of scenery, costumes and lighting demonstrating their ability to translate their production concept into theatrical reality.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Cannot enroll if classification is Freshman

THTR 320 Play Direction 3.0 Credits

Introduces the art of directing, including play analysis, interpretation, rehearsal procedures, techniques of blocking, composition, picturization, and director-actor communications.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Prerequisites: THTR 211 [Min Grade: D] and THTR 121 [Min Grade: D]

THTR 360 Lighting Design 3.0 Credits

This course provides students with a complete introduction to the Theatrical Lighting Design, including discussions of color, composition, movement and electricity. Students apply the principles discussed in a theatre laboratory setting and are prepared to create innovative and practical designs for the stage.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Restrictions: Cannot enroll if classification is Freshman or Sophomore

THTR 380 Special Topics in Theatre 0.5-12.0 Credits

Covers selected topics in theatre. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

THTR 495 Directed Studies in Theatre 12.0 Credits

Provides supervised individual study of special subjects in theatre. May be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR I199 Independent Study in THTR 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR I299 Independent Study in THTR 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR I399 Independent Study in THTR 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR I499 Independent Study in THTR 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR T180 Special Topics in Theatre 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR T280 Special Topics in Theatre 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR T380 Special Topics in Theatre 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

THTR T480 Special Topics in Theatre 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

University - Wide Courses

Courses

UNIV R101 The Drexel Experience 2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated 5 times for 4 credits

University - Wide Courses

Courses

UNIV H101 The Drexel Experience 2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 5 times for 4 credits

UNIV H201 Looking Forward: Academics and Careers 1.0 Credit

Just as UNIV 101 introduces students to the University and the major, UNIV 201 prepares students for their post-college future.

Through developing a portfolio of work, creating reflections on the undergraduate experience and coop, learning about job and graduate school opportunities, and preparing for the senior year, students prepare for graduation and beyond.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

UNIV S101 The Drexel Experience 2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 5 times for 4 credits

UNIV S201 Looking Forward: Academics and Careers 1.0 Credit

Just as UNIV 101 introduces students to the University and the major, UNIV 201 prepares students for their post-college future.

Through developing a portfolio of work, creating reflections on the undergraduate experience and coop, learning about job and graduate school opportunities, and preparing for the senior year, students prepare for graduation and beyond.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

University - Wide Courses

Courses

UNIV G101 The Drexel Experience 2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: Goodwin College of Professional Studies

Repeat Status: Can be repeated 5 times for 4 credits

University - Wide Courses

Courses

UNIV E101 The Drexel Experience 2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: College of Engineering

Repeat Status: Can be repeated 5 times for 4 credits

University - Wide Courses

Courses

UNIV A101 The Drexel Experience 2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 5 times for 4 credits

University - Wide Courses

Courses

UNIV 241 Great Works Symposium 3.0 Credits

The Great Works Symposium is a series of team-taught, interdisciplinary courses, designed to develop into a foundation curriculum for all Drexel undergraduates. Each course is focused on a great human achievement, which may be literary, technological or social, such as The Atomic Bomb, The Internet, The Bhagavad-Gita, The Brooklyn Bridge, or Christmas.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

UNIV PE101 The Drexel Experience 2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated 5 times for 4 credits

University - Wide Courses

Courses

UNIV 101 The Drexel Experience 0.5-2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: University Courses

Repeat Status: Can be repeated 5 times for 4 credits

UNIV 181 Freshman Academic Seminar I 1.0 Credit

The Freshman Academic Seminar (FAS) classes are what give the Freshman Academic Seminar Program its name. The goal of this course is to help students better adjust to their first year at Drexel and navigate the campus, as well as the city of Philadelphia. Students will be paired with a student mentor who is an alumnus of this program. Classes will be facilitated by FAS staff, program mentors, and guest lecturers.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman.

UNIV 182 Freshman Academic Seminar II 0.5 Credits

This course is part two of three. The Freshman Academic Seminar (FAS) classes are what give the Freshman Academic Seminar Program its name. The goal of this course is to help students adjust to their first year at Drexel as both a student and as an individual. Classes will be facilitated mainly by guest lecturers, but may also include FAS staff. Students will be required to participate in group activities which may include additional time spent outside of the classroom exploring Philadelphia.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman.

UNIV 183 Freshmen Academic Seminar III 0.5 Credits

This course is part three of three. The Freshman Academic Seminar (FAS) classes are what give the Freshman Academic Seminar Program its name. The goal of this course is to provide students with knowledge beyond the scope of the classroom by listening to talks and engaging in activities that broaden students' experiences. Students will participate in group activities aimed at enhancing global competence and responsible citizenship. Guest speakers will discuss communication skills, ethical reasoning, professional practice and growth.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Freshman.

UNIV 241 Great Works Symposium 3.0 Credits

The Great Works Symposium is a series of team-taught, interdisciplinary courses, designed to develop into a foundation curriculum for all Drexel undergraduates. Each course is focused on a great human achievement, which may be literary, technological or social, such as The Atomic Bomb, The Internet, The Bhagavad-Gita, The Brooklyn Bridge, or Christmas.

College/Department: Pennoni Honors College

Repeat Status: Can be repeated multiple times for credit

UNIV 320 Writing and Peer Tutoring Workshop 3.0 Credits

This is a writing intensive course.

College/Department: University Courses

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore
Prerequisites: HUM 103 [Min Grade: D] or HUM 105 [Min Grade: A] or HUM 108 [Min Grade: D] or ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

UNIV T180 Special Topics-University Wide 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

UNIV T280 Special Topics-University Wide 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

UNIV T380 Special Topics-University Wide 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

UNIV T480 Special Topics-University Wide 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

UNIV X101 The Drexel Experience 2.0 Credits

College/Department: University Courses

Repeat Status: Can be repeated 1 times for 8 credits

University - Wide Courses

Courses

UNIV B101 [WI] The Drexel Experience 2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 5 times for 4 credits

UNIV B201 Career Management 1.0 Credit

This is a career capstone course for LeBow seniors. At the completion of this course, students will be able to clearly articulate relevant knowledge, skills, abilities and strategies for reaching professional goals, post-graduation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

University - Wide Courses

Courses

UNIV T101 The Drexel Experience 2.0 Credits

This course introduces first year students to university life, his/her major, our community, and Co-op.

College/Department: School of Education

Repeat Status: Can be repeated 5 times for 4 credits

UNIV T180 Special Topics-University Wide 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

UNIV T280 Special Topics-University Wide 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

UNIV T380 Special Topics-University Wide 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

UNIV T480 Special Topics-University Wide 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

Visual Studies

Courses

VSST 101 Design I 4.0 Credits

Focuses on two-dimensional space, black and white, and appropriate tools and materials.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

VSST 102 Design II 4.0 Credits

Expands the visual vocabulary to include color theory. Continues the process of discovery and visual decision-making.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 101 [Min Grade: D] or VSST 104 [Min Grade: D] or VSST 108 [Min Grade: D]

VSST 103 Design III 4.0 Credits

Covers the perception and ordering of three-dimensional space. Includes new methods and materials in the continuing process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D] or VSST 109 [Min Grade: D]

VSST 104 Accelerated Design I 2.0 Credits

This is an accelerated course offered as a substitute for VSST 101. The work concentrates on two-dimensional space with a primary focus in black and white. The course is 8 hours per week delivered in three weeks.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

VSST 105 Accelerated Design II 2.0 Credits

This is an accelerated course offered as a substitute for VSST 102. The work concentrates on color, expanding the two-dimensional vocabulary. The course is 8 hours per week delivered in three weeks.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 101 [Min Grade: D] or VSST 104 [Min Grade: D] or VSST 108 [Min Grade: D]

