



Drexel University

Graduate Course Catalog

2019-2020



Table of Contents

About Drexel University	7	Biomedicine and Entrepreneurship	50
Accreditation	10	Biomedicine and Law	54
Graduate Catalog	12	Biotechnology	57
Center for Hospitality and Sport Management	13	Cancer Biology	58
Master of Science in Food Science	13	Clinical Research for Health Professionals	60
Master of Science in Hospitality Management	13	Clinical Research Organization and Management	62
Sport Coaching Leadership	13	Criminalistic Science	63
Master of Science in Sport Management	13	Drexel Pathway to Medical School	64
Close School of Entrepreneurship	14	Drug Discovery and Development	65
Entrepreneurship and Innovation	14	Forensic Science	67
Graduate Minor in Entrepreneurship & Innovation	15	Histotechnology	68
College of Computing & Informatics	16	Immunology	70
Computer Science	16	Infectious Disease	72
Health Informatics	21	Interdepartmental Medical Science	75
Information Studies	25	Interdisciplinary Health Sciences	75
Information Systems	25	Laboratory Animal Science	76
Library and Information Science	30	Medical Science	78
National Security Management	32	Medical and Healthcare Simulation	80
Software Engineering	32	Microbiology and Immunology	81
Graduate Minor in Computer Science	37	Molecular and Cell Biology and Genetics	84
Archives Specialist Certificate	37	Molecular Medicine	86
Competitive Intelligence and Knowledge Management Specialist Certificate	37	Neuroscience	88
Post-Baccalaureate Certificate in Computer Science	37	Pathologists' Assistant	91
Certificate in Continuity Management	38	Pharmacology and Physiology	93
Certificate in Cybersecurity, Law and Policy	38	Certificate in Clinical Research	96
Digital Curation Specialist	38	Evening Post-Baccalaureate Pre-Medical Certificate Program	97
Digital Libraries Specialist Certificate	38	Certificate in Quantitative Principles for Clinical Research	98
Certificate in Homeland Security	38	Certificate in Veterinary Medical Science	99
Advanced Certificate in Information Studies and Technology	38	Goodwin College of Professional Studies	100
Certificate in Intelligence	38	Professional Studies	100
Youth Services Specialist Certificate	38	College of Nursing and Health Professions	102
College of Medicine: Graduate School of Biomedical Sciences and Professional Studies	39	Art Therapy and Counseling	104
Academic Medicine	41	Creative Arts Therapies PhD	106
Biochemistry	42	Couple and Family Therapy PhD	108
Master of Science in Biological Science	42	Dance/Movement Therapy and Counseling	110
Biomedical Studies	42	Master of Family Therapy	112
Biomedicine and Business	43	Health Administration	114
Biomedicine and Digital Media	47	Human Nutrition	115
		Music Therapy and Counseling	119
		MSN in Nurse Anesthesia	121
		PhD in Nursing	121
		Doctor of Nursing Practice	123

MSN: Clinical Nurse Leader Concentration	125	Post-Master's Certificate in Nursing Education	162
MSN: Clinical Trials Research Concentration	127	Leadership in Health Systems Management	162
MSN: Nursing Education Concentration	127	Adult-Gerontology Acute Care Nurse Practitioner Post-Master's Certificate	163
MSN: Nursing Innovation Concentration	129	Adult-Gerontology Primary Care Nurse Practitioner Post-Master's Certificate	163
MSN: Nursing Leadership in Health Systems Management Concentration	131	Family/Individual Across the Lifespan Nurse Practitioner Post-Master's Certificate	164
MSN "Bridge" Program	133	Pediatric Acute Care Nurse Practitioner Post-Master's Certificate	165
MSN: Adult-Gerontology Acute Care Nurse Practitioner	134	Pediatric Primary Care Nurse Practitioner Post-Master's Certificate	165
MSN: Adult-Gerontology Primary Care Nurse Practitioner	135	Pediatric Primary Care and Pediatric Acute Care Dual Nurse Practitioner Post-Master's Certificate	166
MSN: Family/Individual Across the Lifespan Nurse Practitioner ...	136	Psychiatric Mental Health Nurse Practitioner Post-Master's Certificate	166
MSN: Pediatric Acute Care Nurse Practitioner	137	Women's Health/Gender-Related Nurse Practitioner Post-Master's Certificate	167
Pediatric Primary Care Nurse Practitioner	138	Certificate in Pediatric Rehabilitation	167
MSN: Pediatric Primary Care and Pediatric Acute Care Dual Option	139	Service to Veterans	167
Psychiatric Mental Health Nurse Practitioner	140	Sexual Health and Wellness	168
Women's Health/Gender Related Nurse Practitioner	141	Certificate in Substance Use Disorder Treatment	169
Doctor of Physical Therapy	142	Certificate of Advanced Study in Women's Integrative Health	170
Nutrition Sciences	145	LeBow College of Business	172
Physician Assistant (PA)	146	Accounting	172
Physician Assistant Post-Professional Master's Program	149	MBA Programs	174
Rehabilitation Sciences	149	Executive MBA Program	178
Rehabilitation Sciences	151	Doctorate in Business Administration (DBA)	179
Certificate of Advanced Study in Complementary and Integrative Therapies	152	Business Administration	183
Certificate in Couple and Family Therapy	153	Business Analytics	186
Certificate in Forensic Trends and Issues in Contemporary Healthcare	153	Finance	187
Post-Master's Certificate in Geriatrics	154	Master of Science in Leadership	187
Certificate in Advanced Practice in Hand and Upper Quarter Rehabilitation	155	Marketing	187
Certificate of Advanced Study in Holistic Hospice and Palliative Care	155	Supply Chain Management and Logistics	189
Certificate of Advanced Study in Integrative Addiction Therapies	156	Certificate in Advanced Business	191
Issues in Human Trafficking Certificate	157	Certificate in Leadership	191
Certificate in Medical Family Therapy	157	LeBow College of Business: School of Economics	192
Post-Master's Certificate in Music Therapy	157	Economics	192
Neuroscience, Learning and online Instruction	158	Economics	194
Post-Master's Certificate in Nurse Anesthesia	158	The Antoinette Westphal College of Media Arts & Design	198
Clinical Nurse Leader Post-Master's Certificate	158	Arts Administration	199
Post-Baccalaureate Certificate in Nursing Innovation	159	Master of Science in Design Research/graduate/collegeofmediaartsanddesign/	199
Post-Baccalaureate Certificate in Integrated Nursing Care of Autism Spectrum Disorder (ASD)	160	Digital Media	199
Post-Baccalaureate Certificate in Nursing Education	161	Fashion Design	204

Interior Architecture and Design	206	Certificate in Systems Engineering Fundamentals	300
Museum Leadership	209	Certificate in Systems Engineering Integrated Logistics	300
Paul F. Harron Television Management Program	209	Certificate in Systems Reliability Engineering	300
The College of Arts and Sciences	210	The College of Medicine	302
Biological Sciences	210	The Doctor of Medicine (MD) Program	302
Chemistry	214	The School of Biomedical Engineering, Science, and Health Systems	
Communication	217	305
Communication, Culture and Media	220	Biomedical Engineering	306
Environmental Policy	222	Biomedical Science	311
Environmental Science	224	Integrated Biomedical Engineering and Business	316
Joint JD/PhD Law-Psychology Program	226	Advanced Certificate in Bioinformatics	319
Mathematics	227	Advanced Certificate in Biomedical Technology Development	319
Physics	229	Advanced Certificate in Tissue Engineering	319
Psychology MS	234	The School of Education	320
Public Policy	236	Adult Education and Organization Development	321
Publishing	237	Applied Behavior Analysis	321
Science, Technology, and Society	238	Creativity and Innovation	323
The College of Engineering	241	Education Improvement and Transformation	326
Architectural Engineering	241	Educational Administration	330
Chemical Engineering	245	Educational Leadership and Management	336
Civil Engineering	250	PhD in Educational Leadership Development and Learning	
Computer Engineering	255	Technologies	341
Construction Management	260	Global and International Education	341
Cybersecurity	261	Higher Education	345
Electrical Engineering	265	Learning Technologies	348
Electrical Engineering/Telecommunications Engineering	271	Mathematics Learning & Teaching	351
Master of Engineering	276	Special Education	354
Engineering Management	276	Teaching, Learning and Curriculum	359
Engineering Technology	279	Certificate in Adult Education	367
Environmental Engineering	280	Advanced Teaching and Curriculum Certificate	367
Materials Science and Engineering	283	Post-Master's Certificate in Applied Behavior Analysis	368
Mechanical Engineering and Mechanics	286	Certificate in Autism Spectrum Disorders	369
Project Management	290	Certificate in Collaborative Special Education Law and Process	
Property Management	294	369
Vince and Judy Vidas Program in Systems Engineering	294	Certificate in Community College Administration and Leadership	
Graduate Minor in Computational Engineering	297	370
Certificate in Construction Management	297	Certificate in Creativity and Innovation	370
Graduate Certificate in Project Management	297	Certificate in E-Learning Leadership	371
Certificate in Real Estate	298	Certificate in Education Policy	371
Certificate in Sustainability and Green Construction	298	Certificate in Human Resource Development	372
Certificate in Systems Design and Development	299	Certificate in Instructional Design	372
Certificate in Systems Engineering Analysis	299	Instructional Technology Specialist Certificate	373
		Certificate in Math Leadership & Coaching	373

Certificate in Mathematics Learning & Teaching	374	Architecture	425
Certificate in Multisensory Reading Instruction Level 1	374	Art History	427
School Principal Certificate	374	Arts Administration	427
Post-Bachelor's Teaching Certificate: Elementary Education	375	Biomedical Engineering & Science	430
Post-Bachelor's Teaching Certificate: Secondary Education	376	Bioscience & Biotechnology	438
Special Education 7-12 Post-Bachelor's Certificate	380	Business Statistics	442
Graduate Intern Teaching Certificate	381	Career Integrated Education	445
Reading Specialist Certificate	381	Chemical Engineering	445
Post-Bachelor's Certificate in Special Education Leadership	382	Chemistry	447
Special Education PreK-8 Post-Bachelor's Certificate	382	Civil Engineering	450
STEM Education Certificate	383	Communication	455
Certificate in Student Development and Affairs	384	Communication, Culture and Media	459
Teaching English as a Second Language	384	Complement & Integrative Therapy	462
The Dornsife School of Public Health	386	Computer Science	465
Biostatistics	390	Computing & Security Technology	470
Community Health and Prevention	391	Construction Management	471
Environmental & Occupational Health	393	Cooperative Management	473
Epidemiology MPH	396	Couple & Family Therapy	473
Health Management and Policy	398	Creative Arts in Therapy	482
Health Policy and Social Justice	401	Creativity Studies	495
Public Health MPH	401	Design and Merchandising	497
Executive Master of Public Health	404	Design Research	497
Certificate in Epidemiology and Biostatistics	405	Digital Media	498
Certificate in Global Health	406	E-Learning	502
Certificate in Lesbian, Gay, Bisexual and Transgender (LGBT) Health	407	Economics	503
Thomas R. Kline School of Law	408	Education Human Resource Development	507
American Legal Practice	409	Education Improvement & Transformation	509
The JD Program	409	Education Learning Technologies	510
Master of Legal Studies	412	Educational Administration	513
Trial Advocacy and Dispute Resolution	414	Educational Lifelong Literacy	515
Certificate in Criminal Law	417	Educational Policy	519
Certificate in Health Care Compliance	417	Electrical & Computer Engineering	520
Higher Education Compliance	417	Electrical & Computer Engineering - Computers	521
Certificate in Human Resources Compliance	418	Electrical & Computer Engineering - Electroph	525
Certificate in NCAA Compliance	419	Electrical & Computer Engineering - Power Engineering	528
Course Descriptions	420	Electrical & Computer Engineering - Systems	531
Quarter	420	Engineering Geology	535
Graduate	420	Engineering Management	535
Accounting	421	Engineering Technology	539
Adult Education	424	Engineering, General	541
Architectural Engineering	424	Entrepreneurship and Innovation	541

Environmental Engineering	543	Physician Assistant	658
Environmental Policy	547	Physics	664
Environmental Science	547	Physics - Environmental Science	666
Fashion Design	552	Political Science	666
Finance	554	Production Operations Management	667
Food	556	Professional Studies	670
Food Science	557	Project Management	671
Forensic Science	559	Property Management	673
General Business	559	Psychology	674
Geography Education	563	Public Health	681
Global & International Education	564	Public Policy	685
Higher Education	566	Publishing	686
History	569	Real Estate	687
Homeland Security Management	569	Rehabilitation Sciences	688
Hotel & Restaurant Management	570	Research	690
Human Resource Management	572	Science, Technology and Society	691
Industrial Design	573	Special Education	695
Information Science & Systems	573	Sport Coaching Leadership	701
Interior Design	581	Sport Management	703
International Business	583	Systems Engineering	707
Intra Professional Studies	584	Taxation	710
Legal Studies	588	Teacher Education	712
Linguistics	589	Telecommunications	721
Management	589	Television Management	723
Management of Information Systems	592	Visual Studies	726
Marketing	594	Westphal Studies	727
Materials Engineering	596	Semester	727
Mathematics	600	Graduate	727
Mathematics Education	605	Anatomy	728
Mechanical Engineering & Mechanics	608	Anesthesiology	729
Medical Family Therapy	617	Biochemistry	730
Museum Education	617	Cancer Biology	732
Museum Leadership	618	Cardiothoracic Surgery	733
National Security Management	620	Clinical Research	733
Neuroscience	620	Clinical Research Health Prof	737
Nursing	620	Communication & Preventative Medicine (noncredit)	738
Nursing and Health Professions	644	Communication & Preventitive Medicine (credit)	740
Nutrition & Food Science	646	Critical Care	741
Operations Management	648	Dermatology	741
Operations Research	649	Drexel Pathway to Medicine	742
Organizational Behavior	650	Emergency Medicine	742
Physical Therapy Rehab Science	652	Family Medicine	743

Forensic Criminalistic Analysis	744
Forensic Science	745
Histotechnology	751
Human & Molecular Genetics	751
IMS Prog. Interdepartmental Sciences	751
Interdepartmental	753
Interdisciplinary Health Science	756
Law	758
Legal Studies	775
MMS Prog. - Masters in Med. Science	778
Master of Lab Animal Science	778
Medical Science Preparatory	781
Medical and Healthcare Simulation	782
Medicine	784
Microbiology and Immunology	790
Molecular & Cellular Bio & Genetics	796
Neurology	797
Neuroscience	799
Neurosurgery	801
Obstetrics & Gynecology	801
Office of Medical Education	803
Orthopedics	804
Otolaryngology	806
Otolaryngology	809
Pathologists Assistant	810
Pathology	811
Pediatrics	813
Pharmacology	817
Physical Med & Rehabilitation	819
Physiology	819
Pre - Medical	820
Program in Integrated Learning	820
Psychiatry	822
Public Health	823
Radiation Oncology	824
Radiation Sciences	824
Radiologic Sciences	824
Surgery	826
Women's Health Ed. Program	829
Index	831

About Drexel University

Mission Statement

Drexel University fulfills our founder's vision of preparing each new generation of students for productive professional and civic lives while also focusing our collective expertise on solving society's greatest problems. Drexel is an academically comprehensive and globally engaged urban research university dedicated to advancing knowledge and society and to providing every student with a valuable, rigorous, experiential, technology-infused education, enriched by the nation's premier co-operative education program.

Vision

Drexel will be the Philadelphia region's leading university excelling in high-quality experiential education, online learning, technology transfer and business incubation, translational research, and urban revitalization. Drexel will use and leverage all its assets - outstanding faculty, highly motivated students, over 150,000 alumni world-wide, a pragmatic and entrepreneurial culture, co-operative education, Drexel University Online, and our superior location as a major transportation hub - to create an accessible, relevant and market-leading educational research platform that benefits our diverse community of students, advances our scholarly work, and champions economic development in our region. Drexel will join the ranks of the most impactful and competitive universities in the United States at a time when the nation is clamoring for educational value, jobs, and new ideas for bolstering our economy.

A Brief History of Drexel University

In founding the institution that would become Drexel University, Philadelphia financier and philanthropist Anthony J. Drexel launched a tradition of innovation. Mr. Drexel envisioned an institution of higher learning uniquely suited to the needs of a rapidly growing industrial society and the young women and men seeking their place in it - core values that continue to guide the University in its modern era. Mr. Drexel's vision was realized in 1891 with the establishment of the Drexel Institute of Art, Science and Industry. Originally a non-degree-granting institution, Drexel began conferring bachelor of science degree in 1914, when its 18 departments were organized into four schools. In 1927, the Commonwealth of Pennsylvania granted Drexel the privilege to confer the master of science degree, and in 1965, the doctor of philosophy degree.