VSST 106 Accelerated Design III 2.0 Credits

This is an accelerated course offered as a substitute for VSST 103. The work concentrates on three-dimensional space with a primary focus on materials and craftsmanship. The course meets 8 hours per week delivered in four weeks.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D] or VSST 109 [Min Grade: D]

VSST 108 Design I for Media 3.0 Credits

Introductory 2D design course for media majors combining hand and computer approaches.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

VSST 109 Design II for Media 3.0 Credits

Introductory color design course for media majors combining hand and computer approaches. Builds on the design lessons of VSST 108 Design I for Media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 108 [Min Grade: D]

VSST 110 Introductory Drawing 3.0 Credits

Provides basic understanding of the perceptual problems in drawing, including how three-dimensional objects can be represented on a two-dimensional surface.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

VSST 111 Figure Drawing I 3.0 Credits

Introduces drawing of the human figure, with emphasis on composition and shape-area relationships.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 110 [Min Grade: D]

VSST 112 Figure Drawing II 3.0 Credits

Continues VSST 111. Covers developing mass and form in the human figure.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 111 [Min Grade: D]

VSST 201 Multimedia: Performance 4.0 Credits

Investigates 4D design (the organization of space over time) using objects, light, sound, movement, gesture, and language in solo and group presentations. Incorporates conceptualization, experimentation, perception and analysis.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

VSST 202 Multimedia: Space 4.0 Credits

Concentrates on environment and spatial concepts. Expands previous concern with the object and personal space to envision space and the action within. Requires students to work individually or in groups to create works at this new scale.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D]

VSST 203 Multimedia: Materials 4.0 Credits

This course augments the design studio experiences by introducing the influence of material characteristics and fabrication techniques. Students learn how to design projects, reduce them to the specific parts, make the parts and assemble the work in a coordinated sequence. Work is done in the Visual Studies Arts Annex woodshop.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D] or VSST 109 [Min Grade: D]

VSST 204 Materials Exploration 4.0 Credits

This course examines the relationship of materials and design principles as they relate to wearable art forms.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 103 [Min Grade: D] or VSST 106 [Min Grade: D]

VSST 210 Painting Basics 3.0 Credits

Painting Basics explores the fundamentals of making representational paintings. Working from direct observation, students learn the hands-on practices, materials and concepts of painting applicable to digital representation. Projects that use still life, interior and landscape subjects address design, composition and proportion as well as the effective use of color contrasts to create illumination and spatial depth. Water-based media will be used.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 108 [Min Grade: D]

VSST 301 Painting I 4.0 Credits

New techniques, materials, and terminology, are introduced through a series of assignments based on observations of still life's and life models. Emphasis is placed on the application of color to articulate space and the development of individual expression.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D] or VSST 109 [Min Grade: D]

VSST 302 Painting II 4.0 Credits

Expands the techniques, methods and materials covered in Painting 1. Representational and abstract styles are explored. Using techniques of observation and imagination, new approaches to painting are encouraged.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 301 [Min Grade: C]

VSST 303 Painting III 4.0 Credits

Painting 3 expands on the ideas, methods, and materials, covered in Painting 1 and 2. Students formulate a self-styled project that focuses on a particular approach to painting. Emphasis is placed on mastering technical ability, and inventing imaginative solutions to challenges that arise in the project's completion.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 302 [Min Grade: C]

VSST 304 Materials Exploration 4.0 Credits

This course examines the relationship of materials and design principles as they relate to wearable art forms.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 103 [Min Grade: D] or VSST 106 [Min Grade: D]

VSST 310 Sculpture: Metal Fabrication 4.0 Credits

This specialized course teaches welding and metal fabrication techniques that students use to develop a series of projects. Students also experiment with alternative material combinations and investigate the use of metal in contemporary sculpture.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 8 credits

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 102 [Min Grade: D] or ARCH 102 [Min Grade: D] or VSST 109 [Min Grade: D]

VSST 311 Sculpture I 4.0 Credits

This course focuses on idea development, the creative application of materials and process, and introducing basic wood and metal working tools and techniques. Projects bring these elements together with an emphasis on investigating new media and developing critical dialogue as it pertains to discussing and evaluating artwork.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 103 [Min Grade: D] or VSST 106 [Min Grade: D]

VSST 312 Sculpture II 4.0 Credits

Continues VSST 311.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 311 [Min Grade: D]

VSST 313 Sculpture III 4.0 Credits

Continues VSST 312.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 312 [Min Grade: D]

VSST 321 Screenprint I 4.0 Credits

Water based and photographic techniques are combined to create painterly and precise imagery in the building of a body of work.

Techniques may include stencil-making, digitizing, mono-printing and color exploration. This course introduces the foundations of technical skills, language and theories used by the artist as printmaker.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D] or VSST 109 [Min Grade: D]

VSST 322 Printmaking I 4.0 Credits

Explores various printmaking techniques including but not exclusive of photographic lithography, relief block printing and screen-printing. Drawing processes and mixed media are emphasized. The foundations of technical skills, language and theories used by the artist as printmaker are introduced.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 102 [Min Grade: D] or VSST 105 [Min Grade: D] or VSST 109 [Min Grade: D]

VSST 323 Printmaking II 4.0 Credits

A continuation of Printmaking I, exploring techniques to a greater depth. Drawing, photographic processes and mixed media are emphasized. The foundations of technical skills, language and theories used by the artist as printmaker are introduced.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 322 [Min Grade: D]

VSST 324 Advanced Printmaking 4.0 Credits

Explores combination-printmaking, portfolio development and building a cohesive body of work. Techniques may include mixed media printmaking, digital and alternative media. Students will document their work and develop an artistic statement. The foundations of technical skills, language and theories.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 321 [Min Grade: D] or VSST 322 [Min Grade: D]

VSST 325 Screenprint II 4.0 Credits

A continuation of Screenprinting I, exploring techniques to a greater depth. Techniques may include stencil-making, digitizing, mono-printing and color exploration. This course introduces the foundations of technical skills, language, and theories used by the artist as printmaker.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: VSST 321 [Min Grade: D]

VSST 350 Painting - Special Studies 0.5-12.0 Credits

Includes a broader-based study of painting and allows pursuit of exploratory, more personal statements.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: VSST 303 [Min Grade: D]

VSST 399 Independent Study: Visual Studies 0.5-12.0 Credits

Provides individualized study in visual studies in a specialized area of study. May be repeated for credit. Department permission required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if classification is Junior or Senior.

VSST 465 Special Topics in Visual Studies 3.0 Credits

Provides study in visual studies on a special topic or on an experimental basis. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

VSST I199 Independent Study in Visual Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSST I299 Independent Study in Visual Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSST I399 Independent Study in Visual Studies 0.5-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSST I499 Independent Study in Visual Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSST T180 Special Topics in Visual Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSST T280 Special Topics in Visual Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSST T380 Special Topics in Visual Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

VSST T480 Special Topics in Visual Studies 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WEST Studies

Courses

WEST 100 Introduction to Digital Design Tools 3.0 Credits

This introductory level course will provide the technical background for creative and professional digital communication on several platforms.