The cornerstone of Drexel's career preparation model has been its cooperative education (co-op) program. Introduced in 1919 as one of the first models of its kind, co-op is integral to the University's educational experience. Through co-op, students alternate periods of study with periods of full-time professional employment, providing unrivaled, valuable professional experience.

The institution's curriculum and organization of its academic programs have evolved to include 15 colleges and schools. Through its evolution, Drexel has undergone two changes in name - in 1936 becoming the Drexel Institute of Technology, and in 1970, Drexel University. The current title reflects the institution's commitment to research as well as the breadth of its academic programs.

Drexel's mission, services and opportunities expanded further in 2002 when MCP Hahnemann University, a major Philadelphia health sciences institution, merged with Drexel University with the addition of the College of Medicine (<http://archives.drexelmed.edu/history.php>), the College of

Nursing and Health Professions, and the recently named Dornsife School of Public Health. In 2001, the University established an affiliation with one of Philadelphia's most storied institutions, the Academy of Natural Sciences, now the Academy of Natural Sciences of Drexel University (<http://www.anasp.org/about/academy-history/>). These historic events extended the resources of Drexel have led to many productive synergies in teaching and research.

Drexel's foundation as an innovating institution established the university as a national leader in higher education. In 1983, Drexel became the nation's first university to require all undergraduates to have personal access to a microcomputer for use in all their coursework. The university continued its commitment to integrating technology when it became the first university to operate a fully wireless campus in 2000. In 2006, Drexel became the first major research university to open a new law school in 25 years. The Thomas R. Kline School of Law is one of only two US university law schools that follows a cooperative education model of learning.

Throughout its evolution to a comprehensive urban research university, Drexel's core mission has held constant. Since its founding, the institution has remained a privately controlled, nonsectarian, coeducational center of higher learning, distinguished by a commitment to preparing women and men for success in their chosen careers incorporating experiential learning and celebrating diversity. Its greatly expanded enrollment, campuses, and curricula reflect a history of responsiveness to societal and individual needs - all of which Mr. Drexel sought to address in his day and going forward through his charge "change."

Drexel University Today

Today, over 25,000 students are enrolled in over 100 undergraduate programs and over 190 graduate programs across 16 colleges, schools, and centers:

- Close School of Entrepreneurship (<http://drexel.edu/close/>)
- College of Arts and Sciences (<http://drexel.edu/coas/>)
- College of Computing & Informatics (<http://drexel.edu/cci/>)
- College of Engineering (<https://drexel.edu/engineering/>)
- College of Medicine: School of Biomedical Sciences and Professional Studies (<https://drexel.edu/medicine/academics/graduate-school/>)
- College of Nursing and Health Professions (<https://drexel.edu/cnhp/>)
- Dornsife School of Public Health (<http://drexel.edu/dornsife/>)
- Drexel College of Medicine (<http://drexel.edu/medicine/>)
- Goodwin College of Professional Studies (<http://drexel.edu/goodwin/>)
- LeBow College of Business (<http://www.lebow.drexel.edu/>)
- LeBow College of Business: School of Economics (<http://www.lebow.drexel.edu/faculty-and-research/disciplines/economics/>)
- Pennoni Honors College (<https://drexel.edu/biomed/>)
- School of Biomedical Engineering, Science, and Health Systems (<http://www.biomed.drexel.edu/>)
- School of Education (<http://drexel.edu/soe/>)
- Thomas R. Kline School of Law (<http://www.drexel.edu/law/>)
- Westphal College of Media Arts and Design (<http://www.drexel.edu/westphal/>)

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 1,600 employer organizations in business, government, health care and education participate at locations in more than 30 states and 45 countries. The Steinbright Career Development Center (<http://drexel.edu/scdc/>) (Steinbright) works to ensure that students and alumni get the most from their experiential and career education 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 was ranked in the top third in the 2019 edition of *U.S. News & World Report's* "Best National Universities," coming in at 102nd out of 312.

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 Philadelphia campuses: the Center City Campus houses the College of Nursing and Health Professions and the Queen Lane Medical Campus in East Falls houses the College of Medicine. The Law School also operates the Kline Institute of Trial Advocacy in Center City.

Programs of note

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's Lindy Center for Civic Engagement (<http://www.drexel.edu/lindycenter/>) fosters a culture of civic responsibility by providing programs and resources that empower Drexel students and the broader university community to expand their civic identities through engagement in mutually beneficial partnerships that lead to a more just society.

The Lindy Center for Civic Engagement focuses on four core priorities including: Community-Based Learning, Civic Leadership, Public Service, and Community Partnerships.

Honors Program

The Pennoni College offers several 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 several 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 Symposium

The Symposium (<https://drexel.edu/pennoni/custom-designed-major/the-symposium/>) is an interdisciplinary, project-based course series exploring subjects of the broadest possible interest and greatest societal impact. Through intensive examination of a different major these every year, it brings Drexel University students, teachers, and visiting expert lecturers into collaboration. The Symposium strives to avoid the "textbook approach," with an emphasis on developing in students the active skills of interdisciplinary inquiry: reading, writing, critical thinking, methodological creativity, and argument. Four new courses are offered each year, designed to elaborate different dimensions of the theme. Through these courses, students are encouraged to see the University as an interconnected enterprise, and to imagine the University as one part of a larger spectrum of scholars in the communities of the city, the nation, and the world.

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.

Global

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.

Foreign Language Proficiency

The University awards an advanced-level Certification of Proficiency (<http://catalog.drexel.edu/certificates/proficiencycertificates/>) 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.

Consumer Information and Student Right to Know

In accordance with federal regulations set forth by the Higher Education Opportunity Act of 1965, as amended, a summary of consumer information must be made available to all prospective and enrolled students at Drexel University. Links to the information is available on the Office of the Provost's website (<http://drexel.edu/provost/policies/heoa/>).

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

- The National Association of Schools of Arts & Design has accredited Westphal's Bachelor of Science programs in: Animation & Visual Effects; Art History; Design & Merchandising; Entertainment and Arts Management (Visual Arts); Fashion Design; Film & Video; Game Art & Production; Graphic Design; Interactive Digital Media; Interior Design; Photography; Product Design; TV Production & Media Management.
- The National Association of Schools of Arts & Design has accredited Westphal's Master of Science programs in Digital Media; Fashion Design; Interior Design; and Design Research
- The National Association of Schools of Arts & Design has accredited Westphal's Doctor of Philosophy in Digital Media.
- The Architecture program is accredited by NAAB (National Architectural Accrediting Board).
- The BS in Interior Design is accredited by CIDA (Council for Interior Design Accreditation).
- The MS in Interior Architecture & 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 undergraduate 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 Project Management program is approved by the Project Management Institute (PMI)[®] as a Registered Education Provider (R.E.P.). This designation indicates that Drexel has met or exceeded rigorous standards for the quality and the effectiveness of its program as defined by PMI, <http://www.pmi.org/learning/training-development/rep> (<http://www.pmi.org/learning/training-development/rep>).

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

- The Baccalaureate Degree in Nursing (BSN), the Master's Degree in Nursing (MSN) and the Doctor of Nursing (DNP) at Drexel University

are accredited by the Commission on Collegiate Nursing Education (CCNE) (<http://www.aacn.nche.edu/ccne-accreditation/>), One Dupont Circle, NS, Suite 530, Washington, DC, 20036, 202-887-6791.

- 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 Therapies MA degrees 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 Association).
- The Nurse Anesthesia program is accredited by COA (Council on Accreditation of Nurse Anesthesia Educational Programs).
- The Doctor of 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 College of Computing & Informatics

- The BS in Computer Science is accredited by the Computing Accreditation Commission (CAC) of ABET (<http://www.abet.org>).
- The BS in Information Systems is accredited by the Computing Accreditation Commission (CAC) of ABET (<http://www.abet.org>).
- The BS in Information Technology is accredited by the Computing Accreditation Commission (CAC) of ABET (<http://www.abet.org>).
- The BS in Software Engineering is accredited by the Engineering Accreditation Commission (EAC) of ABET (<http://www.abet.org>).
- The MS in Library and Information Science is accredited by ALA (American Library Association).
- The MS in Health Informatics Program is in Candidacy Status, pending accreditation review by the Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM)

The Drexel University College of Medicine

- The MD degree is accredited by LCME (Liaison Committee on Medical Education).
- The Master's program in Histotechnology (MHP) and the MS Degree in Pathologists' Assistant program are 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, school leadership and other programs leading to Pennsylvania State-issued credentials or endorsements for various PreK-12 subject areas are approved by the Pennsylvania Department of Education. These include teacher preparation programs in the areas of Pre-Kindergarten - Grade 4 (PK-4); Middle Level (Grades 4 - 8) in English, Mathematics and Science; the Secondary Level (Grades 7-12) in areas of Biology, Chemistry, Earth & Space Science, English, General Science, Mathematics, Physics, and Social Studies; and Special Education (both Grades PK - 8 and 7 - 12). State-approved, school leadership certification areas include School Principal K-12, School Superintendent K-12, Special Education Supervisory and Instructional Technology Specialist. Other state-approved programs and program endorsements are provided in the areas of Autism, Reading Specialist, STEM Teaching Endorsement, and Teaching English as a Second Language Program.
- The School of Education will be seeking accreditation from the Council for the Accreditation of Educator Preparation

The Thomas R. Kline School of Law

- The Thomas R. Kline School of Law is accredited by ABA (American Bar Association).
- The Master of Legal Studies (MLS) is accredited by the Compliance Certification Board (CCB)[®].

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.

Graduate Catalog

- Close School of Entrepreneurship (p. 14)
- College of Arts and Sciences (p. 210)
- College of Computing & Informatics (p. 16)
- College of Engineering (p. 241)
- College of Nursing and Health Professions (p. 102)
- Dornsife School of Public Health (p. 386)
- Drexel College of Medicine: MD Program (p. 302)
- Drexel College of Medicine: Graduate School of Biomedical Sciences and Professional Studies (p. 39)
- Goodwin College of Professional Studies (p. 100)
- Graduate College (<http://catalog.drexel.edu/graduate/graduatecollege/>)
- Thomas R. Kline School of Law (p. 408)
- LeBow College of Business (p. 172)
 - School of Economics (p. 192)
- School of Biomedical Engineering, Science and Health Systems (p. 305)
- School of Education (p. 320)
- Westphal College of Media Arts & Design (p. 198)

Close School of Entrepreneurship

In today's extremely competitive global workforce, there is an increased value and demand for initiative, independence, innovation, and the intellectual dexterity to rethink the old ways of doing things and invent new ones. The Charles D. Close School of Entrepreneurship has pioneered an approach to entrepreneurship education that addresses this need by teaching students to be entrepreneurial thinkers and doers, preparing them to meet the world market on solid footing and to create their own opportunities.

The Close School defines entrepreneurship as more than starting a company or sparking innovation within established organizations. At the Close School, entrepreneurship is a habit of mind and an attitude; a skill set applicable to pursuing innovation in both personal and career contexts. We assist students in cultivating an approach to life built around innovative thinking, calculated daring, and proactive behavior.

Within our unique curriculum, students learn skills such as resilience, collaboration, negotiation, and communication. The Close School's academic and co-curricular programs prepare students for the ever-evolving 21st-century workforce, which will include experiences in new venture creation, self-employment, corporate innovation and the development of impactful social enterprises.

Majors

- Entrepreneurship and Innovation (MS) (p. 14)
- **NEW:** Transdisciplinary Science, Computing, Engineering and Design (MS)

Minors

- Entrepreneurship and Innovation (<http://catalog.drexel.edu/graduate/schoolofentrepreneurship/entrepreneurshipandinnovationgminor/>)

Entrepreneurship and Innovation

Major: Entrepreneurship and Innovation

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 52.0701

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

About the Program

The Charles D. Close School of Entrepreneurship is founded on the principle that entrepreneurship encompasses more than starting a new venture. Entrepreneurship is a habit of mind and an attitude; a skill set applicable to pursuing innovation in both personal and career contexts; as well as an approach to life built around innovative thinking, calculated daring, and proactive behavior.

The MS in Entrepreneurship and Innovation is designed for recent graduates or working professionals who wish to increase their knowledge of and experiences in innovation and entrepreneurship. The MS focuses

on developing the entrepreneurial mindset and the skills associated with new-venture creation and corporate innovation.

For additional information about the MS in Entrepreneurship and Innovation, please contact Rita Berson (rk25@drexel.edu).

Degree Requirements

Required Courses

ENTP 501	Entrepreneurship Essentials	3.0
BUSN 501	Measuring and Maximizing Financial Performance	3.0
ENTP 535	Social Entrepreneurship	3.0
ENTP 540	Methods of Entrepreneurship	3.0
ENTP 565	Franchising	3.0
ENTP 611	Learning from Failure	3.0
ENTP 641	Innovation in Established Companies	3.0
ENTP 651	Leading New Ventures	3.0
BLAW 646	Legal Issues in New Ventures	3.0
ENTP 660	Early Stage Venture Funding	3.0
ENTP 621	Innovation & Ideation	3.0
ENTP 690	The Lean Launch	3.0
ENTP 631	Building Internal & External Relationships	3.0
Electives		6.0
Choose two of the following graduate electives, OR two from other units (upon advisor approval):		
ENTP 555	Dynamics of the Family Firm	
ENTP 670	Clean Venture Lab	
ENTP T580	Special Topics in Entrepreneurship	

Total Credits 45.0

Sample Plan of Study

		Credits
Term 1		
ENTP 501	Entrepreneurship Essentials	3.0
ENTP 611	Learning from Failure	3.0
Term Credits		6.0
Term 2		
BUSN 501	Measuring and Maximizing Financial Performance	3.0
ENTP 621	Innovation & Ideation	3.0
Term Credits		6.0
Term 3		
ENTP 540	Methods of Entrepreneurship	3.0
ENTP 631	Building Internal & External Relationships	3.0
Term Credits		6.0
Term 4		
ENTP 641	Innovation in Established Companies	3.0
ENTP 651	Leading New Ventures	3.0
Term Credits		6.0
Term 5		
ENTP 535	Social Entrepreneurship	3.0
Entrepreneurship Elective		3.0
Term Credits		6.0
Term 6		
ENTP 660	Early Stage Venture Funding	3.0
ENTP 690	The Lean Launch	3.0
Term Credits		6.0
Term 7		
ENTP 565	Franchising	3.0
BLAW 646	Legal Issues in New Ventures	3.0
Entrepreneurship Elective		3.0
Term Credits		9.0
Total Credit: 45.0		

Entrepreneurship and Innovation Faculty

Nick Bayer, BS (*Cornell University*). Adjunct Instructor.

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

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

Michael Kurzeja, MBA (*Grantham University*). Adjunct Instructor.

Roger Lee, MS (*Drexel University*). Adjunct Teaching Professor.

Barrie Litzky, PhD (*Drexel University*). Associate Professor.

Larissa Milne, MBA (*Drexel University*). Adjunct Teaching Professor.

Dean Musser, BS (*Drexel University*). Adjunct Instructor.

Ozlem Ogutveren-Gonul, PhD (*Gazi University, Ankara, Turkey*).
Assistant Teaching Professor.

Scott Quitel, JD, MBA (*Temple University*) *Director of Social Entrepreneurship*. Assistant Teaching Professor.

Charles Sacco, MBA (*Drexel University*) *Assistant Dean of Strategic Initiatives; Director of the Baiada Institute for Entrepreneurship*.

Damian Salas, MBA (*Drexel University*) *Assistant Dean of Entrepreneurship Programs*. Assistant Teaching Professor.

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

College of Computing & Informatics

From our position on the leading edge of information and technology, Drexel University's College of Computing & Informatics (CCI) instills the knowledge and skills necessary for our students to lead and innovate across industries in a rapidly evolving technological landscape.

Building on Drexel University's exceptional foundation of entrepreneurship and cooperative education, we provide unparalleled professional experiences and the on-the-job training that is vital to preparing today's students for tomorrow's world. At CCI, our unique structure bringing computing and informatics together under one roof in a dynamic, collaborative college allows us to spot trends before they emerge, to solve problems before they occur, and to build a better tomorrow, starting today.

The College contributes to theory and practice along dimensions that include technical, human, organizational, policy and societal considerations. This broad perspective positions the College 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://drexel.edu/cci/>).