Students will examine basic elements of design through the use of print and web based programs including Illustrator, Photoshop, InDesign, Acrobat, Powerpoint, Word Press and Constant Contact. Students will explore the current potentials, limitations, and issues related to the use of computer software for design application.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

WEST 105 Deciding Design & Media 3.0 Credits

This course concentrates on the observation and exploration of majors in Media Arts & Design as explored in the class offerings at Westphal College. Students will record personal observations and will use reflective writing to develop more informed impressions of disciplines.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

WEST 210 Innovative Problem Solving 4.0 Credits

A seminar course that examines different methods of problem solving and its role across disciplines. The intention is to give the student a basis with which interdisciplinary projects can be approached in an innovative way and problem solving can be examined from multiple viewpoints.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

WEST 220 Multimodal Research 4.0 Credits

This course will develop student's critical thinking skills through examining research and information gathering models. The topics around which students will gather, analyze and synthesize information include: Systems and the Environment, Community Interaction, Technology and Problem Solving.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

WEST 310 Active Learning and Exploration 4.0 Credits

Provides faculty guidance to enable students to identify and investigate an aspect of an interdisciplinary problem that they have identified.

May include establishment of philosophical base, data collection, study of comparable or similar problems, writing of a project program, and preliminary project development. Includes interdisciplinary panel presentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: WEST 210 [Min Grade: D] and WEST 220 [Min Grade: C]

WEST 320 Active Engagement Projects 4.0 Credits

Students will explore, with faculty guidance an interdisciplinary problem solving based project that will be related to an area of interest and broader goals that they have identified as part of WEST 310 Active Learning and Exploration. The students will thoroughly explore the subject and execute the project through a variety of media and platforms.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: WEST 315 [Min Grade: C]

WEST 399 Independent Study Westphal 0.5-12.0 Credits

Provides individualized study in an area related to a major within the Antoinette Westphal College of Media Arts & Design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 21 credits

WEST 465 Special Topics in Media, Arts and Design 0.5-12.0 Credits

Interdisciplinary course involving topics that cross department boundaries in the College of Media Arts & Design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 21 credits

WEST I199 Independent Study in WEST 12.0 Credits

Provides individualized study in an area related to a major within the Antoinette Westphal College of Media Arts & Design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WEST I299 Independent Study in WEST 12.0 Credits

Provides individualized study in an area related to a major within the Antoinette Westphal College of Media Arts & Design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WEST I399 Independent Study in WEST 0.5-12.0 Credits

Provides individualized study in an area related to a major within the Antoinette Westphal College of Media Arts & Design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 21 credits

WEST I499 Independent Study in WEST 12.0 Credits

Provides individualized study in an area related to a major within the Antoinette Westphal College of Media Arts & Design.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WEST T180 Special Topics in WEST Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WEST T280 Special Topics in WEST Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WEST T380 Special Topics in WEST Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WEST T480 Special Topics in WEST Studies 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 7 times for 21 credits

Web & Motion Graphic Design

Courses

WMGD 210 Motion Graphics I 4.0 Credits

This course explores fundamentals of graphics in motion, focusing on the use of word and image for television and web.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: VSCM 230 [Min Grade: D] and VSCM 240 [Min Grade: D]

WMGD 220 Web Graphics I 4.0 Credits

This course focuses on the concepts, issues and techniques related to the design of Websites. Emphasis is on the design and hierarchy of a website. Students will utilize HTML, XHTML, basic JavaScript, dynamic HTML, and Cascading Style Sheets (CSS) skills.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM or major is GRDS.

WMGD 330 Web Graphics II 4.0 Credits

Continues WMGD 220. Increases the complexity and scope of the art direction and design for web graphics. Students will focus on professional quality web pages using dedicated software that adheres to current industry standards.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM or major is GRDS.

Prerequisites: WMGD 220 [Min Grade: D]

WMGD 421 Motion Graphics II 4.0 Credits

This course focuses on applying aesthetics and skills learned in the first level to real-world applications that emphasize the graphics design of moving images.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: WMGD 210 [Min Grade: D]

WMGD 465 Special Topics 3.0 Credits

Provides study in web & motion graphic design on a special topic or on an experimental basis. May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Can enroll if major is GRDS.

WMGD 496 Senior Thesis in Web and Motion Graphic Design 3.0 Credits

This course is a personal investigation that evidences advanced creative thinking and problem-solving in motion graphics. Thesis will result in an in-depth project that demonstrates professional abilities.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GRDS.

Prerequisites: WMGD 421 [Min Grade: D]

WMGD I199 Independent Study in WMGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WMGD I299 Independent Study in WMGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WMGD I399 Independent Study in WMGD 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WMGD I499 Independent Study in WMGD 12.0 Credits

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WMGD T180 Special Topics in Web & Motion Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WMGD T280 Special Topics in Web & Motion Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WMGD T380 Special Topics in Web & Motion Graphic Design 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WMGD T480 Special Topics in Web & Motion Graphic Design 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 3 times for 12 credits

Web Development

Courses

WBDV 216 History of Web Development 3.0 Credits

This course explores all aspects of web development including the foundations of web technologies, formulation of web standards and how the individual web surfer's wants and needs have changed over time. Also discussed will be ground-breaking websites and the evolution of interface design for the web.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

WBDV 220 User Experience 3.0 Credits

In this course, students learn to identify and implement the elements required to create incredible digital experiences. Through the application of user-centered design practices, students will develop predictive and enjoyable designs based on a holistic consideration of users' experience. Topics covered in this course include brand personality, content strategy, information architecture, and usability.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 100 [Min Grade: D]

WBDV 240 Web Authoring I 3.0 Credits

This course explores principles and techniques for creating effective interactive media-rich websites. It includes aesthetics of human-computer interaction; bandwidth; project planning, budgeting and management; prototyping; testing and revision management.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 100 [Min Grade: D]

WBDV 241 Vector Authoring I 3.0 Credits

Focuses attention on learning multimedia-authoring tools to create self-contained delivery programs, includes consideration and discussion of social impacts on digital technology.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: WBDV 240 [Min Grade: D] or DIGM 240 [Min Grade: D]

WBDV 242 Dynamic Vector Graphics 3.0 Credits

Students work with concepts and software for better integration of Internet multimedia-authoring programs with assorted browsers and server side databases.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (WBDV 240 [Min Grade: D] or DIGM 240 [Min Grade: D]) and (INFO 152 [Min Grade: D] or CS 143 [Min Grade: D] or CS 171 [Min Grade: D])

WBDV 243 Content Management Systems 3.0 Credits

Students set up a content management system and develop a custom theme. Also includes project planning, organizing and maintaining effective stylesheets and recognizing common browser bugs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (WBDV 240 [Min Grade: D] or DIGM 240 [Min Grade: D]) or (INFO 151 [Min Grade: D] or CS 143 [Min Grade: D] or CS 171 [Min Grade: D])

WBDV 265 Web Game Design 3.0 Credits

Examines multimedia authoring tools used to create self-contained interactive games. Students address real world production as they master advanced game design concepts.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: WBDV 242 [Min Grade: D] or DIGM 242 [Min Grade: D]

WBDV 332 Rich Internet Applications 3.0 Credits

This course explores web development techniques used within the local web browser to create applications capable of retrieving data from an online server asynchronously in the background without interfering with the display and or behavior of the existing page.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: INFO 152 [Min Grade: D] and (WBDV 243 [Min Grade: D] or DIGM 243 [Min Grade: D])

WBDV 370 Mobile Interactive Design I 3.0 Credits

Focuses on creating user experience optimized for mobile devices. Students learn to build unique applications that take advantage of gestures and accelerometers. Special consideration is given to limited screen real estate, low bandwidth internet access, no internet access, and touch screen devices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: WBDV 242 [Min Grade: D] or DIGM 242 [Min Grade: D]

WBDV 371 Mobile Interactive Design II 3.0 Credits

In this course, students learn how to convert web-based applications into cross-platform native applications for mobile devices (i.e. Smart Phones and Tablets). Special consideration is given to incorporating functionality that is currently unavailable to web-based applications (i.e. Device accelerometer, camera, geolocation, etc).

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: WBDV 370 [Min Grade: D]

WBDV 399 Independent Project in Interactive Digital Media 0.5-12.0 Credits

Supervised planning and execution of a project in the area of Interactive Digital Media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: WBDV 243 [Min Grade: D]

WBDV 445 Advanced Hybrid Interactivity 3.0 Credits

This course focuses on the integration of PC potential to access high bandwidth objects including video, audio, 3D animations and other dynamic content from the Internet.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: WBDV 242 [Min Grade: D] or DIGM 242 [Min Grade: D]

WBDV 447 Vector Authoring III 3.0 Credits

this class teaches advanced Flash authoring concepts and explores online applications for entertainment, streaming video, simulations and e-commerce. Projects will use role-playing, group, and individual instruction in the concepts, tools and social concepts for the creation of vector based media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: WBDV 243 [Min Grade: D] or (DIGM 243 [Min Grade: D] and CS 131 [Min Grade: D])

WBDV 448 Interactive Digital Media Workshop I 3.0 Credits

This course explores the management process of developing or redesigning a successful interactive digital experience. Students work in team environments to analyze project requirements; define steps towards development and focus on audience, usability and testing.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: WBDV 243 [Min Grade: D] or DIGM 243 [Min Grade: D]

WBDV 449 Interactive Digital Media Workshop II 3.0 Credits

In this course, students work in a team environment to convert a digital media prototype into production quality product utilizing collaboration software, Gantt charts, and distributed revision control and source code management (SCM) systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: WBDV 448 [Min Grade: D]

WBDV 452 Web Information Database Applications 3.0 Credits

Database and the server technology that accesses them are central to all dynamic web sites. This course will use PHP and MySQL to provide students with the tools for the creation of database driven sites.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: WBDV 243 [Min Grade: D]

WBDV 460 Experimental Web Technologies 3.0 Credits

This course focuses on researching new innovations in experimental digital media technologies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: WBDV 370 [Min Grade: D]

WBDV 465 Special Topics in Interactive Digital Media 3.0 Credits

Addresses current topics in a rapidly changing field. Possible offerings include; multimedia databases, virtual and augmented reality, 3-D XML, interactive art in virtual space, and multi-threaded narrative, etc... May be repeated for credit if topics vary.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WBDV I199 Independent Study in WBDV 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WBDV I299 Independent Study in WBDV 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WBDV I399 Independent Study in WBDV 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WBDV I499 Independent Study in WBDV 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WBDV T180 Special Topics in Web Development 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WBDV T280 Special Topics in Web Development 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WBDV T380 Special Topics in Web Development 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

WBDV T480 Special Topics in Web Development 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Women's and Gender Studies

Courses

WGST 101 Introduction to Women's and Gender Studies 3.0 Credits

Women's and Gender Studies is a field that takes as its themes the study of women and gender, utilizing multi-disciplinary approaches from fields such as history, psychology, philosophy, and sociology. WGST 101 approaches the topics experientially and allows students to explore their own gender and sexuality as living identities.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

WGST 201 Introduction to Feminisms 3.0 Credits

Feminisms are movements to understand and critique gender relations and gender oppression, and also attempts to construct positive visions of human freedom and ethical action in an unjust world. This course is an introduction to the history of feminisms. The major movements that make up feminism in the modern era, in both the U.S. and abroad, will be examined.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

WGST 220 Writing on the Body 3.0 Credits

A study of the female body, since the publication of "Our Bodies Ourselves" to the present, dealing with such themes as the body as sexual object or reproductive womb, the body as social construct and the tyranny of the look, and related issues in politics, violence, sexism, fashion, peer-pressure, illness, age, etc.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

WGST 225 Women & Human Rights Worldwide 3.0 Credits

Women's human rights emerged in the 1980 as a special area, distinct from existing human rights norms. They are intended to better defend women's rights throughout the world. This class will consider women's human rights in a global context, looking at all parts of the world. We will examine women's rights around various topics such as health, social position, exile, war, censorship, childhood, and work. Academic literature, fiction, and film will all contribute to an understanding of the topic.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

WGST 230 Arab Women Writers 3.0 Credits

From Maghrebian Algeria and Morocco to Middle Eastern Egypt and Iraq and Lebanon, Arab women writers depict life in their countries or an unnamed desert state, from the 1940's to the Iraq War, raising critical questions about society, politics, economics and woman's place in doing so.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

WGST 235 African Francophone Women Writers: Displacement. From One Continent To Another 3.0 Credits

An introduction to the writing of some Francophone women writers from West and Sub-Saharan Africa. With each writer, the status, roles and challenges of women in their respective countries and societies will be examined.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

WGST 240 Women and Society in a Global Context 3.0 Credits

Studies women in a global society with one major area covered during each offering. Offered each year to accommodate one major world area.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

Restrictions: Cannot enroll if classification is Freshman

WGST 255 Gender and Black Popular Culture 3.0 Credits

This course critically examines the media's role in the social construction of "Blackness." Paying particular attention to images of race, culture and gender, this course examines representations of Black women and men in "popular culture" (film, television, music, advertising, etc.).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

WGST 260 Gender and Judaism 3.0 Credits

An exploration of gender in Jewish religion and tradition. How has Judaism historically understood gender? Is Judaism a traditional or progressive religion where gender is concerned? What is the future of gender in Judaism?.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

WGST 265 Sexuality and Dictatorship 3.0 Credits

The class studies two different dictatorship governments in South America in the twentieth century: Chile and Uruguay through their victims' literary production. Male and female writers reacted differently towards these totalitarian systems. Female writers, especially Uruguayan, explored their sexuality in their writings to rebel against these dictatorships.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

WGST 270 Cigarettes and High Heels 3.0 Credits

The class introduces students to basic notions of semiotics that help to understand how humans create meanings according to a complex interplay of conventions of which we are normally unaware. The class explores the interpretations of two common social practices in modern societies: smoking and wearing high heels. It mainly concentrates on Spanish speaking societies in the Western hemisphere.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

WGST 275 Women's Health and Human Rights 3.0 Credits

This course explores the relationships between women's health and human rights under political and socially constructed influences. Health and well being are intricately associated with fundamental rights. We will conduct a comprehensive overview of women's health by engaging in lectures, class discussions, readings, journaling, group work, interviews and in-class activities.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

WGST 301 Sex, Gender, Feminism: A Seminar in Feminist Theories 3.0 Credits

What does it mean to call oneself a feminist in the twenty-first century? This class explores the history of feminism from the perspective of sex and gender. In it, students ask and answer the question, "What kind of feminist am I?".

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

WGST 308 Queer Theory 3.0 Credits

In an attempt to theorize the meaning of "queer" (and, in turn, its counterparts - "normal" and "straight") and to articulate what "queer theory" is/does, this course will examine major attempts to challenge the concept of "normal" and explicate the meaning and use of the concept "queer".