Majors

- Computer Science (MSCS, PhD) (p. 16)
- Data Science (MSDS) (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/datascience/>)
- **NEW:** Digital Content Management (MSI)
- Health Informatics (MSHI) (p. 21)
- **NEW:** Human-Computer Interaction and User Experience (MSI)
- Information Science (PhD) (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/informationsciencephd/>)
- Information Systems (MSIS) (p. 25)
- Library and Information Science (MSI) (p. 30)
- Software Engineering (MSSE) (p. 32)

Minors

- Applied Data Science (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/applieddatasciencegminor/>)
- Computational Data Science (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/computationaldatasciencegminor/>)
- Computer Science (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/computersciencegminor/>)
- Healthcare Informatics (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/healthcareinformaticsgminor/>)
- **NEW:** Human-Computer Interaction and User Experience

Certificates

- Applied Data Science (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/applieddatasciencepbc/>)
- Computational Data Science (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/computationaldatasciencepbc/>)

- Computer Science (p. 37)
- Healthcare Informatics (<http://catalog.drexel.edu/graduate/collegeofcomputingandinformatics/healthcareinformaticspbc/>)
- **NEW:** Human-Computer Interaction and User Experience
- Information Studies and Technology (Advanced Certificate) (p. 38)

Computer Science

Major: Computer Science

Degree Awarded: Master of Science in Computer Science (MSCS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MSCS); 90.0 (PhD)

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional Programs (CIP) code: 11.0701

Standard Occupational Classification (SOC) code: 11-3021; 15-1111; 15-1131; 15-1132; 15-1199

About the Program

The Department of Computer Science in the College of Computing & Informatics (<http://drexel.edu/cci/>) houses research groups actively conducting research on a wide range of topics in Computer Science including artificial intelligence, algorithms, computer vision and graphics, programming languages, networks, privacy and security, high-performance computing, software engineering, computer algebra, and algorithms. The department emphasizes both interdisciplinary and applied research and is supported by major federal research grants from the National Science Foundation, Department of Defense, Department of Energy, and the National Institute of Standards and Technology, as well as by private sources.

Master of Science in Computer Science

The Master of Science in Computer Science program is designed to provide breadth of understanding in the core topics of computer science, in-depth advanced material, and a range of topics in the research areas of the faculty. A balance of theory and practice is presented, preparing students to perform cutting edge research as well as training students to become practicing computer scientists or software engineers in business, industry, or government. A thesis option is available to prepare students for doctoral studies or other research-oriented career paths.

A graduate co-op is available for the Master of Science program. For more information, visit the Steinbright Career Development Center's website (<http://www.drexel.edu/scdc/co-op/graduate/>).

Doctorate in Computer Science

Students enrolled in the PhD in Computer Science program are expected to become an expert in a research area in computer science or its interdisciplinary field with other disciplines. They are expected to conduct research in considerable depth, and make substantial contributions through creative research and serious scholarship. The program is designed for students to ensure core knowledge of the fundamental computer science areas and to conduct bleeding edge research at the forefront of a selected area. Students are prepared for leadership careers in research and education in computer science and interdisciplinary work using computer science.

Additional Information

For more information about these programs, visit the College of Computing & Informatics' website (<https://drexel.edu/cci/academics/overview/>).

Master of Science in Computer Science

General Requirements

Students must complete a minimum of 45.0 graduate credits for the MS degree.

Core Requirements 18.0

Students must take 1 course marked "Core Candidate" from each of the 6 categories below. There are 2 Core Candidate courses in each category.

Theory

CS 521	Data Structures and Algorithms I (Core Candidate)
CS 522	Data Structures and Algorithms II
CS 525	Theory of Computation (Core Candidate)
CS 618	Algorithmic Game Theory
CS 620	Advanced Data Structure and Algorithms
CS 621	Approximation Algorithms
CS 623	Computational Geometry

Intelligent Systems

CS 500	Fundamentals of Databases (Core Candidate)
CS 510	Introduction to Artificial Intelligence (Core Candidate)
CS 511	Robot Laboratory
CS 610	Advanced Artificial Intelligence
CS 611	Game Artificial Intelligence
CS 612	Knowledge-based Agents
CS 613	Machine Learning
CS 615	Deep Learning
CS 660	Data Analysis at Scale
CS 661	Responsible Data Analysis

Programming Systems

CS 550	Programming Languages (Core Candidate)
CS 650	Program Generation and Optimization
CS 675	Reverse Software Engineering
CS 676	Parallel Programming
SE 575	Software Design (Core Candidate)
SE 576	Software Reliability and Testing
SE 577	Software Architecture
SE 578	Security Engineering

Computer Systems

CS 543	Operating Systems (Core Candidate)
CS 544	Computer Networks (Core Candidate)
CS 643	Advanced Operating Systems
CS 645	Network Security
CS 647	Distributed Systems Software

Vision and Graphics

CS 536	Computer Graphics (Core Candidate)
CS 537	Interactive Computer Graphics
CS 558	Game Engine Programming
CS 583	Introduction to Computer Vision (Core Candidate)
CS 634	Advanced Computer Vision
CS 636	Advanced Computer Graphics

Applications

CS 530	Developing User Interfaces (Core Candidate)
CS 540	High Performance Computing (Core Candidate)
CS 567	Applied Symbolic Computation
CS 590	Privacy
CS 630	Cognitive Systems

CS 668	Computer Algebra I
CS 669	Computer Algebra II

Breadth Requirements 9.0

Students must take an additional 3 courses from the remaining courses above, spanning at least 2 of the listed categories.

Depth Requirements 6.0

Students are required to complete at least 2 more Computer Science (CS) and Software Engineering (SE) courses beyond the breadth requirement, preferably at the 600- or 700-level. The CS Independent Study course (CS I599, CS I699, CS I799) may be taken if approved by the College.

Additional Graduate-Level Courses 6.0

Two additional graduate level courses are required. These courses are typically 600- or 700-level Computer Science (CS) courses. Graduate courses may be taken from outside the department, if on the list of approved external courses, and may include CS Independent Study (CS I599, CS I699, CS I799) and CS 997 Research in Computer Science, if approved by the College.

Other courses, such as intermediate 500-level and special topics, may also qualify for fulfilling this requirement. Students must check with their advisor to see if this is the case, and have these courses approved by the College. Any course offered by another department that is not on the list of approved external courses must be approved by the College, or it will not count towards the degree.

Thesis or Non-Thesis Option 6.0

Thesis Option

Usually students pursuing a Master's Thesis will first do 3.0 research credits (CS I599, CS I699, CS I799 or CS 997) to obtain background knowledge required by the thesis topic. It is the responsibility of the student to find a thesis supervisor.

CS 898	Master's Thesis
--------	-----------------

Non-thesis Option

The non-thesis option requires 2 additional 600- or 700-level Computer Science (CS) courses taken in place of the 6.0 thesis credits.

Total Credits 45.0

Sample Plan of Study (MScS)

Term 1	Credits
Core Requirement Courses	6.0
Term Credits	6.0
Term 2	
Core Requirement Courses	6.0
Term Credits	6.0
Term 3	
Core Requirement Courses	6.0
Term Credits	6.0
Term 4	
Breadth Requirement	3.0
Depth Requirement	3.0
Term Credits	6.0
Term 5	
Breadth Requirement	3.0
Depth Requirement	3.0
Term Credits	6.0
Term 6	
Breadth Requirement	3.0
Elective	3.0
Term Credits	6.0
Term 7	
Electives	6.0
Term Credits	6.0
Term 8	
Elective	3.0
Term Credits	3.0
Total Credit:	45.0

PhD in Computer Science

Core Requirements

18.0

Students must take 1 course marked "Core Candidate" from each of the 6 categories below. There are 2 Core Candidate courses in each category.

Theory

CS 521	Data Structures and Algorithms I (Core Candidate)
CS 525	Theory of Computation (Core Candidate)
CS 522	Data Structures and Algorithms II
CS 618	Algorithmic Game Theory
CS 620	Advanced Data Structure and Algorithms
CS 621	Approximation Algorithms
CS 623	Computational Geometry

Intelligent Systems

CS 500	Fundamentals of Databases (Core Candidate)
CS 510	Introduction to Artificial Intelligence (Core Candidate)
CS 511	Robot Laboratory
CS 610	Advanced Artificial Intelligence
CS 611	Game Artificial Intelligence
CS 612	Knowledge-based Agents
CS 613	Machine Learning
CS 615	Deep Learning
CS 660	Data Analysis at Scale
CS 661	Responsible Data Analysis

Programming Systems

CS 550	Programming Languages (Core Candidate)
CS 650	Program Generation and Optimization
CS 675	Reverse Software Engineering
CS 676	Parallel Programming
SE 575	Software Design (Core Candidate)
SE 577	Software Architecture
SE 576	Software Reliability and Testing
SE 578	Security Engineering

Computer Systems

CS 543	Operating Systems (Core Candidate)
CS 544	Computer Networks (Core Candidate)
CS 643	Advanced Operating Systems
CS 645	Network Security
CS 647	Distributed Systems Software

Vision and Graphics

CS 536	Computer Graphics (Core Candidate)
CS 583	Introduction to Computer Vision (Core Candidate)
CS 537	Interactive Computer Graphics
CS 558	Game Engine Programming
CS 634	Advanced Computer Vision
CS 636	Advanced Computer Graphics

Applications

CS 530	Developing User Interfaces (Core Candidate)
CS 540	High Performance Computing (Core Candidate)
CS 567	Applied Symbolic Computation
CS 590	Privacy
CS 630	Cognitive Systems
CS 668	Computer Algebra I
CS 669	Computer Algebra II

Breadth Requirement

12.0

Students must take another 4 intermediate and advanced courses from the remaining courses above, spanning at least 3 of the listed course categories while earning at least a grade of B in each course.

Depth Requirement

18.0

Students are required to complete at least 18.0 credits of CS courses beyond the Breadth Requirement. These courses should be Computer Science (CS) and Software Engineering (SE) courses preferably at the 600- or 700-level courses. Course selection must be approved by the student's research advisor. The department will periodically offer topics courses, typically run in a seminar fashion, on current research areas of interest to faculty. As part of the Depth Requirements, 3.0 out of the 18.0 credits, but no more than 9.0 credits, are to be Independent Study work (CS I799).

Total Credits

48.0

Plan of Study

Upon entering the PhD program, each student will be assigned an Graduate Advisor, and with the help of the Advisor will develop and file a plan of study (which can be brought up to date when necessary). The plan of study should be filed with the Graduate Advisor no later than the end of the first term.

Qualifying Requirements

PhD student must pass each of the six core courses selected as part of the "Core Requirements" (one "Core Candidate" course from each of the listed categories) with a grade B+ or higher. If a student fails to meet this minimum grade requirement, he or she may either (1) take the other "Core Candidate" course in the same category and obtain a grade of B+ or higher; (2) retake the same course at the next offering; or (3) retake the final exam of the same course with permission by the instructor, if deemed appropriate by the instructor and the College. Normally, a student is expected to satisfy this requirement by the end of the student's first year. These requirements, including the remedial actions, must be completed by the end of the student's second year. Transfer credits may count towards these requirements subject to course instructor approval of the syllabus for the transferred course.

Candidacy Exam

The Computer Science candidacy examination serves to define the student's research domain and to evaluate the student's knowledge and understanding of various fundamental and seminal results in that domain. At this point the student is expected to be able to read, understand, analyze, and explain advanced technical results in a specialized area of computer science at an adequate level of detail. The candidacy examination will evaluate those abilities using a defined set of published manuscripts. The student will prepare a written summary of the contents of the material, present the summary orally, and answer questions about the material. The examination committee will evaluate the written summary, the oral presentation, and the student's answers.

Thesis Proposal

After completing the candidacy examination successfully, the PhD candidate must prepare a thesis proposal that outlines, in detail, the specific problems that will be solved in the PhD dissertation. The quality of the research proposal should be at the level of, for example, a peer-reviewed proposal to a federal funding agency, or a publishable scientific paper. The candidate is responsible for sending the research proposal to the PhD committee two weeks before the oral presentation. The PhD committee need not be the same as the candidacy exam committee, but it follows the same requirements and must be approved by the Office of Graduate Studies. The oral presentation involves a 30-minute presentation by the candidate followed by an unspecified period during which the committee will ask questions. After the question and answer period, the candidate will be asked to leave the room and the committee will determine if the research proposal has been accepted. The research proposal can be repeated at most once.

Thesis Defense

After completing the research proposal successfully, the PhD candidate must conduct the necessary research and publish the results in a PhD dissertation. The dissertation must be submitted to the PhD committee two weeks prior to the oral defense. The oral presentation involves a 45-minute presentation by the candidate, open to the public, followed by an unspecified period during which the committee will ask questions. The question-and-answer period is not open to the public. After the question and answer period, the candidate will be asked to leave the room and the committee will determine if the candidate has passed or failed the examination. The candidate will be granted one more chance to pass the final defense if (s)he fails it the first time. Paperwork selecting the thesis committee and indicating the results of the thesis defense must be filed with the College of Computing & Informatics (<http://drexel.edu/cci/>) and the Graduate College (<https://drexel.edu/graduatecollege/>).

Dual Degree Opportunities

Graduate students already enrolled in a master's degree program at Drexel have the opportunity, through the dual master's program, to work simultaneously on two CCI master's degrees and to receive both upon graduation. To be eligible, graduate students must be currently working on their first CCI master's degree when requesting admission to the second CCI master's degree. They must obtain approval from the graduate advisors of both programs and work out a plan of study encompassing coursework and/or research (thesis) credits for both degrees.

To satisfy dual degree requirements for the MSCS and another degree the plan of study must include the following: mandatory core, flexible core, breadth and one depth course for a total of 30.0 credits. To obtain a dual degree you must have a minimum of 60 credits, thesis and research credits will be in excess of the 30.0 credits required by MSCS. The dual degree for MSCS students is only available to on-campus students. Please contact your advisor (<https://drexel.edu/cci/current-students/graduate-professional-development/advising/>) for more information on program requirements as some CCI master's degree combinations may require additional prerequisites.

The dual master's student must complete the Change of Curriculum and Status form (<https://drexel.edu/graduatecollege/forms-policies/forms/>) and obtain approvals from both graduate advisors. Final approval is granted by the Graduate College (<http://drexel.edu/graduatecollege/>). The student is then registered in both majors simultaneously. Upon graduation, the student must file two Application for Degree (<http://drexel.edu/drexelcentral/graduation/information/applying-for-degree/>) forms.

3675 Market Street

In March 2019, the College of Computing & Informatics relocated to 3675 Market (<https://drexel.edu/cci/about/our-facilities/>). For the first time in the College's history, all CCI faculty, students and professional staff are housed under one roof. Occupying two floors in the brand new uCity Square building, CCI's new home offers state-of-the-art technology in our classrooms, labs, meeting areas and collaboration spaces. 3675 Market offers Class A laboratory, office, coworking, and convening spaces. In fall 2019, the College will open a third floor which will include additional offices, classrooms, a research lab, a maker space, and a ground-breaking DXC Technology Innovation Lab. Located at the intersection of Market Street and 37th Street, 3675 Market will act as a physical nexus, bridging academic campuses and medical centers to the east and south, the commercial corridors along Market Street and Chestnut Street, and the residential communities to the north and west.

The uCity Square building offers:

- Speculative lab/office space
- World-class facilities operated by CIC (<https://cic.us/philadelphia/>)
- Café/restaurant on-site
- Quorum, a two-story, 15K SF convening space and conference center
- Adjacent to future public square
- Access to Science Center's nationally renowned business acceleration and technology commercialization programs

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 three physical locations, including W. W. Hagerty 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](http://www.library.drexel.edu/) (<http://www.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.

CCI Commons

Located on the 10th floor of 3675 Market Street, the CCI Commons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, and more collaborative space for its students. Students have access to 3675 Market's fully equipped conference room with 42" displays and videoconferencing capabilities. The CCI Commons provides technical support to students, faculty, and professional staff. In addition, the staff provides audio-visual support for all presentation classrooms within 3675 Market. Use of the CCI Commons 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 CCI Commons 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 CCI Commons 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 CCI Commons, 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.

CCI Learning Center

The CCI Learning Center (CCILC), located in 3675 Market Street's CCI Commons student computer lab, provides consulting and other learning resources for students taking computer science classes. The CCILC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

The CCILC and CCI Commons serve as a central hub for small group work, student meetings, and TA assistance.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, in 3675 Market Street including: the Drexel Health and Risk Communication Lab, Interactive Systems for Healthcare, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), High Performance Computing Laboratory (SPIRAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Social Computing Research Group, 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>).

Computer Science Faculty

Yuan An, PhD (*University of Toronto, Canada*) *Director of International Programs*. 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

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*) *The Auerbach Berger Chair in Cybersecurity Distinguished Professor of Computer Science*. 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.

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.

Emeritus Faculty

Valerie Ann Yonker, PhD (*Drexel University*). Associate Teaching Professor Emerita. Human service information systems, systems analysis and design, measurement in software evaluation, knowledge engineering.