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

WGST 320 Masculinities 3.0 Credits

An exploration of how masculinity is lived its multiple forms, traditional and alternative, in contemporary Western society. This course aims to arrive at a theory of masculinity – what does it mean to be "masculine"?.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

WGST 324 Retail Intersections: Social & Cultural Issues 3.0 Credits

Those who participate in the business of fashion such as retailers, merchants, designers, manufacturers and stylists must evolve in order to sell to customers. Throughout their lives, students are exposed to retailing, merchandising, buying, design, sales, branding, promotions, manufacturing and other such fields. For those interested in the study of retailing, fashion and merchandising, it is essential to understand landmark research and theoretical concepts behind the influences of this field and how social change, innovations and with the evolution of a multicultural marketplace, shifts have occurred over generations, and into the 21st century. This conceptual and theoretical course will expose students to a diverse range of clients and consumers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

WGST I199 Independent Study in Women's and Gender Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WGST I299 Independent Study in Women's and Gender Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WGST I399 Independent Study in Women's and Gender Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WGST I499 Independent Study in Women's and Gender Studies 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WGST T180 Special Topics in Women's and Gender Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WGST T280 Special Topics in Women's and Gender Studies 1.0-6.0 Credit

Gives students an opportunity to apply the interdisciplinary methodology of women's studies to a focused topic. Topics to be announced. May be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 24 credits

WGST T380 Special Topics in Women's and Gender Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WGST T480 Special Topics in Women's and Gender Studies 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Women's Studies

Courses

WMST I199 Independent Study in WMST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WMST I299 Independent Study in WMST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WMST I399 Independent Study in WMST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WMST I499 Independent Study in WMST 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Writing

Courses

WRIT 210 [WI] The Peer Reader in Context 3.0 Credits

This course focuses on reading and writing practices. Students engage in autobiographical explorations and examine writing center theory and practice. After successful completion, students may apply to become a Drexel Writing Center Peer Reader.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (ENGL 101 [Min Grade: C] and ENGL 102 [Min Grade: C])

WRIT 220 [WI] Creative Nonfiction Writing 3.0 Credits

A writing workshop in which students will read and write nonfiction; emphasis is placed on experimenting with different forms as the personal essay, literary journalism, nature writing, science writing and editing and preparing manuscripts for publication. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

WRIT 225 [WI] Creative Writing 3.0 Credits

A workshop course in composing imaginative forms of personal expression, including poems, short stories, plays, and personal essays. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

WRIT 226 Writing in Public Spaces 3.0 Credits

This introductory-level creative writing course asks students to write descriptively about objects in museums and public spaces around the city. The class meets mostly in public spaces. The last two classes will be held on campus to workshop the short stories we will produce over the term. Writing Intensive.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: ENGL 103 [Min Grade: D]

WRIT 301 [WI] Writing Poetry 3.0 Credits

A writing workshop in which students will read and write poetry; emphasis is placed on experimenting with different forms of poetry, editing, and manuscript preparations for publication. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

WRIT 302 [WI] Writing Fiction 3.0 Credits

A creative writing workshop course focusing on fiction. Students read and write short stories. Students develop skills by creating complete fictional works and critiquing the work of other students. Emphasis placed on narrative structure, prose style, pacing, voice and tone, appropriate material, character, plot, description, dialogue, and editing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

WRIT 303 Writing Humor and Comedy 3.0 Credits

A creative writing course focusing on humor and comedy. Students read and write satire, essays, social commentary and special forms. Students develop skills by creating complete works and critiquing the work of other students. Emphasis is placed on writing for specific audiences, narrative structure, prose style and editing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

WRIT 304 [WI] Special Topics in Writing 3.0 Credits

A variable topics course in writing in which students will read and write in different genres, according to the specific topic (i.e., Writing Fiction; Joking, Comedy and Laughter; Memoir and Autobiography; Nature Writing); emphasis is placed on editing and manuscript preparation for publication. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Cannot enroll if classification is Freshman or Sophomore

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

WRIT 305 Life is Beautiful 3.0 Credits

This community partnership course links memoir with life, story-telling, and dying. Specifically, the course partners students with local hospice patients to co-create a life-story for the patient and his or her family. Students learn interviewing, listening, and writing techniques as well as skills in analysis and presentation. Additionally, the course facilitates interactions with the community and helps students to see themselves as linked to a community outside of college.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 12 credits

WRIT 306 Writing About the Media 4.0 Credits

This course teaches students how to write about media events and artifacts (books, movies, theatre, music, etc.), both as individual works and in a larger cultural context. It also teaches them about the kinds of media outlets which publish reviews and the style of writing these outlets favor.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (ENGL 101 [Min Grade: D] and ENGL 102 [Min Grade: D] and ENGL 103 [Min Grade: D]) or ENGL 105 [Min Grade: D]

WRIT 310 Literary Editing & Publication 3.0 Credits

A course focusing on the techniques of editing, copyediting, proofreading, graphic selection and placement, the development of qualitative standards in manuscript selection for literary texts as well as connecting useful editorial/publication practice and social concerns in the fields of literary production.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

WRIT 312 [WI] The Practice of Professional Writing 3.0 Credits

This seminar acquaints students with the broad spectrum of work in professional writing, including reading and discussion of assigned research on various aspects of writing, and panel discussions with guest speakers, experienced professional writers and managers who work writers. Students research a writing-related field or topic.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

WRIT 400 [WI] Writing in Cyberspace 4.0 Credits

Students explore the world of cyberspace, learning about cyberpunk, hyperfiction and the literary theory related to them, operating in a MOO, and developing a website for a specific audience. Students consider these online environments critically and reflect on their significance. No previous computer experience required.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

WRIT 405 Internship in Literary Publishing 2.0 Credits

Internship in Literary Publishing offers students practical experience in journal publication. One such example is Painted Bride Quarterly, which is produced both electronically and in print.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 6 credits

Prerequisites: ENGL 103 [Min Grade: D] or ENGL 105 [Min Grade: A]

WRIT I199 Independent Study in WRIT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WRIT I299 Independent Study in WRIT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WRIT I399 Independent Study in WRIT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WRIT I499 Independent Study in WRIT 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WRIT T180 Special Topics in Writing 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WRIT T280 Special Topics in Writing 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

WRIT T380 Special Topics in Writing 3.0 Credits

A variable topics course in writing in which students will read and write in different genres, according to the specific topic (i.e., Writing Fiction; Joking, Comedy and Laughter: Memoir and Autobiography: Nature Writing); emphasis is placed on editing and manuscript preparation for publication. This is a writing intensive course.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

Restrictions: Cannot enroll if classification is Freshman or Sophomore

WRIT T480 Special Topics in Writing 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Semester

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- Undergraduate (p. 965)

Undergraduate

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Otolaryngology (OTOL) (p. 967)

Pathology (PATH) (p. 967)

Pediatrics (PEDS) (p. 967)

Pre-Medical (PMED) (p. 967)

Psychiatry (PSYC) (p. 968)

Surgery (SURG) (p. 968)

COM School of Biomedical Sciences & Professional Studies (QQ)

Biochemistry (BIOC) (p. 965)

Medical Science Preparatory (MSPP) (p. 966)

Pre-Medical (PMED) (p. 967)

Biochemistry

Courses

BIOC 400S Biochemistry 4.0 Credits

Biochemistry is the essential basis for understanding metabolic and disease processes at the biochemical and molecular levels. Because of its importance as a foundation to medicine, biochemistry is going to be a major focus of the MCAT, beginning with the test in the summer of 2015. The course, which will be taught at Drexel University College of Medicine, by College of Medicine faculty, will cover the topics in general biochemistry, with a particular focus on those topics that are to be included on the new MCAT.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC T480S Special Topics in Biochemistry 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

Emergency Medicine

Courses

EMMD S124S Advance Emergency Medicine 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Family Medicine

Courses

FAMD S224S REPRODUCTIVE HEALTH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD S244S REPRODUCTIVE HEALTH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD S444S Environmental & Occup Hlth 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Medical Science Preparatory

Courses

MSPP 400S Advanced Topics in Chemistry I 4.0 Credits

This review course in general and organic chemistry will contain a review of chemical calculations and theory in topics such as stoichiometry, gas laws, thermodynamics, electrochemistry, equilibria, and pH. Atomic theory and bonding will also be reviewed. The semester ends with a discussion of the stereochemistry of organic molecules.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSP.

MSPP 401S Adv Topics in Chemistry II 4.0 Credits

This review course in organic chemistry will investigate reaction mechanisms, spectroscopy, qualitative organic chemistry, and laboratory techniques.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 402S Advanced Topics in Physics I 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSP.