Health Informatics

Major: Health Informatics

Degree Awarded: Master of Science in Health Informatics (MSHI)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.2706

Standard Occupational Classification (SOC) code: 15-1111

About the Program

The Master of Science in Health Informatics (MSHI) at the College of Computing & Informatics prepares graduates to use data, information and knowledge for scientific inquiry and problem solving to improve health outcomes. The program addresses the challenges and opportunities encountered as healthcare transforms itself into a digital, patient-centered system. The inter-disciplinary nature of the MSHI program brings clinicians and IT professionals together to analyze problems and develop solutions through the application of advanced information technology.

Students in this program complete their required courses in the College of Computing & Informatics and choose from a group of approved electives drawn from the College of Nursing and Health Professions, the Dornsife School of Public Health and the LeBow College of Business. All courses are delivered online and students are encouraged to enroll in approved experiential learning programs. Under the guidance of skilled faculty, students engage in a variety of learning activities, develop their organizational leadership skills and develop an appreciation of the varied perspectives in today's healthcare world.

The MS in Health Informatics enables IT professionals who want to expand their knowledge and skills into healthcare, whether in patient care organizations such as hospitals and clinics, or the insurance and pharmaceutical industries. The flexibility of this program is ideal for clinicians who wish to acquire technical skills to advance their careers in today's competitive health care environment.

Drexel's MSHI degree program is accredited by the Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM). Drexel University's educational programs are accredited by MSCHE (Middle States Commission on Higher Education).

Admission Requirements

The Master of Science in Health Informatics accepts applicants who hold a Bachelor's degree from an accredited university. Please visit the College of Computing & Informatics' website (<https://drexel.edu/cci/admissions/graduate-professional-development/admissions-information-and-requirements/ms-programs-admissions-requirements/>) for more information on admission requirements.

Additional Information

For more information about this program, visit the College of Computing & Informatics' MS in Health Informatics (<https://drexel.edu/cci/academics/graduate-programs/ms-in-health-informatics/>) web page.

Degree Requirements

The curriculum is based around contemporary health issues and has been designed to help students understand the current landscape of health informatics and how information, technology and people relate and intersect in healthcare environments. Because health informatics is an interdisciplinary field, all students will complete a common core of 11 courses (33 quarter hours) from the College of Computing & Informatics before choosing from a suite of specialized electives offered by the College of Computing & Informatics or other Colleges at Drexel University.

Required Courses		
INFO 540	Perspectives on Information Systems	3.0
INFO 600	Web Systems & Architecture	3.0
INFO 605	Database Management Systems	3.0
INFO 606	Advanced Database Management	3.0
INFO 620	Information Systems Analysis and Design	3.0
INFO 648	Healthcare Informatics	3.0
INFO 659	Introduction to Data Analytics	3.0
INFO 712	Information Assurance	3.0
INFO 896	Health Informatics Experience *	3.0
NURS 557	Leadership and Stewardship in the Health Professions	3.0
NURS 558	Economics of Healthcare Management & Policy	3.0
Approved Electives		9.0
Choose three of the following:		
BST 571	Introduction to Biostatistics	
BUSN 651	Healthcare Business Practice I: Foundations	

BUSN 652	Healthcare Business Practice II
BUSN 653	Healthcare Business Practice III: Capstone
DSCI 511	Data Acquisition and Pre-Processing
DSCI 521	Data Analysis and Interpretation
EPI 570	Introduction to Epidemiology
EPI 572	Design and Analysis of Epidemiological Studies
HSAD 505	Ethical and Legal Issues in Healthcare Management and Policy
INFO 517	Principles of Cybersecurity
INFO 608	Human-Computer Interaction
INFO 610	Analysis of Interactive Systems
INFO 611	Design of Interactive Systems
INFO 622	Content Representation
INFO 623	Social Network Analytics
INFO 624	Information Retrieval Systems
INFO 634	Data Mining
INFO 646	Information Systems Management
INFO 731	Managing Health Informatics Projects
INFO 732	Healthcare Informatics: Planning & Evaluation
INFO 733	Public Health Informatics
NURS 531	Epidemiology in Action: Tracking Health & Disease
NURS 532	Evaluation of Health Outcomes
NURS 564	The Business of Healthcare
RSCH 519	Introduction to Biostatistics
RSCH 523	Methods for Health Research
SE 630	Software Engineering Economics
Free electives	3.0
Total Credits	45.0

* Students are encouraged to approach the program director to develop a project assignment and agreement for INFO 896.

Sample Plan of Study

Term 1		Credits
INFO 540	Perspectives on Information Systems	3.0
INFO 648	Healthcare Informatics	3.0
	Term Credits	6.0
Term 2		
INFO 600	Web Systems & Architecture	3.0
INFO 605	Database Management Systems	3.0
	Term Credits	6.0
Term 3		
INFO 620	Information Systems Analysis and Design	3.0
INFO 659	Introduction to Data Analytics	3.0
	Term Credits	6.0
Term 4		
INFO 712	Information Assurance	3.0
Approved Elective		3.0
	Term Credits	6.0
Term 5		
NURS 557	Leadership and Stewardship in the Health Professions	3.0
Approved Elective		3.0
	Term Credits	6.0
Term 6		
INFO 606	Advanced Database Management	3.0
NURS 558	Economics of Healthcare Management & Policy	3.0
	Term Credits	6.0
Term 7		
Approved Elective		3.0
Free Elective		3.0
	Term Credits	6.0
Term 8		

INFO 896	Health Informatics Experience	3.0
	Term Credits	3.0
Total Credit: 45.0		

Dual Degree Opportunities

Graduate students already enrolled in a master's degree program at Drexel have the opportunity, through the dual master's program, to work simultaneously on two CCI master's degrees and to receive both upon graduation. To be eligible, graduate students must be currently working on their first CCI master's degree when requesting admission to the second CCI master's degree. They must obtain approval from the graduate advisors of both programs and work out a plan of study encompassing coursework and/or research (thesis) credits for both degrees. Please contact your advisor (<https://drexel.edu/cci/current-students/graduate-professional-development/advising/>) for more information on program requirements as some CCI master's degree combinations may require additional pre-requisites.

The dual master's student must complete the Change of Curriculum and Status form (<https://drexel.edu/graduatecollege/forms-policies/forms/>) and obtain approvals from both graduate advisors. Final approval is granted by the Graduate College (<http://drexel.edu/graduatecollege/>). The student is then registered in both majors simultaneously. Upon graduation, the student must file two Application for Degree (<http://drexel.edu/drexelcentral/graduation/information/applying-for-degree/>) forms.

Evaluations

The College of Computing & Informatics works continually to improve its degree programs. As part of this effort, the Health Informatics degree is evaluated relative to the following Learning Objectives:

Specific learning outcomes for program graduates include the following:

- Articulate the ways in which data, information, and knowledge are used to solve health problems from the individual to the population level.
- Apply theories, methods, and processes for the generation, storage, retrieval, use, management, and sharing of healthcare data, information, and knowledge.
- Apply, adapt, and validate informatics concepts and approaches as they relate to specific biomedical and healthcare problems.
- Select relevant concepts and techniques from the social sciences to solve problems in health informatics.
- Work collaboratively across disciplines to define, discuss, and resolve health problems.
- Analyze the ethical and policy issues related to biomedical and healthcare informatics.

Facilities

3675 Market Street

In March 2019, the College of Computing & Informatics relocated to 3675 Market (<https://drexel.edu/cci/about/our-facilities/>). For the first time in the College's history, all CCI faculty, students and professional staff are housed under one roof. Occupying two floors in the brand new uCity Square building, CCI's new home offers state-of-the-art technology in our classrooms, labs, meeting areas and collaboration spaces. 3675 Market offers Class A laboratory, office, coworking, and convening spaces. In fall 2019, the College will open a third floor which will include additional offices, classrooms, a research lab, a maker space, and a ground-

breaking DXC Technology Innovation Lab. Located at the intersection of Market Street and 37th Street, 3675 Market will act as a physical nexus, bridging academic campuses and medical centers to the east and south, the commercial corridors along Market Street and Chestnut Street, and the residential communities to the north and west.

The uCity Square building offers:

- Speculative lab/office space
- World-class facilities operated by CIC (<https://cic.us/philadelphia/>)
- Café/restaurant on-site
- Quorum, a two-story, 15K SF convening space and conference center
- Adjacent to future public square
- Access to Science Center's nationally renowned business acceleration and technology commercialization programs

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 three physical locations, including W. W. Hagerty 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](http://www.library.drexel.edu/) (<http://www.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.

CCI Commons

Located on the 10th floor of 3675 Market Street, the CCI Commons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, and more collaborative space for its students. Students have access to 3675 Market's fully equipped conference room with 42" displays and videoconferencing capabilities. The CCI Commons provides technical support to students, faculty, and professional staff. In addition, the staff provides audio-visual support for all presentation classrooms within 3675 Market. Use of the CCI Commons 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 CCI Commons 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 CCI Commons 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 CCI Commons, 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.

CCI Learning Center

The CCI Learning Center (CCILC), located in 3675 Market Street's CCI Commons student computer lab, provides consulting and other learning resources for students taking computer science classes. The CCILC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

The CCILC and CCI Commons serve as a central hub for small group work, student meetings, and TA assistance.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, in 3675 Market Street including: the Drexel Health and Risk Communication Lab, Interactive Systems for Healthcare, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), High Performance Computing Laboratory (SPIRAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Social Computing Research Group, 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>).

Computing & Informatics Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Youth information behaviors, public libraries, multicultural issues in youth library services, and qualitative research methods.

Yuan An, PhD (*University of Toronto, Canada*) Director of *International Programs*. 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*) 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

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*) *BSCST Program Director*. Associate 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.

M. Carl Drott, PhD (*University of Michigan*). Associate Professor. Systems analysis techniques, web usage, competitive intelligence.

Andrea Forte, PhD (*Georgia Institute of Technology*) *PhD Program Director, and MS in Information Program Director*. 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

Peter Grillo, PhD (*Temple University*) *Associate Department Head for Undergraduate Affairs, Information Science*. Teaching Professor. Strategic applications of technology within organizations.

Jeremy R. Johnson, PhD (*Ohio State University*). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

Xia Lin, PhD (*University of Maryland*) *Department Head, Information Science*. 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*) *The Auerbach Berger Chair in Cybersecurity Distinguished Professor of Computer Science*. 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.

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.

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. Digital curation, archives and records management, digital humanities, and diversity, inclusivity, and equity.

Jeffrey L. Popyack, PhD (*University of Virginia*). Professor. Operations research, stochastic optimization, computational methods of Markov decision processes; artificial intelligence, computer science education.

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*). 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.

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. Case-based reasoning, explainable artificial intelligence, machine learning, textual analytics, natural language understanding, language models, recommender systems, technological aspects of knowledge management, project management, and requirements engineering.

Erija Yan, PhD (*Indiana University*). Assistant Professor. Network Science, information analysis and retrieval, scholarly communication methods and applications.

Emeritus Faculty

Michael E. Atwood, PhD (*University of Colorado*). 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.

Delia Neuman, PhD (*The Ohio State University*). Professor Emerita. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Gerry Stahl, PhD (*University of Colorado*). 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: Master of Science in Information Systems (MSIS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional Programs (CIP) code: 11.0401

Standard Occupational Classification (SOC) code: 11-3021

About the Program

The College of Computing & Informatics' Master of Science in Information Systems (MSIS) prepares students for both the technical and real-world aspects of creating and managing information systems. The program is offered both online and on campus, part-time and full-time.

The program is designed for students with or without prior background in information systems, seeking to learn latest methods in data analysis, human-centered computing, and information systems. Courses integrate the business, organizational, and technical aspects of computer-based information systems, while offering the chance to develop and expand expertise in three specialist areas:

1. Software and systems development, such as organizational information system design, requirements analysis, software project management, modern systems development and implementation.
2. Data analytics, information, and knowledge management, such as organizational data management, data mining, natural language processing, intelligent systems, and competitive intelligence.
3. Human-centered computing, such as human-computer interaction, user-experience design, social computing, collaboration systems, and online community support.

A graduate co-op is available for this program. For more information, visit the Steinbright Career Development Center's website (<http://www.drexel.edu/scdc/co-op/graduate/>).

Additional Information

For more information about this program, visit the College of Computing & Informatics' MS in Information Systems (<https://drexel.edu/cc/academics/graduate-programs/ms-in-information-systems/>) web page.

Admission Requirements

The Master of Science in Information Systems accepts applicants who hold a Bachelor's degree from an accredited university. Please visit the College of Computing & Informatics' website (<https://drexel.edu/cc/academics/graduate-programs/ms-in-information-systems/>) for more information on admission requirements.

Degree Requirements

Required Courses		
INFO 532	Software Development	3.0
INFO 540	Perspectives on Information Systems	3.0
INFO 600	Web Systems & Architecture	3.0
INFO 605	Database Management Systems	3.0
INFO 608	Human-Computer Interaction	3.0
INFO 620	Information Systems Analysis and Design	3.0
INFO 646	Information Systems Management	3.0
SE 627	Requirements Engineering and Management	3.0
SE 638	Software Project Management	3.0
Distribution Requirements		12.0
Select four of the following:		
CS 520	Computer Science Foundations	
CS 570	Programming Foundations	
CS 571	Advanced Programming Techniques	
INFO 517	Principles of Cybersecurity	
INFO 606	Advanced Database Management	
INFO 622	Content Representation	
INFO 623	Social Network Analytics	
INFO 624	Information Retrieval Systems	
INFO 633	Information Visualization	
INFO 634	Data Mining	
INFO 648	Healthcare Informatics	
INFO 655	Intro to Web Programming	

INFO 659	Introduction to Data Analytics	
INFO 670	Cross-platform Mobile Development	
INFO 690	Understanding Users: User Experience Research Methods	
INFO 691	Prototyping the User Experience	
INFO 710	Information Forensics	
INFO 712	Information Assurance	
INFO 731	Managing Health Informatics Projects	
INFO 732	Healthcare Informatics: Planning & Evaluation	
SE 578	Security Engineering	
SE 630	Software Engineering Economics	
SE 636	Software Engineering Process	
Free Electives *		6.0
Total Credits		45.0

* Courses in the distribution course set that students do not take to meet the distribution requirement may be taken as free electives. All other masters-level INFO courses may be taken as free electives. MSIS students may not take courses designated as doctoral-level courses.

Sample Plan of Study

Term	Courses	Credits
Term 1		
INFO 532	Software Development	3.0
INFO 540	Perspectives on Information Systems	3.0
	Term Credits	6.0
Term 2		
INFO 600	Web Systems & Architecture	3.0
INFO 605	Database Management Systems	3.0
	Term Credits	6.0
Term 3		
INFO 608	Human-Computer Interaction	3.0
INFO 620	Information Systems Analysis and Design	3.0
	Term Credits	6.0
Term 4		
SE 627	Requirements Engineering and Management	3.0
Distribution Course		3.0
	Term Credits	6.0
Term 5		
SE 638	Software Project Management	3.0
Distribution Course		3.0
	Term Credits	6.0
Term 6		
INFO 646	Information Systems Management	3.0
Distribution Course		3.0
	Term Credits	6.0
Term 7		
Distribution Course		3.0
Free Elective		3.0
	Term Credits	6.0
Term 8		
Free Elective		3.0
	Term Credits	3.0
Total Credit:		45.0

Dual Degree Opportunities

Graduate students already enrolled in a master's degree program at Drexel have the opportunity, through the dual master's program to work simultaneously on two master's degrees and to receive both upon graduation. To be eligible, graduate students must be currently working on their first degree when requesting admission to the second. They must

obtain approval from the graduate advisors of both programs and work out a plan of study encompassing coursework and/or research (thesis) credits for both degrees. Please contact your advisor (<https://drexel.edu/cci/current-students/graduate-professional-development/advising/>) for more information on program requirements as some CCI master's degree combinations may require additional pre-requisites.

The dual master's student must complete the Change of Curriculum and Status form (<https://drexel.edu/graduatecollege/forms-policies/forms/>) and obtain approvals from both graduate advisors. Final approval is granted by the Graduate College (<http://drexel.edu/graduatecollege/>). The student is then registered in both majors simultaneously. Upon graduation, the student must file two Application for Degree (<http://drexel.edu/drexelcentral/graduation/information/applying-for-degree/>) forms.

Facilities

3675 Market Street

In March 2019, the College of Computing & Informatics relocated to 3675 Market (<https://drexel.edu/cci/about/our-facilities/>). For the first time in the College's history, all CCI faculty, students and professional staff are housed under one roof. Occupying two floors in the brand new uCity Square building, CCI's new home offers state-of-the-art technology in our classrooms, labs, meeting areas and collaboration spaces. 3675 Market offers Class A laboratory, office, coworking, and convening spaces. In fall 2019, the College will open a third floor which will include additional offices, classrooms, a research lab, a maker space, and a ground-breaking DXC Technology Innovation Lab. Located at the intersection of Market Street and 37th Street, 3675 Market will act as a physical nexus, bridging academic campuses and medical centers to the east and south, the commercial corridors along Market Street and Chestnut Street, and the residential communities to the north and west.

The uCity Square building offers:

- Speculative lab/office space
- World-class facilities operated by CIC (<https://cic.us/philadelphia/>)
- Café/restaurant on-site
- Quorum, a two-story, 15K SF convening space and conference center
- Adjacent to future public square
- Access to Science Center's nationally renowned business acceleration and technology commercialization programs

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 three physical locations, including W. W. Hagerty 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](http://www.library.drexel.edu) (<http://www.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.

CCI Commons

Located on the 10th floor of 3675 Market Street, the CCI Commons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, and more collaborative space for its students. Students have access to 3675 Market's fully equipped conference room with 42" displays and videoconferencing capabilities. The CCI Commons provides technical support to students, faculty, and professional staff. In addition, the staff provides audio-visual support for all presentation classrooms within 3675 Market. Use of the CCI Commons 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 CCI Commons 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 CCI Commons 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 CCI Commons, 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.

CCI Learning Center

The CCI Learning Center (CCILC), located in 3675 Market Street's CCI Commons student computer lab, provides consulting and other learning resources for students taking computer science classes. The CCILC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

The CCILC and CCI Commons serve as a central hub for small group work, student meetings, and TA assistance.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, in 3675 Market Street including: the Drexel Health and Risk Communication Lab, Interactive Systems for Healthcare, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), High Performance Computing Laboratory (SPIRAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Social Computing Research Group, 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>).

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 Learning Objectives:

Graduates of the MS in Information Systems program are prepared to assume leadership and management positions designing, developing, and delivering innovative technological solutions to information problems in a variety of contexts. Their preparation encompasses the knowledge and abilities required to:

- Use a human-centered approach to analyze information needs and design solutions to meet those needs.
- Lead or contribute substantially to a team in developing information technology products and services.
- Evaluate, compare, and select from alternative and emerging information technologies.
- Communicate with technical and non-technical audiences about information technology concepts and stakeholder needs.
- Contribute substantially to an information technology plan for an organization.
- Explain information technology uses, benefits, and ethical and global issues for individuals and organizations.

Computing & Informatics Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Youth information behaviors, public libraries, multicultural issues in youth library services, and qualitative research methods.

Yuan An, PhD (*University of Toronto, Canada*) *Director of International Programs*. 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*) *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

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*) *BSCST Program Director*. Associate 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.

M. Carl Drott, PhD (*University of Michigan*). Associate Professor. Systems analysis techniques, web usage, competitive intelligence.

Andrea Forte, PhD (*Georgia Institute of Technology*) *PhD Program Director, and MS in Information Program Director*. 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

Peter Grillo, PhD (*Temple University*) *Associate Department Head for Undergraduate Affairs, Information Science*. Teaching Professor. Strategic applications of technology within organizations.

Jeremy R. Johnson, PhD (*Ohio State University*). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

Xia Lin, PhD (*University of Maryland*) *Department Head, Information Science*. 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*) *The Auerbach Berger Chair in Cybersecurity Distinguished Professor of Computer Science*. 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.

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.

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. Digital curation, archives and records management, digital humanities, and diversity, inclusivity, and equity.

Jeffrey L. Popyack, PhD (*University of Virginia*). Professor. Operations research, stochastic optimization, computational methods of Markov decision processes; artificial intelligence, computer science education.

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*). 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.

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. Case-based reasoning, explainable artificial intelligence, machine learning, textual analytics, natural language understanding, language models, recommender systems, technological aspects of knowledge management, project management, and requirements engineering.

Erija Yan, PhD (*Indiana University*). Assistant Professor. Network Science, information analysis and retrieval, scholarly communication methods and applications.

Emeritus Faculty

Michael E. Atwood, PhD (*University of Colorado*). 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.

Delia Neuman, PhD (*The Ohio State University*). Professor Emerita. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Gerry Stahl, PhD (*University of Colorado*). 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.

Library and Information Science

Major: Library and Information Science

Degree Awarded: Master of Science in Information Science (MSI)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 25.0101

Standard Occupational Classification (SOC) code: 25-4021

About the Program

The Library and Information Science (LIS) graduate major integrates information technology, professional knowledge, and interdisciplinary, experiential learning to prepare our graduates to lead and innovate in libraries, archives, museums, and information organizations. The LIS graduate major in the MSI program is accredited by the American Library Association (ALA) since 1924, and is one of the one of the oldest continuously operating LIS graduate programs in North America.

Admission Requirements

The Master of Science in Information accepts applicants who hold a Bachelor's degree from an accredited university. Please visit the College of Computing & Informatics' website (<https://drexel.edu/cci/admissions/graduate-professional-development/admissions-information->

[and-requirements/ms-programs-admissions-requirements/](https://drexel.edu/cci/admissions/graduate-professional-development/admissions-information-requirements/ms-programs-admissions-requirements/)) for more information on admission requirements.

Additional Information

For more information about this program, visit the College of Computing & Informatics' MS in Information web page (<https://drexel.edu/cci/academics/graduate-programs/ms-in-information/>) and/or the Library and Information Science graduate major web page (<https://drexel.edu/cci/academics/graduate-programs/ms-in-information/library-science-graduate-program-major/>).

Degree Requirements

Foundation Courses		
INFO 505	Information Professionals and Information Ethics	3.0
INFO 508	Information Innovation through Design Thinking	3.0
	or DSRE 620 Design Problem Solving	
INFO 590	Foundations of Data and Information	3.0
Core Courses		
INFO 506	Users, Services, & Resources	3.0
INFO 507	Leading and Managing Information Organizations	3.0
INFO 591	Data and Digital Stewardship	3.0
INFO 657	Digital Library Technologies	3.0
INFO 662	Metadata and Resource Description	3.0
Elective Courses		15.0
Choose 5 from list below, additional options may be approved by advisor:		
INFO 560	Introduction to Archives I	
INFO 561	Introduction to Archives II	
INFO 649	Library Programming	
INFO 650	Public Library Service	
INFO 651	Academic Library Service	
INFO 665	Collection Management	
INFO 683	Resources for Children	
INFO 684	Resources for Young Adults	
INFO 687	Issues in Information Literacy	
Capstone Project		
INFO 890	Capstone Project	6.0
Total Credits		45.0

Sample Plan of Study

Term 1		Credits
INFO 505	Information Professionals and Information Ethics	3.0
INFO 508	Information Innovation through Design Thinking	3.0
or DSRE 620	Design Problem Solving	
Term Credits		6.0
Term 2		
INFO 506	Users, Services, & Resources	3.0
INFO 590	Foundations of Data and Information	3.0
Term Credits		6.0
Term 3		
INFO 591	Data and Digital Stewardship	3.0
INFO 662	Metadata and Resource Description	3.0
Term Credits		6.0
Term 4		
INFO 507	Leading and Managing Information Organizations	3.0
INFO 657	Digital Library Technologies	3.0
Term Credits		6.0
Term 5		
Electives		6.0
Term Credits		6.0
Term 6		

Electives		6.0
	Term Credits	6.0
Term 7		
Elective		3.0
INFO 890	Capstone Project	3.0
	Term Credits	6.0
Term 8		
INFO 890	Capstone Project	3.0
	Term Credits	3.0

Total Credit: 45.0

Facilities

3675 Market Street

In March 2019, the College of Computing & Informatics relocated to 3675 Market (<https://drexel.edu/cci/about/our-facilities/>). For the first time in the College's history, all CCI faculty, students and professional staff are housed under one roof. Occupying two floors in the brand new uCity Square building, CCI's new home offers state-of-the-art technology in our classrooms, labs, meeting areas and collaboration spaces. 3675 Market offers Class A laboratory, office, coworking, and convening spaces. In fall 2019, the College will open a third floor which will include additional offices, classrooms, a research lab, a maker space, and a ground-breaking DXC Technology Innovation Lab. Located at the intersection of Market Street and 37th Street, 3675 Market will act as a physical nexus, bridging academic campuses and medical centers to the east and south, the commercial corridors along Market Street and Chestnut Street, and the residential communities to the north and west.

The uCity Square building offers:

- Speculative lab/office space
- World-class facilities operated by CIC (<https://cic.us/philadelphia/>)
- Café/restaurant on-site
- Quorum, a two-story, 15K SF convening space and conference center
- Adjacent to future public square
- Access to Science Center's nationally renowned business acceleration and technology commercialization programs

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 three physical locations, including W. W. Hagerty 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](http://www.library.drexel.edu/) (<http://www.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.

CCI Commons

Located on the 10th floor of 3675 Market Street, the CCI Commons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, and more collaborative space for its students. Students have access to 3675 Market's fully equipped conference room with 42" displays and videoconferencing capabilities. The CCI Commons provides technical support to students, faculty, and professional staff. In addition, the staff provides audio-visual support for all presentation classrooms within 3675 Market. Use of the CCI Commons 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 CCI Commons 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 CCI Commons 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 CCI Commons, 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.

CCI Learning Center

The CCI Learning Center (CCILC), located in 3675 Market Street's CCI Commons student computer lab, provides consulting and other learning resources for students taking computer science classes. The CCILC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

The CCILC and CCI Commons serve as a central hub for small group work, student meetings, and TA assistance.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, in 3675 Market Street including: the Drexel Health and Risk Communication Lab, Interactive Systems for Healthcare, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), High Performance Computing Laboratory (SPIRAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Social Computing Research Group, 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>).

Evaluations

The College of Computing & Informatics works continually to improve its degree programs. As part of this effort, the Library and Information

Science graduate major is evaluated relative to the following Learning Objectives:

Graduates of the LIS graduate major in the Master of Science in Information (MSI) degree program are prepared to assume leadership positions in designing, executing, and evaluating information services and products and in managing organizations that facilitate access to recorded knowledge. Their preparation enables them to gain the knowledge and abilities required to:

- Explain the foundational principles, professional ethics and values, and social and technological contexts within which various information professionals work.
- Identify and analyze the information needs of various communities (e.g., academic institutions, local neighborhoods, workplaces, schools) and design and implement library/information programs and services to meet those needs.
- Analyze and apply information policies and information-related laws (including the standards and guidelines of pertinent professional organizations) that advance the creative and ethical applications of information technologies and the delivery of information resources throughout society.
- Foster the core values of the profession (e.g., access, equity, intellectual freedom, privacy, social justice) in all programs and services offered in these communities.
- Encourage the development of information literacy in support of all areas of individuals' and communities' needs (e.g., in formal and informal education, career development, healthcare and financial planning, research innovation, political and social engagement, etc.).
- Lead and manage information agencies, projects, and people through creative and effective approaches to planning, budgeting, policy making, fundraising, communication, and advocacy.
- Use research and data in sophisticated ways to demonstrate the value of the library and to help individuals and communities address community challenges (e.g., poverty and hunger, population shifts, economic development, preservation of cultural heritage, etc.).
- Help individuals and communities to understand, appraise, organize, manage, and preserve digital assets available through a variety of formal and informal sources and to create and manage their own digital identities and materials effectively.

Library & Information Science Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Youth information behaviors, public libraries, multicultural issues in youth library services, and qualitative research methods.

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.

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

Xia Lin, PhD (*University of Maryland*) Department Head, *Information Science*. 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.

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.

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.

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.

Erija Yan, PhD (*Indiana University*). Assistant Professor. Network Science, information analysis and retrieval, scholarly communication methods and applications.

Emeritus Faculty

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.

Delia Neuman, PhD (*The Ohio State University*). Professor Emerita. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Howard D. White, PhD (*University of California at Berkeley*). Professor Emeritus. Literature information systems, bibliometrics, research methods, collection development, online searching.

Software Engineering

Major: Software Engineering

Degree Awarded: Master of Science in Software Engineering (MSSE)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 14.0903

Standard Occupational Classification (SOC) code: 15-1132; 15-1133

About the Program

The College of Computing & Informatics' Master of Science in Software Engineering (MSSE) program was created in response to the growing importance of software in modern society and the rapid rise in demand for professional software engineers.

The MS in Software Engineering program draws on the broad strengths of the College of Computing & Informatics to provide a curriculum that encompasses behavioral, managerial, and technical aspects of software engineering. The program is appropriate for students interested in technical and managerial software work across a wide range of application domains.

All students in the program take a core curriculum that provides a foundation spanning key software engineering topics and providing an integrative software studio experience. Students also take electives allowing them to specialize and gain in-depth knowledge according to their individual interests and career goals. The degree program culminates in a hands-on capstone experience (Software Studio) in which graduate students work for two to three quarters on an intensive team-based software project, with the goal of applying what they have learned to a real-world, ongoing project.

Admission Requirements

The Master of Science in Software Engineering accepts applicants who hold a Bachelor's degree from an accredited university. Please visit the College of Computing & Informatics' website (<https://drexel.edu/cci/admissions/graduate-professional-development/admissions-information-and-requirements/ms-programs-admissions-requirements/>) for more information on admission requirements.

Additional Information

For more information about this program, please visit the College of Computing & Informatics' MS in Software Engineering (<http://drexel.edu/cci/academics/programs/graduate-programs/ms-in-software-engineering/>) web page (<https://drexel.edu/cci/academics/graduate-programs/ms-in-software-engineering/>).

Degree Requirements

Software Engineering Core Courses

Core Courses

SE 575	Software Design	3.0
SE 576	Software Reliability and Testing	3.0
SE 577	Software Architecture	3.0
SE 578	Security Engineering	3.0
SE 627	Requirements Engineering and Management	3.0
SE 630	Software Engineering Economics	3.0
SE 636	Software Engineering Process	3.0

Breadth Courses 12.0

Choose 12 credits from the following:

CS 500	Fundamentals of Databases
CS 530	Developing User Interfaces
CS 645	Network Security
CS 647	Distributed Systems Software
INFO 608	Human-Computer Interaction
INFO 633	Information Visualization
SE 610	Open Source Software Engineering
SE 572	Web Services and Mobile Architectures

SE 638 Software Project Management

Depth and Software Studio Courses 12.0

At least 12 total credits, including at least 6 and up to 9 Software Studio credits, are required

Choose 1 or 2 of the following to fulfill the depth requirement:

Any graduate CS course not required for the core or counted as a breadth course

ECEC 500	Fundamentals Of Computer Hardware
ECEC 622	Parallel Programming
ECEC 641	Web Security I
ECEC 632	Performance Analysis of Computer Networks
ECEC 642	Web Security II
ECEC 643	Web Security III
INFO 517	Principles of Cybersecurity
INFO 555	Introduction to Geographic Information Systems
INFO 605	Database Management Systems
INFO 606	Advanced Database Management
INFO 607	Applied Database Technologies
INFO 610	Analysis of Interactive Systems
INFO 611	Design of Interactive Systems
INFO 634	Data Mining
INFO 648	Healthcare Informatics
INFO 679	Information Ethics
INFO 710	Information Forensics
INFO 712	Information Assurance
INFO 725	Information Policy and Ethics

Complete 2 or 3 software studio courses:

SE 691	Software Studio
--------	-----------------

Total Credits 45.0

Sample Plan of Study

Term 1		Credits
SE 575	Software Design	3.0
SE 627	Requirements Engineering and Management	3.0
Term Credits		6.0
Term 2		Credits
SE 576	Software Reliability and Testing	3.0
SE 630	Software Engineering Economics	3.0
Term Credits		6.0
Term 3		Credits
SE 577	Software Architecture	3.0
SE 636	Software Engineering Process	3.0
Term Credits		6.0
Term 4		Credits
SE 578	Security Engineering	3.0
Breadth Course		3.0
Term Credits		6.0
Term 5		Credits
SE 691	Software Studio	3.0
Breadth Course		3.0
Term Credits		6.0
Term 6		Credits
SE 691	Software Studio	3.0
Breadth Course		3.0
Term Credits		6.0
Term 7		Credits
SE 691	Software Studio	3.0
Breadth Course		3.0
Term Credits		6.0
Term 8		Credits

Depth Course	3.0
Term Credits	3.0
Total Credit: 45.0	

Dual Degree Opportunities

Graduate students already enrolled in a master's degree program at Drexel have the opportunity, through the dual master's program, to work simultaneously on two CCI master's degrees and to receive both upon graduation. To be eligible, graduate students must be currently working on their first CCI master's degree when requesting admission to the second CCI master's degree. They must obtain approval from the graduate advisors of both programs and work out a plan of study encompassing coursework and/or research (thesis) credits for both degrees. Please contact your advisor (<https://drexel.edu/cc/current-students/graduate-professional-development/advising/>) for more information on program requirements as some CCI master's degree combinations may require additional pre-requisites.

The dual master's student must complete the Change of Curriculum and Status form (<https://drexel.edu/graduatecollege/forms-policies/forms/>) and obtain approvals from both graduate advisors. Final approval is granted by the Graduate College (<http://drexel.edu/graduatecollege/>). The student is then registered in both majors simultaneously. Upon graduation, the student must file two Application for Degree (<http://drexel.edu/drexelcentral/graduation/information/applying-for-degree/>) forms.