MSPP 403S Advanced Topics in Physics II 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 404S Concepts in Verbal Reasoning I 6.0 Credits

This is a didactic course with weekly preparations for the Verbal Reasoning and Writing, Physical Sciences and Biological Sciences of the Medical College Admissions Test. Incorporated into the course are approximately six mock MCAT exams for practice.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 405S Concepts in Verbal Reasoning II 6.0 Credits

This is a didactic course with weekly preparations for the Verbal Reasoning and Writing, Physical Sciences and Biological Sciences of the Medical College Admissions Test. Incorporated into the course are approximately six mock MCAT exams for practice.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP T480S Special Topics in Medical Science Preparatory 12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

Medicine

Courses

MEDI S124S INPATIENT MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI S342S MEDICAL ONCOLOGY - 2 WKS (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI S492S CARDIOLOGY TEACHING LAB-HARVEY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Neurology

Courses

NEUL S132S NEUROLOGY ELECTIVE-2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Obstetrics & Gynecology

Courses

OBGY S154S High Risk Obstetrics 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Office of Medical Education

Courses

OMED S112S Strategic& Financial Mgmt 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Orthopedics

Courses

ORTH S134S Adult Orthopaedics 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH S192S Orthopaedic Trauma* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH S242S Orthopedics: Spine Surgery* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Otolaryngology

Courses

OTOL S114S Adult&Pediatric Otolaryngology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL S124S Otorhinolaryngology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Pathology

Courses

PATH S184S PEDIATRIC PATHOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Pediatrics

Courses

PEDS S204S Pediatric Rehabilitation 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS S492S PEDIATRIC NEUROSURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Pre-Medical

Courses

PMED 111S General Chemistry I 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 112S General Chemistry I Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 114S CONCEPTS IN CHEMISTRY I 4.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 121S General Physics I 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 122S General Physics I Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 131S General Chemistry II 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PMED 132S General Chemistry II Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 141S General Physics II 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PMED 142S General Physics II Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PMED 151S College Algebra & Trigonometry 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 211S General Biology I 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 212S General Biology I Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 221S Organic Chemistry I 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 222S Organic Chemistry I Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 231S General Biology II 3.0 Credits**College/Department:** COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if major is PMED.**PMED 232S General Biology II Lab 1.0 Credit****College/Department:** COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if major is PMED.**PMED 240S Conceptual Reviews in General and Organic Chemistry 3.0 Credits**

The intention of the course shall be to serve as a course concentrating on select topics in general chemistry and organic chemistry as required for the current MCAT requirements. The instruction shall be covered by the instructor along with input by a TA(s) to bridge the gap between biology, physics and chemistry. In this way, the students leave with a more holistic view of the concepts to be discussed with breadth and depth, and how these different disciplines come together to explain observations. Where possible case studies shall be used to apply the concepts taught to put them into application.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Prerequisites:** PMED 111S [Min Grade: C] and PMED 112S [Min Grade: C] and PMED 131S [Min Grade: C] and PMED 132S [Min Grade: C] and PMED 221S [Min Grade: C] and PMED 222S [Min Grade: C] and PMED 241S [Min Grade: C] and PMED 242S [Min Grade: C]**PMED 241S Organic Chemistry II 3.0 Credits****College/Department:** COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if major is PMED.**PMED 242S Organic Chemistry II Lab 1.0 Credit****College/Department:** COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if major is PMED.**PMED T180S Special Topics in Pre-Medical 12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated multiple times for credit**PMED T280S Special Topics in Pre-Medical 12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated multiple times for credit

Psychiatry

Courses

PSYC S242S Geropsychiatry - 2wks 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit

Surgery

Courses

SURG S114S Surgical Endocrinology/Oncology 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**SURG S204S GROSS SURGERY SERVICE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit

Additional Academic Programs

- Emerging Scholars Program (p. 969)
- First Year Exploratory Studies (p. 969)
- Army Reserve Officers' Training Corps (ROTC) (p. 970)
- Naval Reserve Officers' Training Corps (NROTC) (p. 971)
- Air Force Reserve Officers' Training Corps (AFROTC) (p. 972)
- Lindy Center for Civic Engagement (p. 972)

Emerging Scholars Program

About the Program

This two-year program is designed for students interested in the humanities and social sciences and who want to experience the range of opportunities in these disciplines. In particular, the program is designed for students with academically strong backgrounds who are civic-minded and enthusiastic, who want to make an impact—in other words: emerging scholars.

The Program will provide mentorship, specialized seminars, and co-curricular events, as well as a co-op in the community to guide students towards defining their scholarly and career interests. The Emerging Scholars Program does not grant a degree, but helps guide students in choosing a major that's right for them. The program has been created so that students will be able to move easily into the curricula for any of the humanities and social science majors by the end of the second year (or earlier if so requested).

Additional Information

More information about the Emerging Scholars Program (<http://drexel.edu/coas/academics/undergraduate-programs/emerging-scholars-program>) can be found on the College of Arts and Sciences website.

First Year Exploratory Studies

About the Program

The First-Year Exploratory Studies curriculum consists of full-time study for the freshman year in one of two tracks, the Business, Humanities, and Social Science Track or the Science, Technology, Engineering, and Mathematics Track. These tracks provide students the opportunity to explore academic and career options, gaining valuable information about themselves, their academic interests and career aspirations.

The First-Year Exploratory Studies program has a dedicated academic advising staff to guide each student in course planning and major selection. This guidance enables students to make well-informed decisions in selecting a degree program and career path.

More information about the First-Year Exploratory Studies program can be found on the Goodwin College of Professional Studies website (<http://www.drexel.edu/goodwin/academics/first-year-exploratory-studies-program>).

Business, Social Science, and Humanities Track

Plan of Study

First Year		Credits
Fall		
BIO 100, 108, or 109*	Applied Cells, Genetics & Physiology Cells, Genetics and Physiology Laboratory Biological Diversity, Ecology & Evolution	3.0-4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
PSY 101	General Psychology I	3.0
UNIV 101	The Drexel Experience	1.0
Exploratory Track Electives**		6.0
Term Credits		16.0-17.0
Winter		
COOP 101	Career Management and Professional Development	0.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
GSTD T180	Special Topics in GSTD (Academic Exploration and Planning)	3.0
MATH 101	Introduction to Analysis I	4.0
Exploratory Studies Track Electives**		6.0
Term Credits		16.0
Spring		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
GSTD T180	Special Topics in GSTD (Career Exploration and Planning)	3.0
MATH 102	Introduction to Analysis II	4.0
PHYS 101 or 151	Fundamentals of Physics I Applied Physics	4.0
Exploratory Track Elective**		3.0
Term Credits		17.0
Total Credit: 49.0-50.0		

* BIO 108 and BIO 109 are taken together

** Students will select exploratory electives with their advisor.

Science, Technology, Engineering, and Mathematics

Plan of Study

First Year		Credits
Fall		
CHEM 101 or 111	General Chemistry I General Chemistry I	3.5-4.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
UNIV 101	The Drexel Experience	0.5-2.0
Exploratory Track Electives*		6.0
Term Credits		17.0-19.0
Winter		
COOP 101	Career Management and Professional Development	0.0
ENGL 102	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing	3.0
GSTD T180	Special Topics in GSTD (Academic Exploration and Planning)	4.0
MATH 122	Calculus II	4.0
Exploratory Track Electives*		6.0
Term Credits		17.0
Spring		
ENGL 103	Composition and Rhetoric III: Themes and Genres	3.0
MATH 200	Multivariate Calculus	4.0
GSTD T180	Special Topics in GSTD (Career Exploration and Planning)	3.0

Exploratory Track Electives*	6.0
Term Credits	16.0
Total Credit: 50.0-52.0	

Army Reserve Officers' Training Corps (ROTC)

About the Program

The Army Reserve Officers' Training Corps, established at Drexel in 1918, is an integral part of the University. Army ROTC courses are open to all students, and enrollment alone does not carry a military obligation. Students selected for the advanced course (normally pre-junior, junior, and senior years) will complete their academic and military studies concurrently, and upon graduation will be commissioned as lieutenants in the United States Army, Army Reserve, or Army National Guard. Participation in the advanced course may qualify participants to receive financial aid through a series of scholarships and co-operative education programs.

The purpose of the Army Reserve Officers' Training Corps (<http://www.armyrotc.com/edu/drexel>) program at Drexel University is to provide this nation with leaders of character for our Army, Army Reserve, and National Guard. ROTC training is also intended to foster ideals of patriotism; promote an understanding of the role of the citizen-soldier; stimulate interest in a military career; and develop character, self-discipline, and leadership ability. Army ROTC is a college elective, and enrollment does not require military service.

Students can apply for on-campus 4-year, 3-year and 2-year scholarships here at Drexel. All Army ROTC scholarships at Drexel cover full tuition and fees. Additionally, Army ROTC scholarship winners also receive free room (in dorm of choice on campus) and a 25% discount on Drexel's meal plan. These additional incentives are given by the university and total in excess of \$7,500 annually. For example, a 3-year Army ROTC scholarship at Drexel, including these incentives plus monthly stipend and quarterly textbook stipend is worth over \$135,000 over 4-years. In order to be offered a scholarship, students must meet certain physical fitness and academic requirements.

The Military Science program is divided into the basic course and the advanced course. The basic course normally coincides with the student's first two years of college. The purpose of the course is threefold: to develop certain military skills, to give the student sufficient information to decide whether to continue in the advanced course, and to allow the instructors an opportunity to evaluate the student's potential to become an officer. It consists of four or five Military Science courses and weekly attendance at Leadership Laboratories each term the cadet is in school. Except for scholarship Cadets, no military obligation is incurred by students participating in these courses. Basic course credit may be granted to students who successfully complete a five-week Cadet Initial Entry Training course at Fort Knox, Kentucky, between the sophomore and junior years. Prior Service Soldiers who have completed Basic Training also receive credit for the basic course. The advanced course, taken during a student's junior and senior years, is designed to prepare students for commissioned service. The first year of instruction (first two years for co-op students) is directed toward preparing students for the Cadet Leaders Course at Fort Knox, Kentucky. The final year of instruction is devoted to prepare students to be commissioned officers.

To be admitted to the advanced course, a student must have credit for the two-year basic course, must volunteer, must be selected by the professor

of military science, and must successfully complete the required screening and physical tests.

Enlisted Army Reservists and National Guardsmen may apply for the Simultaneous Membership program, which permits them to serve as officer trainees with their units and receive commissions upon completion of the ROTC advanced course.

Airborne training, Air Assault training, Mountain Warfare training, Northern Warfare training, and Cadet Troop Leadership Training with a Regular Army unit are available to interested Cadets.

Twice per school year, Cadets are required to participate in a leadership development exercise. These exercises are usually two to three days in duration and are conducted at Fort Dix, New Jersey, or other military installation. The field training exercises give students a chance to put into practice skills learned in the classroom and during Leadership Laboratories. Contracted students are also required to attend the Cadet Leaders Course over the summer between their Junior and Senior years. The Department of Military Science will work with the co-op coordinators to allow co-op Cadets to attend this training

Uniforms worn during Leadership Laboratory periods and leadership development exercises are issued free of charge to all students enrolled in ROTC. Students are responsible for maintaining the uniforms and returning them upon commissioning or leaving the program.

Students who satisfactorily complete ROTC course requirements are commissioned as Second Lieutenants in the United States Army, Army Reserve, or National Guard. Drexel graduates who receive their commission through ROTC may apply for a commission in any branch of the Army for which they are qualified.

Further information on the scholarships and Army ROTC is available from the Drexel University ROTC Battalion (<http://www.goarmy.com/rotc/schools/drexel-university/about.html>) at 215-590-8808.

Plan of Study (4 year)

First Year		
Fall		Credits
MLSC 101	Basic Leadership Lab/Practicum	0.0
MLSC 110	Leadership and Personal Development	1.0
Term Credits		1.0
Winter		
MLSC 102	Basic Leadership Lab/Practicum	0.0
MLSC 120	Foundations in Leadership	1.0
Term Credits		1.0
Spring		
MLSC 103	Basic Leadership Lab/Practicum	0.0
MLSC 130	Continuing Studies: Foundations in Leadership	1.0
Term Credits		1.0
Second Year		
Fall		
MLSC 201	Basic Leadership Lab/Practicum	0.0
MLSC 210	Innovative Tactical Leadership	2.0
Term Credits		2.0
Winter		
MLSC 202	Basic Leadership Lab/Practicum	0.0
MLSC 220	Leadership in Changing Environments	2.0
Term Credits		2.0
Spring		
MLSC 203	Basic Leadership Lab/Practicum	0.0

MLSC 230	Adaptive Team Leadership	2.0
	Term Credits	2.0
Third Year		
Fall		
MLSC 301	Leadership Lab/Practicum	0.0
MLSC 310	Leadership in Contact	2.0
	Term Credits	2.0
Winter		
MLSC 302	Leadership Lab/Practicum	0.0
MLSC 320	Complex Team Leadership Issues	2.0
	Term Credits	2.0
Spring		
MLSC 303	Leadership Lab/Practicum	0.0
MLSC 330	Military Leadership Co-op Preparation	2.0
	Term Credits	2.0
Fourth Year		
Fall		
MLSC 401	Leadership Lab/Practicum	0.0
MLSC 410	Developing Adaptive Leaders	2.0
	Term Credits	2.0
Winter		
MLSC 402	Leadership Lab/Practicum	0.0
MLSC 420	Leadership in Contemporary Environments	2.0
	Term Credits	2.0
Spring		
MLSC 403	Leadership Lab/Practicum	0.0
MLSC 430	Advanced Leadership in Contemporary Environments	2.0
	Term Credits	2.0
Total Credit: 21.0		

Plan of Study (5 year)

		Credits
First Year		
Fall		
MLSC 101	Basic Leadership Lab/Practicum	0.0
MLSC 110	Leadership and Personal Development	1.0
	Term Credits	1.0
Winter		
MLSC 102	Basic Leadership Lab/Practicum	0.0
MLSC 120	Foundations in Leadership	1.0
	Term Credits	1.0
Spring		
MLSC 103	Basic Leadership Lab/Practicum	0.0
MLSC 130	Continuing Studies: Foundations in Leadership	1.0
	Term Credits	1.0
Second Year		
Fall		
MLSC 201	Basic Leadership Lab/Practicum	0.0
MLSC 210	Innovative Tactical Leadership	2.0
	Term Credits	2.0
Winter		
MLSC 202	Basic Leadership Lab/Practicum	0.0
MLSC 220	Leadership in Changing Environments	2.0
	Term Credits	2.0
Third Year		
Fall		
MLSC 203	Basic Leadership Lab/Practicum	0.0
MLSC 230	Adaptive Team Leadership	2.0
	Term Credits	2.0
Winter		
MLSC 303	Leadership Lab/Practicum	0.0