Facilities

3675 Market Street

In March 2019, the College of Computing & Informatics relocated to 3675 Market (<https://drexel.edu/cc/about/our-facilities/>). For the first time in the College's history, all CCI faculty, students and professional staff are housed under one roof. Occupying two floors in the brand new uCity Square building, CCI's new home offers state-of-the-art technology in our classrooms, labs, meeting areas and collaboration spaces. 3675 Market offers Class A laboratory, office, coworking, and convening spaces. In fall 2019, the College will open a third floor which will include additional offices, classrooms, a research lab, a maker space, and a ground-breaking DXC Technology Innovation Lab. Located at the intersection of Market Street and 37th Street, 3675 Market will act as a physical nexus, bridging academic campuses and medical centers to the east and south, the commercial corridors along Market Street and Chestnut Street, and the residential communities to the north and west.

The uCity Square building offers:

- Speculative lab/office space
- World-class facilities operated by CIC (<https://cic.us/philadelphia/>)
- Café/restaurant on-site
- Quorum, a two-story, 15K SF convening space and conference center
- Adjacent to future public square
- Access to Science Center's nationally renowned business acceleration and technology commercialization programs

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

three physical locations, including W. W. Hagerty 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](http://www.library.drexel.edu) (<http://www.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.

CCI Commons

Located on the 10th floor of 3675 Market Street, the CCI Commons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, and more collaborative space for its students. Students have access to 3675 Market's fully equipped conference room with 42" displays and videoconferencing capabilities. The CCI Commons provides technical support to students, faculty, and professional staff. In addition, the staff provides audio-visual support for all presentation classrooms within 3675 Market. Use of the CCI Commons 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 CCI Commons 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 CCI Commons 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 CCI Commons, 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.

CCI Learning Center

The CCI Learning Center (CCILC), located in 3675 Market Street's CCI Commons student computer lab, provides consulting and other learning resources for students taking computer science classes. The CCILC is staffed by graduate and undergraduate computer science students from the College of Computing & Informatics.

The CCILC and CCI Commons serve as a central hub for small group work, student meetings, and TA assistance.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, in 3675 Market Street including: the Drexel Health and Risk Communication Lab,

Interactive Systems for Healthcare, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), High Performance Computing Laboratory (SPIRAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Social Computing Research Group, 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>).

Computing & Informatics Faculty

Denise E. Agosto, PhD (*Rutgers, The State University of New Jersey*). Professor. Youth information behaviors, public libraries, multicultural issues in youth library services, and qualitative research methods.

Yuan An, PhD (*University of Toronto, Canada*) *Director of International Programs*. 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*) *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

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*) *BSCST Program Director*. Associate 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.

M. Carl Drott, PhD (*University of Michigan*). Associate Professor. Systems analysis techniques, web usage, competitive intelligence.

Andrea Forte, PhD (*Georgia Institute of Technology*) *PhD Program Director, and MS in Information Program Director*. 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

Peter Grillo, PhD (*Temple University*) *Associate Department Head for Undergraduate Affairs, Information Science*. Teaching Professor. Strategic applications of technology within organizations.

Jeremy R. Johnson, PhD (*Ohio State University*). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

Xia Lin, PhD (*University of Maryland*) *Department Head, Information Science*. 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*) *The Auerbach Berger Chair in Cybersecurity Distinguished Professor of Computer Science*. 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.

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.

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. Digital curation, archives and records management, digital humanities, and diversity, inclusivity, and equity.

Jeffrey L. Popyack, PhD (*University of Virginia*). Professor. Operations research, stochastic optimization, computational methods of Markov decision processes; artificial intelligence, computer science education.

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*). 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.

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. Case-based reasoning, explainable artificial intelligence, machine learning, textual analytics, natural language understanding, language models, recommender systems, technological aspects of knowledge management, project management, and requirements engineering.

Erija Yan, PhD (*Indiana University*). Assistant Professor. Network Science, information analysis and retrieval, scholarly communication methods and applications.

Emeritus Faculty

Michael E. Atwood, PhD (*University of Colorado*). 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.

Delia Neuman, PhD (*The Ohio State University*). Professor Emerita. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media.

Gerry Stahl, PhD (*University of Colorado*). 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.

Graduate Minor in Computer Science

About the Program

The Graduate Minor Degree in Computer Science trains current Drexel graduate students either in an MS or a PhD program of their home departments other than the Computer Science Department to obtain fundamental computer science knowledge as well as an introduction to advanced topics in computer science that will be suitable for their own graduate studies. The aim is to provide a systematic and efficient education to Drexel graduate students interested in expanding their studies through integration of computing, including but not limited to rigorous algorithmic thinking and effective computational implementation, without any prerequisites on computer science knowledge.

Required Core Courses

CS 520	Computer Science Foundations	3.0
CS 570	Programming Foundations	3.0
CS 571	Advanced Programming Techniques	3.0

Elective Courses

Complete 2 courses selected from the Master of Science in Computer Science Core Requirements. One course must be a core candidate. If courses are taken from two different Core Requirement categories, both courses must be a Core Candidate.

Theory

CS 521	Data Structures and Algorithms I (Core Candidate)
CS 522	Data Structures and Algorithms II
CS 525	Theory of Computation (Core Candidate)
CS 618	Algorithmic Game Theory
CS 620	Advanced Data Structure and Algorithms
CS 621	Approximation Algorithms
CS 623	Computational Geometry

Intelligent Systems

CS 500	Fundamentals of Databases (Core Candidate)
CS 510	Introduction to Artificial Intelligence (Core Candidate)
CS 511	Robot Laboratory
CS 610	Advanced Artificial Intelligence
CS 611	Game Artificial Intelligence
CS 612	Knowledge-based Agents
CS 613	Machine Learning

CS 615	Deep Learning
CS 660	Data Analysis at Scale
CS 661	Responsible Data Analysis
Programming Systems	
CS 550	Programming Languages (Core Candidate)
CS 650	Program Generation and Optimization
CS 675	Reverse Software Engineering
CS 676	Parallel Programming
SE 575	Software Design (Core Candidate)
SE 576	Software Reliability and Testing
SE 577	Software Architecture
SE 578	Security Engineering
Computer Systems	
CS 543	Operating Systems (Core Candidate)
CS 544	Computer Networks (Core Candidate)
CS 643	Advanced Operating Systems
CS 645	Network Security
CS 647	Distributed Systems Software
Vision and Graphics	
CS 536	Computer Graphics (Core Candidate)
CS 537	Interactive Computer Graphics
CS 558	Game Engine Programming
CS 583	Introduction to Computer Vision (Core Candidate)
CS 634	Advanced Computer Vision
CS 636	Advanced Computer Graphics
Applications	
CS 530	Developing User Interfaces (Core Candidate)
CS 540	High Performance Computing (Core Candidate)
CS 567	Applied Symbolic Computation
CS 590	Privacy
CS 630	Cognitive Systems
CS 668	Computer Algebra I
CS 669	Computer Algebra II
Total Credits	15.0

Additional Information

For more information, please visit the College of Computing & Informatics (<http://drexel.edu/cci/programs/graduate-programs/>)' website.

Post-Baccalaureate Certificate in Computer Science

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 11.0701

Standard Occupational Classification (SOC) Code: 15-1131

About the Program

The Post-Baccalaureate Certificate Program in Computer Science accepts applicants who hold Bachelor degrees in areas other than Computer Science and offers them opportunities to learn the fundamentals of programming and theory in computer science. The aim is to provide an efficient and systematic education on basics of computer science without any prerequisite knowledge. The certificate program

may also serve as an on-ramp to a Master of Science in Computer Science (p. 16) or Software Engineering (p. 32), if completed with predetermined grade requirements.

Admission Requirements

Please visit the College of Computing & Informatics' website (<https://drexel.edu/cci/admissions/graduate-professional-development/admissions-information-and-requirements/professional-development-admissions-requirements/>) to learn more about admission requirements.

Additional Information

For more information about this certificate program, please visit the College of Computing & Informatics' website (<http://drexel.edu/cci/academics/programs/professional-development-programs/post-baccalaureate-certificate-in-computer-science/>).

Program Requirements

Required Core Courses

CS 520	Computer Science Foundations	3.0
CS 570	Programming Foundations	3.0
CS 571	Advanced Programming Techniques	3.0

Elective Courses 3.0

Complete 1 of the following courses:

CS 500	Fundamentals of Databases
CS 510	Introduction to Artificial Intelligence
CS 521	Data Structures and Algorithms I
CS 525	Theory of Computation
CS 530	Developing User Interfaces
CS 536	Computer Graphics
CS 540	High Performance Computing
CS 543	Operating Systems
CS 544	Computer Networks
CS 550	Programming Languages
CS 575	Software Design
CS 583	Introduction to Computer Vision

Total Credits 12.0

Advanced Certificate in Information Studies and Technology

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's

Number of Credits to Completion: 24.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 3 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 11.0401

Standard Occupational Classification (SOC) Code: 15-1199

About the Program

This non-degree program provides specialized training beyond the master's degree so that practitioners can update and extend their skills and knowledge by adding position-relevant coursework in order to meet their current employment requirements. It is not intended to provide coursework that can be applied to the College of Computing & Informatics' master's or doctoral degrees. The program leads to an Advanced

Certificate in Information Studies and Technology awarded through the College of Computing & Informatics.

Admission Requirements

Please visit the College of Computing & Informatics' website (<https://drexel.edu/cci/admissions/graduate-professional-development/admissions-information-and-requirements/professional-development-admissions-requirements/>) for more information on admission requirements.

Additional Information

For additional information, view the College of Computing & Informatics Advanced Certificate in Information Studies and Technology (<https://drexel.edu/cci/academics/professional-development-programs/continuing-education/>) web page.

Requirements

The Advanced Certificate in Information Studies and Technology consists of a minimum of eight courses that must be completed within three calendar years. Students must take four INFO courses as well as complete the final independent study within the College. The three remaining courses may be taken from offerings within the College or from other programs in the University, based on consultation with the student's advisor and agreement of the faculty mentor.

College of Medicine: Graduate School of Biomedical Sciences and Professional Studies

Overview

Renowned for its innovative, student-centered educational programs, the Graduate School of Biomedical Sciences and Professional Studies in the College of Medicine at Drexel University provides regionally unique PhD and Master's level academic offerings that attract the brightest, most ambitious and entrepreneurial applicants. With a strong emphasis on job placement in different scientific and health related career fields as well as academic rigor to prepare students for medical and health-related professional schools, Drexel students are at the forefront of their selected disciplines and emerge as graduates as the next generation of leaders.

Today, there are more than 950 students pursuing doctoral or master's degrees within the Graduate School in the College of Medicine.

The collaborative nature of the new Graduate School with other Drexel schools (Engineering and College of Arts and Sciences, among others) provides students with a multidisciplinary advantage. Coupled with the solid foundation afforded by a Drexel education, innovation-driven programming offers students a unique experience to launch their careers in the chosen field of study.

The Graduate School of Biomedical Sciences and Professional Studies is committed to supporting and promoting an academic "success-network" that propels the transition from training in different disciplines to becoming leaders in solving global problems.

More information is available on the Graduate School of Biomedical Sciences and Professional Studies (<http://www.drexel.edu/medicine/Academics/Graduate-School/>) website.

Majors

- Academic Medicine (MS) (p. 41)
- **NEW:** Biochemistry of Health & Disease (MS)
- **NEW:** Biochemistry of Health & Disease (PhD)
- Biomedical Studies (MS) (p. 42)
- Biomedicine and Business (MS) (p. 43)
- Biomedicine and Digital Media (MS) (p. 47)
- Biomedicine and Entrepreneurship (MS) (p. 50)
- Biomedicine and Law (MS) (p. 54)
- Biotechnology (MS) (p. 57)
- Cancer Biology (MS) (p. 58)
- Clinical Research for Health Professionals (MS) (p. 60)
- Clinical Research Organization & Management (MS) (p. 62)
- Criminalistic Science (MS) (p. 63)
- Drexel Pathway to Medical School (MS) (p. 64)
- Drug Discovery and Development (MS) (p. 65)
- Forensic Science (MS) (p. 67)

- Histotechnology (MS) (p. 68)
- Immunology (MS) (p. 70)
- Infectious Disease (MS) (p. 72)
- Intensive Medical Sciences (MS) (<http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences/intensivemedicalsciences/>)
- Interdisciplinary Health Sciences (MS) (p. 75)
- Laboratory Animal Science (MLAS) (p. 76)
- Medical and Healthcare Simulation (MS) (p. 80)
- Medical Science (MS, MD/MS) (p. 78)
- Microbiology and Immunology (MS, PhD) (p. 81)
- Molecular Cell Biology and Genetics (MS, PhD) (p. 84)
- Molecular Medicine (MS) (p. 86)
- Neuroscience (MS, PhD) (p. 88)
- Pathologists' Assistant (MS) (p. 91)
- Pharmacology & Physiology (MS, PhD) (p. 93)

Minors

- **NEW:** Clinical Research and Organization Management
- Drug Discovery and Development (<http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences/drugdiscoveryanddevelopmentgminor/>)
- Pre-veterinary (<http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences/preveterinarygminor/>)

Certificates

- Clinical Research (p. 96)
- Drug Discovery and Development (<http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences/drugdiscoveryanddevelopmentpbc/>)
- Medical and Healthcare Simulation (<http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences/medicalandhealthcaresimulation/>)
- Pre-Medical, Evening Program (p. 97)
- Quantitative Principles for Clinical Research (p. 98)

Mission Statement

Drexel University College of Medicine excels and innovates in education, research, and delivery of compassionate care in our culture of diversity, spirited inquiry, collaboration, and opportunity.

About the College

The College of Medicine's main campus, Queen Lane, is in a suburban-like setting in the East Falls section of Philadelphia. Additional facilities are located at the Center City campus, next to Hahnemann University Hospital. Our Pediatrics Department is at St. Christopher's Hospital for Children, and the Psychiatry Department is based at Friends Hospital. Students can receive clinical education at more than 20 affiliated hospitals and ambulatory sites chosen for their commitment to teaching as well as medical excellence. The College of Medicine is renowned for its innovative educational programs, enhanced by the use of technology that permeates all components of the curriculum.

The College's medical practice, Drexel Medicine®, is a patient-focused practice emphasizing quality, innovation and community service, and enhanced by physician involvement in the research and educational programs.

Collaborative projects leveraging Drexel University's technological expertise continue to push the frontiers of nanomedicine and neuroengineering. The College of Medicine is a major regional center for spinal cord research, and has developed one of the leading centers for malaria study in the nation. Additionally, the College is home to a memory disorders center dedicated to ground-breaking research in Alzheimer's and related dementias.

Drexel University College of Medicine houses one of eight National Institute on Drug Abuse (NIDA) Centers of Excellence for Physician Information, one of 21 National Centers of Excellence in Women's Health designated by the Department of Health & Human Services, the Executive Leadership in Academic Medicine (ELAM) program, and the Archives and Special Collections on Women in Medicine. It has developed the largest HIV/AIDS primary care practice in the Mid-Atlantic region, with extensive NIH-funded research in prevention and therapeutic intervention. Faculty clinicians are highly respected in numerous other specialties, including cardiology and pain management.

Facilities

Drexel University College of Medicine (<http://www.drexel.edu/medicine/>) is a living laboratory, giving students a broad variety of hands-on experience, enhanced by clinical rotations in hospitals, practicums, and external research opportunities, depending on their program of study. Students in all programs benefit from the College's physical plant, which offers some of the most advanced facilities in biomedical, health sciences, and healthcare education. The Queen Lane campus is designed for the purpose of teaching basic sciences and clinical skills in lecture halls, classrooms, small group rooms and a variety of laboratories. The College of Medicine provides wireless Internet access to curricular resources from anywhere on campus. Computers, multimedia technology, and the Internet augment the information and skills students learn from classes, print materials, and on clinical rotations. College of Medicine faculty members have been leaders in developing interactive computer-based learning tools, ranging from biochemical exercises to simulated patients presenting ethical dilemmas. Comprehensive curriculum websites, streaming videos of lectures, and online slide atlases for histology and pathology are all available.

Some of the College's key facilities and their features include:

Queen Lane Student Activities Center

A 17,700-square-foot student activity center was completed in 2006 at the Queen Lane Campus. The Student Activities Center occupies 2 floors and houses a full line of exercise equipment, a bookstore, student government offices and flexible space for events and lectures. The facility is available to students, staff and groups.

Queen Lane Medical Simulation Center

The College opened a state-of-the-art simulation center for medical education in 2010. Part of a new 25,000-square-foot addition, the center allows students to learn in simulated operating room and patient room settings.