MLSC 330	Military Leadership Co-op Preparation	2.0
	Term Credits	2.0
Fourth Year		
Fall		
MLSC 302	Leadership Lab/Practicum	0.0
MLSC 320	Complex Team Leadership Issues	2.0
	Term Credits	2.0
Winter		
MLSC 301	Leadership Lab/Practicum	0.0
MLSC 310	Leadership in Contact	2.0
	Term Credits	2.0
Fifth Year		
Fall		
MLSC 401	Leadership Lab/Practicum	0.0
MLSC 410	Developing Adaptive Leaders	2.0
	Term Credits	2.0
Winter		
MLSC 402	Leadership Lab/Practicum	0.0
MLSC 420	Leadership in Contemporary Environments	2.0
	Term Credits	2.0
Spring		
MLSC 403	Leadership Lab/Practicum	0.0
MLSC 430	Advanced Leadership in Contemporary Environments	2.0
	Term Credits	2.0
Total Credit: 21.0		

Military History Requirement

To receive a commission, cadets must also take one of the following courses:

HIST 230	United States Military History I (before 1900)	4.0
HIST 231	US Military History II (since 1900)	4.0

Naval Reserve Officers' Training Corp (NROTC)

About the Program

Students are eligible to participate in the Naval Reserve Officers' Training Corps (<http://www.vpul.upenn.edu/nrotc>) (NROTC) through a cross-enrollment agreement with the University of Pennsylvania. All naval science courses are held on Penn's campus. The NROTC program enables a college student to earn a commission in the Navy or the Marine Corps while concurrently satisfying requirements for his or her baccalaureate degree. Scholarship and nonscholarship programs are available.

Navy-option scholarship and college program (nonscholarship) students must enroll in Naval Science (NSC) NSC 101 and NSC 102 during their freshman year, NSC 201 and NSC 202 during their sophomore year, NSC 301 and NSC 302 in their junior year, and NSC 401 and NSC 402 in their senior year. Those seeking commissions in the Marine Corps will enroll in NSC 310 and NSC 410 instead of NSC 301-302 and NSC 401-402.

Scholarship program students must complete one year of calculus, one year of calculus-based physics, a course in computer science, one course in American military history/national security policy, and one year of English. College program students must complete one year of college-level algebra, one year of physical science courses, one semester of a computer science course, and one year of English. Students must check

with their naval science instructors to determine specific courses that fulfill the above requirements.

In addition to the above, all students are required to attend a two-hour professional laboratory period scheduled on Wednesday afternoons (no academic credit) that emphasizes military drill, physical fitness, and leadership/military topics.

For further information regarding physical and other qualifications for admission and other matters pertaining to participation in the NROTC (<http://www.upenn.edu/nrotc>) program, you can write to the Professor of Naval Science, NROTC Unit, Hollenback Center, 3000 South Street, Philadelphia, PA 19104; 215-898-7436; fax: 215-573-2067.

Plan of Study

First Year		
Term 1		Credits
NSC 100	Naval Science Drill	0.0
NSC 102	Seapower and Maritime Affairs	2.0
Term Credits		2.0
Second Year		
Term 1		
NSC 201	Leadership & Management	2.0
Term Credits		2.0
Third Year		
Term 1		
NSC 301	Engineering	2.0
NSC 302	Weapons	2.0
Term Credits		4.0
Fourth Year		
Term 1		
NSC 401	Navigation II	2.0
NSC 402	Leadership and Ethics	2.0
Term Credits		4.0

Total Credit: 12.0

Air Force Reserve Officers' Training Corp (AFROTC)

About the Program

Students are eligible to participate in the Air Force Reserve Officers' Training Corps (<http://www.sju.edu/afrotc>) (AFROTC) through a cross-enrollment agreement with St. Joseph's University. All aerospace studies courses will be held on the St. Joseph's campus. The AFROTC program enables a college student to earn a commission as an Air Force officer while concurrently satisfying requirements for his or her baccalaureate degree.

The Department of Aerospace Studies offered through Detachment 750 at St. Joseph's University offers college students a three- or four-year curriculum leading to a commission as a Second Lieutenant in the United States Air Force (USAF). In the four-year option, a student (cadet) takes General Military Course (GMC) classes during his/her freshman and sophomore years, attends a four-week summer training program between his/her sophomore and junior years, and then takes the Professional Officer Course (POC) classes during his/her junior and senior years. A cadet is under no contractual obligation with the USAF until entering the POC or accepting an AFROTC scholarship. The GMC curriculum focuses on the scope, structure, organization, and history of the USAF with an emphasis on the development of airpower and its relationship to current

events. The POC curriculum concentrates on the concepts and practices of leadership and management, and the role of national security forces in American society.

In addition to the academic portion of the curricula, each cadet participates in a two-hour Leadership Laboratory each week. Leadership Laboratory utilizes the cadet organization designed for the practice of leadership and management techniques.

Further information on the AFROTC program at Saint Joseph's University can be found at sites.sju.edu/afrotc (<http://sites.sju.edu/afrotc>), or students can contact detachment personnel directly at:

Unit Admissions Officer
AFROTC Detachment 750
Saint Joseph's University
Philadelphia, PA 19131
Phone: 610-660-3190
Email: rotc@sju.edu

Lindy Center for Civic Engagement

Drexel University's Lindy Center for Civic Engagement promotes the ideals of social responsibility and public service by facilitating community based experiential learning for students, faculty, and staff. Through collaborations with the community, we improve the public good on the local, national, and global levels while enriching the scholarship and character of Drexel through enhanced education.

The Lindy Center is part of Drexel University's role as a positive contributor to the quality of life in the region. Our consistent relationships within the wider community impact upon the pressing social issues affecting our region and are sources for engaged scholarship for faculty and enhanced learning for students. We develop community based learning opportunities so that every Drexel student will recognize the benefits of public service to their education, their career, and to society.

For more information, view the Lindy Center (<http://www.drexel.edu/lindycenter>)'s web page.

Certificate

- Civic Engagement (p. 972)

Certificate in Civic Engagement

Certificate Level: Undergraduate

Admission Requirements: Drexel students only

Certificate Type: Certificate

Number of Credits to Completion: 18.0

Instructional Delivery: Campus

Calendar Type: Quarter

Maximum Time Frame: 1 year

Classification of Instructional Program (CIP) Code: 33.0104

Standard Occupational Classification (SOC) Code: 21-1099

Civic engagement is participation in the public life of the community on issues of public concern. Civic engagement can take many forms, from volunteerism doing community service, to electoral participation and advocacy.

This certificate is designed for those whose commitment to civic engagement extends beyond CIVC 101 - the introductory civic

engagement course, and enables students of all majors to attach a recognized body of civic engagement work to their transcript. The program will also provide students with an intellectual core and an element of critical thinking for future civic engagement activities.

Please note that this certificate is available only to currently enrolled Drexel students.

Requirements

CIVC 100	Foundations of Civic Engagement	3.0
Select two of the following:		6.0
CIVC 200	Active Citizenship and Community-Based Learning	
CIVC 201	Civic Engagement Leadership	
CIVC 202	University-Community Partnerships	
CIVC 299	Special Topics in Civic Engagement	
Select two of the following: *		6.0
Any 200-level CIVC Courses(s) *		
CIVC 450	Independent Study **	
NFS 391	Community Nutrition †	
MKTG 351	Marketing for Non-Profit Organizations †	
NURS 403	Community Public Health Nursing †	
SOC 370	Practicum in Applied and Community Sociology †	
Students complete one capstone course		
CIVC 490	Capstone Project in Civic Engagement	3.0
Total Credits		18.0

* Choices may include CIVC 200, CIVC 201, CIVC 202, or CIVC 299. However, the same CIVC course cannot be used to fulfill two requirements.

** Independent Study proposals must be reviewed by the Director/Advisory Board.

† With the approval of the Director and the offering instructor, additional Drexel courses may carry civic engagement credit for an individual student on an optional basis in the future.

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