Clinical Education Assessment Center

Ten examination rooms with digital capture that simulate physicians' offices are linked to control and observation rooms for faculty. Students work with standardized patients to enhance their abilities in medical interviewing, physical examination skills, and patient counseling.

Multidisciplinary Laboratories

- Forty-two tables with microscopes for teaching neuroanatomy, microbiology, and pathology are available.
- Microscopes are equipped with a networked video system so that all students in a class can look at a single slide under the microscope through monitors on their lab tables or on a projection screen and can retrieve microscopic images via computer.

New College Building

The New College Building at the Center City Hahnemann campus is designed for the purpose of teaching basic and clinical sciences, with auditoriums, classrooms, laboratories and offices. The lecture halls are designed to accommodate a variety of educational methodologies, spanning from the basic lecture format to the enriched laboratory setting where courses such as Anatomy, Pathology, Microbiology, Histology and Applied Anatomic Pathology can be taught.

Libraries

Drexel University has four libraries (<http://www.drexel.edu/medicine/About/Libraries/>) to serve the needs of students, faculty and staff. The collections of two libraries – one at Queen Lane and one at Center City – emphasize subjects relevant to the health sciences, with print resources distributed to meet the needs of the programs and departments at each campus, and free document delivery service between the locations.

Computers in the reference areas of each library, and the Microcomputer Centers, provide access to the Libraries' online catalog; to databases (indexes) including MEDLINE, CINAHL, and PsycINFO; to more than 2000 full-text electronic journals, and to online reference resources such as MD Consult and Harrison's Online. Full Internet access is provided for reference and research purposes.

All online resources (databases, electronic journals, etc.) are available to students, staff and faculty who are registered Library users, and can be accessed from off-campus locations. In addition to Internet access, computers in the Microcomputer Centers also provide a broad range of software including word processing, spreadsheet, communications, graphics, and statistics. Computer-assisted instruction and tutorials are available for many curricula-related topics. A plotter and scanner are also available at some locations.

The Library staff is dedicated to providing assistance to students and other library users through on-the-spot reference help, mediated literature searches, and instructional sessions. Guides are available online to help with the use of Library services and resources.

Videoconferencing

Drexel University College of Medicine makes extensive use of videoconferencing between Philadelphia campuses and clinical teaching sites, and the Sacramento campus. There are videoconferencing classrooms with split screen to allow for speakers in different locations.

Web-Based Instruction

Uses of web-based instruction range from providing a supplement to classroom instruction to teaching a whole course remotely. Many instructors post their syllabi on the web, distribute supplementary readings via the web, and set up electronic discussion lists for their students. Having students submit assignments electronically is common practice.

Unique faculty-developed tools, including doc.com, a web-based set of video encounters between physician and patient, help medical students improve their communication skills. DxR, a web-based patient simulation program, trains students in clinical reasoning; and MedEthEx provides

an online series of exercises in medical ethics and communication. The recently implemented Web-OSCE, closely linked to doc.com, allows medical trainees to interview standardized patients remotely and receive performance feedback.

Academic Medicine

Major: Academic Medicine

Degree Awarded: Master of Science

Calendar Type: Semester

Total Credit Hours: 36.0 + research based publication; Additional 25.0 credits for concentration in otolaryngology

Classification of Instructional Programs (CIP) code: 51.1199

Standard Occupational Classification (SOC) code: 25-1071

Note: This program is currently not accepting students.

About the Program

Exceptional residents often pursue scholarly activities in addition to fulfilling their other residency requirements. This program is designed for those residents who publish research and pursue scholarly activities in addition to their typical residency training, and who desire to pursue careers in clinical education in their field of interest.

Students pursuing an MS in Academic Medicine must designate a concentration. At this time the first available concentration is the field of otolaryngology.

The MS in Academic Medicine is designed to address topics of value to the academic physician, including training in leadership, education, ethics, professionalism, public health, health accreditation, statistics, bioepidemiology, research techniques, medical writing and editing, grant writing, research regulations, public speaking and academic health center management. These are topics typically important to educators, but not commonly covered in depth during residency training.

Goals and Objectives

The MS in academic medicine provides a structured pathway for physicians planning careers as clinical educators to acquire specialized knowledge and to demonstrate a special expertise in teaching. The objectives of the MS in Academic Medicine include:

- training young physicians to be skilled clinical educators;
- providing students with core knowledge about academic medicine that is not included systematically in residency training programs;
- encouraging research;
- exposing students to the process of supervising and mentoring research;
- encouraging life-long continued study of materials and methods for clinical education.

Examinations

All residents are required to take in-service training examinations annually. This is a national, standardized test provided for each clinical specialty. Performance at the 70th percentile or better in this examination is considered a passing grade for the MS. Alternatively, board certification would be sufficient to acknowledge that the student has mastered a body of knowledge suitable for the MS degree. Each clinical specialty has its own (very rigorous) requirements for board certification, supervised by the American Board of Medical Specialties.

Admission Requirements

Applications are reviewed by the department in which the degree is offered (for example: otolaryngology - head and neck surgery).

Recommendations for acceptance are presented to the Biomedical Graduate Education Committee of the College of Medicine for final approval. The requirements for admission include but are not limited to:

- enrollment in an ACGME approved residency program;
- satisfactory completion of at least one year of residency;
- a letter of recommendation from the applicant's Department Chair or Program Director;
- an interview in person;
- medical school transcript.

Visit the Office of Biomedical Graduate Studies Admissions website for more detailed information about applying to the program, including important application dates.

Degree Requirements

A minimum of thirty-six semester credits are required with a B average or better. Thus, the course of study for the MS in Academic Medicine will be in addition to the standard curriculum for residents plus the requirement of a research based, first authored publication.

Research Requirements

Each candidate for the MS will conduct a research project under the guidance of his/her advisory committee. In most cases this project will encompass clinical or bench research that will result in a first author publication in a peer-reviewed journal. (Case reports are not sufficient for fulfilling this requirement.) However if the student is involved in scholarly activity of another nature that is deemed sufficiently rigorous by the advisory committee, flexibility to recognize and accept other activities is intended. For example, such activities might include writing a book or developing the curriculum for a new academic program.

Curriculum

ACMD 600S	Academic Medicine: Core Knowledge I	3.0
ACMD 601S	Academic Medicine: Core Knowledge II	3.0
ACMD 602S	Academic Medicine Thesis Research	4.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 600S	Thesis Defense (taken twice, each time for 9 credits)	18.0
Additional didactic courses included in the Associated Residency Program		6.0
Total Credits		36.0

Required courses for concentration in Otolaryngology

25.0 semester credits

OTO 600S	General Otolaryngology	3.0
OTO 601S	Otology	3.0
OTO 602S	Head and Neck Oncology	3.0
OTO 603S	Pediatric Otolaryngology, Introduction	3.0
OTO 604S	Journal Club in Otolaryngology	1.0
Select two Otolaryngology electives from the following:		6.0
OTO 605S	Laryngology – Voice, Introduction	
OTO 606S	Laryngology – Voice, Advanced	
OTO 607S	Laryngology – Swallowing	
OTO 608S	Temporal Bone Dissection	

OTO 609S	Neurotology	
OTO 610S	Audiology	
OTO 611S	Endocrine Surgery	
OTO 612S	Allergy and Immunology	
OTO 613S	Radiology of the Head and Neck	
OTO 614S	Pathology and Histology	
OTO 615S	Pediatric Otolaryngology, Advanced	
OTO 616S	Otolaryngology Practice	
OTO 617S	Research Methodology and Publication	
OTO 618S	Facial Plastic and Reconstructive Surgery	
OTO 619S	Sleep Disorders	
OTO 620S	Taste and Smell	
OTO 622S	Bronchoesophagology	
Select one Otolaryngology surgery elective from the following:		6.0
OTO 700S	General Otolaryngologic Surgery	
OTO 701S	Otologic Surgery	
OTO 702S	Head and Neck Oncologic Surgery	
OTO 700S	General Otolaryngologic Surgery	
OTO 703S	Pediatric Otolaryngologic Surgery	
OTO 704S	Neurotologic Surgery	
OTO 705S	Laryngologic Surgery	
OTO 706S	Rhinologic Surgery	
OTO 707S	Surgery of the Sinuses	
OTO 708S	Bronchoesophagology	
OTO 709S	Cosmetic Plastic and Reconstructive Surgery	
Total Credits		25.0

Biomedical Studies

Major: Biomedical Studies

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 56.0

Classification of Instructional Programs (CIP) code: 26.0102

Standard Occupational Classification (SOC) code: 19-1042

About the Program

This two-year Special Master's degree program is designed for students who have completed all health professional school prerequisites and need to strengthen their science background and/or MCAT score before applying to medical or other health professional schools.

In the first year, students take advanced undergraduate courses in physics and chemistry, graduate courses in biochemistry, physiology, anatomy, psychology/sociology, laboratory techniques, a community outreach course, and a year-long dedicated MCAT preparation course. Students transition into the second year of the program after successfully completing the first year curriculum by passing all courses, achieving a minimum cumulative graduate GPA of 3.0, sitting for the MCAT, and completing a summer research project. Students typically submit their medical school applications during the summer between year one and year two. During the second year, students take rigorous coursework in biochemistry, physiology, microanatomy, and neuroanatomy, utilizing the IMS (<http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences/intensivemedicalsciences/>) curriculum medical school-equivalent lectures and laboratory materials, complemented by an ethics and a professionalism course.

The Master of Science degree will be awarded contingent upon satisfactory completion of all program requirements, including an earned cumulative graduate GPA of no less than 3.0.

For more information about this program, visit the College of Medicine's Master of Science in Biomedical Studies (<http://drexel.edu/medicine/academics/graduate-school/biomedical-studies/>) web page.

More information:

Drexel University College of Medicine
Division of Pre-medical and Pre-health Programs
Graduate School of Biomedical Sciences and Professional Studies
New College Building, Room 4104
245 North 15th Street, Mail Stop 344
Philadelphia, PA 19102

Phone: 215-762-4692

Email: CoM_MedicalSciences@drexel.edu

Admission Requirements

Applicants to the MBS program must have fulfilled all undergraduate pre-medical requirements and demonstrated mastery of the material at a minimum grade of C. These requirements include a year of biology, chemistry, physics and organic chemistry, including respective laboratory sections. Applicants are required to submit official MCAT scores if the exam was taken, or official GRE scores in lieu of the MCAT. The following credentials are competitive for application to the MBS program:

- A minimum undergraduate math/science (BCPM) and cumulative GPA of 2.9
- All premedical prerequisite courses at a grade of C or better
- Minimum MCAT scores of 35th percentile, or minimum GRE scores of 50th percentile

Applicants with lower scores may be considered if they can demonstrate a marked improvement in their academic history. Health care-related experiences, community service, research, leadership and extracurricular activities are also taken into consideration.

Degree Requirements

Required Undergraduate Courses

MSPP 400S	Advanced Topics in Chemistry I	4.0
MSPP 401S	Advanced Topics in Chemistry II	4.0
MSPP 402S	Advanced Topics in Physics I	4.0
MSPP 403S	Advanced Topics in Physics II	4.0
MSPP 404S	Concepts in Science and Verbal Reasoning I	6.0
MSPP 405S	Concepts in Science and Verbal Reasoning II	6.0

Required MS Courses

MSPP 511S	Concepts in Biochemistry and Cell Biology	4.0
MSPP 512S	Psychosocial and Behavioral Factors in Health and Medicine	3.0
MSPP 525S	Community Dimensions of Medicine	2.0
MSPP 505S	Laboratory Techniques in Biochemistry & Molecular Biology	2.0
MSPP 513S	Advanced Human Anatomy	4.0
MSPP 515S	Advanced Human Physiology	4.0
IMSP 502S	Medicine and Society	3.0
IMSP 513S	Medical Biochemistry	8.0
IMSP 506S	Medical Professionalism and Leadership	3.0
IMSP 522S	Medical Physiology I	3.5
IMSP 523S	Medical Physiology II	3.5
IMSP 542S	Medical Microanatomy I	5.0
IMSP 543S	Medical Microanatomy II	3.0
IMSP 562S	Medical Neuroanatomy	6.0

Summer Research Project

MSPP 550S	Research Project	2.0
-----------	------------------	-----

Additional Non-required Courses

IMSP 544S	Medical Immunology I	
IMSP 545S	Medical Immunology II	
IMSP 552S	Medical Nutrition	
Total Credits		84.0

Sample Plan of Study

First Year

Fall		Credits
Required Undergraduate Courses		
MSPP 402S	Advanced Topics in Physics I	4.0
MSPP 400S	Advanced Topics in Chemistry I	4.0
MSPP 404S	Concepts in Science and Verbal Reasoning I	6.0
Required Graduate Courses		
MSPP 511S	Concepts in Biochemistry and Cell Biology	4.0
MSPP 512S	Psychosocial and Behavioral Factors in Health and Medicine	3.0
MSPP 525S*	Community Dimensions of Medicine	2.0
MSPP 505S	Laboratory Techniques in Biochemistry & Molecular Biology	2.0
Term Credits		25.0

Spring

Required Undergraduate Courses		
MSPP 403S	Advanced Topics in Physics II	4.0
MSPP 401S	Advanced Topics in Chemistry II	4.0
MSPP 405S	Concepts in Science and Verbal Reasoning II	6.0
Required MS Courses		
MSPP 513S	Advanced Human Anatomy	4.0
MSPP 515S	Advanced Human Physiology	4.0
Term Credits		22.0

Second Year

Fall		Credits
MSPP 550S	Research Project	2.0
IMSP 513S	Medical Biochemistry	8.0
IMSP 522S	Medical Physiology I	3.5
IMSP 542S	Medical Microanatomy I	5.0
IMSP 502S	Medicine and Society	3.0
Optional		
IMSP 544S	Medical Immunology I	
Term Credits		21.5
Spring		Credits
IMSP 506S	Medical Professionalism and Leadership	3.0
IMSP 523S	Medical Physiology II	3.5
IMSP 543S	Medical Microanatomy II	3.0
IMSP 562S	Medical Neuroanatomy	6.0
Optional		
IMSP 545S	Medical Immunology II	
IMSP 552S	Medical Nutrition	
Term Credits		15.5

Total Credit: 84.0

* This course will be offered over two semesters

Biomedicine and Business

Major: *Biomedicine and Business*

Degree Awarded: *Master of Science (MS)*

Calendar Type: *Semester*

Total Credit Hours: *36.0*

Classification of Instructional Programs (CIP) code: *26.9999*

Standard Occupational Classification (SOC) code: *11-1021*

About the Program

Mission Statement

The MS in Biomedicine and Business degree program provides comprehensive training in fundamental aspects of scientific discovery, technology commercialization, and business. The program prepares graduates for management positions in scientifically oriented organizations in the public or private sector (e.g., biotechnology and pharmaceutical industry, academics, government, non-profit organizations). Students develop broad core knowledge in biological sciences and biomedical technology development and commercialization plus finance, economics, and organizational leadership.

Curriculum

This is an interdisciplinary program offered by the College of Medicine. The science courses are taught by faculty from Drexel University College of Medicine. Faculty from Drexel University's LeBow College of Business teach the business courses.

- Non-thesis program (36.0 semester credits needed to graduate)
- Required and elective courses in each discipline
- Flexible internship (experiential learning)
- Customizable plan of study

Format

- Online (select courses in both disciplines are offered face-to-face on-campus)
- Accelerated: 1-year MS (full-time) or 2.5 years (part-time)

Full-time and Part-Time Options

Students may meet the degree requirements in either a full-time (at least 9.0 credits per semester) or part-time basis. Full-time students generally complete the program in one year. Part-time students must complete the program within six years. Students must enroll in at least 4.5 semester credits of College of Medicine courses to qualify for financial aid. For information regarding financial aid, please visit Drexel Central (<http://www.drexel.edu/drexelcentral/>).

Program Contact Information

For questions about the curriculum and program goals, please contact one of the Program Directors:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

For questions about how to apply to the program, please contact an enrollment counselor at duonline@drexel.edu or visit the Drexel University Online MS in Biomedicine and Business web page (<https://online.drexel.edu/online-degrees/biomedical-degrees/ms-biomedicine-business/>).

For information regarding financial aid, please visit Drexel Central (<http://www.drexel.edu/drexelcentral/>).

Admission Requirements

Post-college applicants must have completed a four-year degree program. An undergraduate degree in science is preferred but not required. Although a minimum cumulative grade point average (GPA) of 3.0

is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

Applicants must also fulfill the following requirements for consideration:

- Official transcripts from all colleges and universities attended
- Essay/Personal statement
- Resume
- References from at least three instructors or professionals

Official test scores from graduate and professional admission exams, such as the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), Law School Admission Test (LSAT), or Medical College Admission Test (MCAT), are optional but highly desirable.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL). IELTS scores may be submitted in lieu of TOEFL scores. An evaluation by World Education Services (WES) is required for transcripts from institutions outside the United States.

Online applications (<https://online.drexel.edu/online-degrees/biomedical-degrees/ms-biomedicine-business/#apply>) are accepted all year round for consideration for either fall or spring admission. Students may defer admission by one year. All admission decisions are made at the College of Medicine.

Program Contact Information

For questions about the curriculum and program goals, please contact one of the Program Directors:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

For questions about how to apply to the program, please contact an enrollment counselor at duonline@drexel.edu or visit the Drexel University Online MS in Biomedicine and Business web page (<https://online.drexel.edu/online-degrees/biomedical-degrees/ms-biomedicine-business/>).

For information regarding financial aid, please visit Drexel Central (<http://www.drexel.edu/drexelcentral/>).

Degree Requirements

Science courses are offered by Drexel University College of Medicine and are taught in **semester terms** (fall and spring). Business courses are offered by LeBow College of Business and are taught face-to-face in **quarter terms** (fall, winter, spring, and summer).

Three (3.0) credit quarter courses confer the equivalent of 2.0 semester credits. The program requires the completion of 36.0 semester credits for graduation. Semesters and quarters overlap sufficiently to allow full-time students to meet the degree requirements for this program in two years.

There are several ways to customize the internship or experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student's own personal needs and career aspirations. The duration of the internship may vary. Shorter

rotations may require that the student enrolls in elective courses to meet the semester credit requirements for the degree.

Required Courses		
Science		
MIIM 503S	Biomedical Ethics	2.0
	or IDPT 500S Responsible Conduct of Research	
MIIM 518S	Foundations of Applied Biomedicine *	3.0
MIIM 519S	Commercialization of Biomedical Technology **	3.0
MIIM 631S	Biomedical Innovation Development and Management	5.0
Business ***		
BUSN 501	Measuring and Maximizing Financial Performance	3.0
BUSN 502	Essentials of Economics	3.0
Elective Courses		
Choose at least 1 program-specific science elective and at least 2 business electives		
Science, Program-Specific (Choose at least 1, but more than 1 is recommended)		
MIIM 517S	Applied Statistics for Biomedical Sciences	
	or IDPT 501 Biostatistics I	
MIIM 550S	Biomedicine Seminar	
MIIM 605S	Experiential Learning	
MIIM 645S	Biomedical Career Explorations	
MIIM T680S	Special Topics in Microbiology & Immunology	
Science, Clinical Research		
CR 501S	Emerging Trends in Medical Device Regulation	
CR 511S	The History of Misconduct in Biomedical Research	
CR 513S	Business Processes and Contemporary Concerns in Pharmaceutical R & D	
CR 514S	World Wide Regulatory Submissions	
CR 515S	Intro to Clinical Trials	
CR 525S	Scientific Writing and Medical Literature	
CR 535S	Current Federal Regulatory Issues in Biomedical Research	
CR 545S	Pharmaceutical Law	
CR 555S	Compliance & Monitoring Issues	
CR 600S	Designing the Clinical Trial	
Science, Basic Science & Research		
MIIM 521S	Biotechniques I: Molecular and Genomic Methods	
MIIM 522S	Biotechniques II: Immunological Methods	
MIIM 530S	Fundamentals of Molecular Medicine I	
	or MIIM 515 Concepts in Biomedicine I	
MIIM 531S	Fundamentals of Molecular Medicine II	
	or MIIM 516 Concepts in Biomedicine II	
MIIM 533S	Molecular Medicine Journal Club II	
MIIM 534S	Molecular Medicine Journal Club I	
MIIM 540S	Viruses and Viral Infections	
MIIM 541S	Bacteria and Bacterial Infections	
MIIM 542S	Mycology and Fungal Infections	
MIIM 543S	Parasitology and Parasitic Diseases	
MIIM 545S	Introduction to Infectious Diseases	
MIIM 546S	Introduction to Immunology	
MIIM 606S	Microbiology and Immunology Seminar	
MIIM 613S	Emerging Infectious Diseases	
MIIM 653S	Clinical Correlations in Infectious Disease	
Business (Choose at least 2, but more are recommended) ***		
ACCT 601	Managerial Accounting	
BUSN 715	Business Consulting Projects	
BLAW 646	Legal Issues in New Ventures	
ECON 601	Managerial Economics	
ECON 650	Business & Economic Strategy: Game Theory & Applications	
FIN 601	Corporate Financial Management	
INTB 620	International Business Management	
MIS 632	Database Analysis and Design for Business	

MGMT 510	Business Problem Solving
MGMT 601	Managing the Total Enterprise
MGMT 652	New Venture Planning
MKTG 601	Marketing Strategy & Planning
MKTG 638	New Product Planning, Strategy, and Development
MKTG 654	Corporate Brand & Reputation Management
ORGB 625	Leadership and Professional Development
ORGB 631	Leading Effective Organizations
ORGB 640	Negotiations for Leaders
POM 601	Operations Management
STAT 601	Business Statistics
STAT 632	Datamining for Managers
BUSN T680	Special Topics in BUSN
Entrepreneurship ***	
ENTP 611	Learning from Failure
ENTP 621	Innovation & Ideation
ENTP 641	Innovation in Established Companies

- * Substitutions: MIIM 515S AND MIIM 516S OR MIIM 530S OR MIIM 531S
- ** Substitutions: MIIM 525S and MIIM 536S
- *** Science courses are offered on a semester basis; business and entrepreneurship courses are offered on a quarter basis. Semesters and quarters overlap. Credits shown for business and entrepreneurship courses are quarter credits (3 quarter credits = 2 semester credits). This program requires a minimum of 36.0 semester credits to meet the degree requirements. This requirement can be met through a combination of science, business and entrepreneurship courses.

Sample Plans of Study

To learn more about part-time options, please contact a Program Director:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

Sample Plans of Study

These are samples of customizable plans of study. Variations may occur depending on course availability and each student's interest.

Full-Time, Fall Start*

First Year		Credits
Fall		
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
BUSN 501	Measuring and Maximizing Financial Performance	3.0
Elective Course(s)		
CR 525S	Scientific Writing and Medical Literature	3.0
Term Credits		9.0
Spring		
Required Course(s)		
MIIM 503S	Biomedical Ethics	2.0
MIIM 519S	Commercialization of Biomedical Technology	3.0
BUSN 502	Essentials of Economics	3.0
Elective Course(s)		
ORGB 625	Leadership and Professional Development	3.0
Term Credits		11.0
Summer		
Elective Course(s)		
MIIM 605S	Experiential Learning	6.0

MIIM 645S	Biomedical Career Explorations	2.0
Elective Course(s)		
MGMT 510	Business Problem Solving	3.0
Term Credits		11.0
Second Year		
Fall		
Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
ORGB 631	Leading Effective Organizations	3.0
Term Credits		11.0

Total Credit: 42.0

* **This is a full-time plan with # 9.0 semester credits/ semester.** Business and entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 4 terms (1 year), completing 3-4 courses per term, all terms are eligible for financial aid. The first term can be part-time (8 credits) and still meet the 36 semester credit requirement for graduation.

Full-Time, Spring Start**

First Year		Credits
Spring		
Required Course(s)		
MIIM 503S	Biomedical Ethics	2.0
MIIM 519S	Commercialization of Biomedical Technology	3.0
BUSN 502	Essentials of Economics	3.0
Elective Course(s)		
ORGB 625	Leadership and Professional Development	3.0
Term Credits		11.0
Summer		
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
Elective Course(s)		
MIIM 645S	Biomedical Career Explorations	2.0
CR 515S	Intro to Clinical Trials	3.0
ECON 601	Managerial Economics	3.0
Term Credits		11.0
Second Year		
Fall		
Required Course(s)		
BUSN 501	Measuring and Maximizing Financial Performance	3.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
MIIM 605S	Experiential Learning	4.0
Term Credits		10.0
Spring		
Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
Elective Course(s)		

MGMT 510	Business Problem Solving	3.0
Term Credits		8.0

Total Credit: 40.0

**** This is a full-time plan with # 9.0 semester credits/ semester.** Business and entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 4 terms (1 year), completing 3-4 courses per term, all terms are eligible for financial aid.

Part-Time, Fall Start***

First Year (Part-Time)

Fall		Credits
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
BUSN 501	Measuring and Maximizing Financial Performance	3.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
Term Credits		9.0

Spring

Required Course(s)		
MIIM 503S	Biomedical Ethics	2.0
MIIM 519S	Commercialization of Biomedical Technology	3.0
BUSN 502	Essentials of Economics	3.0
Term Credits		8.0

Summer

Elective Courses		
MIIM 605S	Experiential Learning	4.0
MGMT 510	Business Problem Solving	3.0
Term Credits		7.0

Second Year (Part-Time)

Fall

Elective Course(s)		
MIIM 645S	Biomedical Career Explorations	2.0
CR 515S	Intro to Clinical Trials	3.0
ORGB 631	Leading Effective Organizations	3.0
Term Credits		8.0

Spring

Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
Elective Course(s)		
ORGB 625	Leadership and Professional Development	3.0
Term Credits		8.0

Total Credit: 40.0

***** This is a part-time plan with <9.0 semester credits/ semester.** Business and entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 5 terms (1.5 years), completing 3-4 courses per term, all terms are eligible for financial aid.

Part-Time, Spring Start****

First Year (Part-Time)

Spring

Required Course(s)		
MIIM 503S	Biomedical Ethics	2.0
MIIM 519S	Commercialization of Biomedical Technology	3.0
BUSN 502	Essentials of Economics	3.0
Term Credits		8.0

Summer

Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
Elective Course(s)		
MIIM 645S	Biomedical Career Explorations	2.0
ECON 601	Managerial Economics	3.0
Term Credits		8.0

Second Year (Part-Time)

Fall

Required Course(s)		
BUSN 501	Measuring and Maximizing Financial Performance	3.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
CR 525S	Scientific Writing and Medical Literature	3.0
Term Credits		9.0

Spring

Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
CR 545S	Pharmaceutical Law	3.0
Term Credits		5.0-9.0

Summer

Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
Elective Course(s)		
ACCT 601	Managerial Accounting	3.0
Term Credits		8.0

Total Credit: 38.0-42.0

****** This is a part-time plan with <9.0 semester credits/ semester.** Business and entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 5 terms (1.5 years), completing 3-4 courses per term, all terms are eligible for financial aid.

Program Goals

Upon completion of the degree requirements of this program students would have achieved the following program-level goals:

1. Develop core knowledge in biological sciences, technology development and commercialization
2. Gain understanding of finance, economics, management and organization leadership
3. Apply business expertise to evaluate the process of delivering biomedical products to market
4. Develop skills to identify and evaluate professional ethical dilemmas and appropriate solutions
5. Strengthen communication, leadership, and soft-skills (e.g., teamwork, problem-solving, knowledge of career opportunities, networking)

Drexel Student Learning Priorities (DSLPs)

In the course of meeting these program-level goals, students would have also made progress in all of Drexel's Student Learning Priorities (DSLPs) (<http://drexel.edu/provost/assessment/outcomes/dslp/>) to help them build their future:

Core Intellectual and Practical Skills:

- Communication
- Creative and critical thinking
- Ethical reasoning
- Information literacy
- Self-directed learning

Experiential and Applied Learning:

- Global competence
- Leadership
- Professional practice
- Research, scholarship and creative expression
- Responsible citizenship

Biomedicine and Digital Media

Major: Biomedicine and Business

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 41.5

Classification of Instructional Programs (CIP) code: 26.9999

Standard Occupational Classification (SOC) code: 27-1014

About the Program

The MS in Biomedicine and Digital Media program intersects science, technology, entrepreneurship, and interactive digital art design and animation. This skills-based program is for individuals interested in media design and production careers with an emphasis in health and science.

Graduates of this program will be prepared to progress into more advanced graduate studies in science or digital media and/or careers in scientifically oriented media/communication jobs in the public or private sector (e.g., academic, scientific publishing and media companies), or lead their new ventures in digital imaging.

Curriculum

This is an interdisciplinary hybrid (blended) program offered by the College of Medicine. The science courses, which are offered online are taught by faculty from Drexel University College of Medicine. Faculty from Drexel University's College of Media Arts and Design teach the digital media courses which are offered face-to-face. Select courses in both disciplines are offered face-to-face on campus. Students must complete a minimum of 36.0 semester credits to graduate.

- No thesis requirement
- Required and elective courses in each discipline
- Flexible internship (experiential learning)
- Customizable plan of study

Format

- Hybrid/Blended (digital media courses are face-to-face, select science courses are offered face-to-face on-campus)
- Accelerated: 1-year MS (full-time) or 2.5 years (part-time)

Program Contact Information

For questions about the curriculum and program goals, please contact one of the Program Directors:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

For questions about how to apply to the program, please contact an enrollment counselor at duonline@drexel.edu.

For information regarding financial aid, please visit Drexel Central (<http://www.drexel.edu/drexelcentral/>).

Admission Requirements

Post-college applicants must have completed a four-year degree program. An undergraduate degree in science is preferred but not required. Although a minimum cumulative grade point average (GPA) of 3.0 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

Applicants must also fulfill the following requirements for consideration:

- Official transcripts from all colleges and universities attended
- Essay/personal statement
- Resume
- References from at least three instructors or professionals

Official test scores from graduate admission exams, such as the Graduate Record Examination (GRE), are optional but highly desirable.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL). IELTS scores may be submitted in lieu of TOEFL scores. An evaluation by World Education Services (WES) is required for transcripts from institutions outside the United States.

Online applications (<https://online.drexel.edu/online-degrees/biomedical-degrees/ms-biomedicine-business/#apply>) are accepted all year round for

consideration for either fall or spring admission. Students may defer admission by one year. All admission decisions are made at the College of Medicine.

Program Contact Information

For questions about the curriculum and program goals, please contact one of the Program Directors:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)
(sandhya.kkortagere@drexelmedu.edu)

For questions about how to apply to the program, please contact an enrollment counselor at duonline@drexel.edu or visit the Drexel University Online MS in Biomedicine and Business web page (<https://online.drexel.edu/online-degrees/biomedical-degrees/ms-biomedicine-business/>).

For information regarding financial aid, please visit Drexel Central (<http://www.drexel.edu/drexelcentral/>).

Degree Requirements

Science courses are offered by Drexel University College of Medicine and are taught in **semester terms** (fall and spring). Digital Media courses are offered by Westphal College of Media Arts & Design and are taught face-to-face in **quarter terms** (fall, winter, spring, and summer).

Three (3.0) credit quarter courses confer the equivalent of 2.0 semester credits. The program required the completion of 36.0 semester credits for graduation. Semesters and quarters overlap sufficiently to allow full-time students to meet the degree requirements for this program in two years.

There are several ways to customize the internship or experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student's own personal needs and career aspirations. The duration of the internship may vary. Shorter rotations may require that the student enrolls in elective courses to meet the semester credit requirements for the degree.

Required Courses

Science Requirements		
MIIM 503S	Biomedical Ethics	2.0
	or IDPT 500S Responsible Conduct of Research	
MIIM 518S	Foundations of Applied Biomedicine *	3.0
MIIM 519S	Commercialization of Biomedical Technology **	3.0
MIIM 631S	Biomedical Innovation Development and Management	5.0
Digital Media Requirements ***		
DIGM 505	Design and Interactivity Bootcamp	3.0
DIGM 506	Animation and Game Design Bootcamp	3.0
Electives		
Choose at least 1 program-specific science elective and 2 digital media electives		5.0
Science, Program-Specific		
MIIM 517S	Applied Statistics for Biomedical Sciences	
	or IDPT 501 Biostatistics I	
MIIM 550S	Biomedicine Seminar	
MIIM 645S	Biomedical Career Explorations	
MIIM 605S	Experiential Learning	
MIIM T680S	Special Topics in Microbiology & Immunology	
Science, Clinical Research		
CR 501S	Emerging Trends in Medical Device Regulation	
CR 511S	The History of Misconduct in Biomedical Research	

CR 514S	World Wide Regulatory Submissions
CR 515S	Intro to Clinical Trials
CR 525S	Scientific Writing and Medical Literature
CR 535S	Current Federal Regulatory Issues in Biomedical Research
CR 545S	Pharmaceutical Law
CR 555S	Compliance & Monitoring Issues
CR 600S	Designing the Clinical Trial
Science, Basic Science & Research	
MIIM 530S	Fundamentals of Molecular Medicine I
	or MIIM 515S Concepts in Biomedicine I
MIIM 531S	Fundamentals of Molecular Medicine II
	or MIIM 516S Concepts in Biomedicine II
MIIM 534S	Molecular Medicine Journal Club I
MIIM 533S	Molecular Medicine Journal Club II
MIIM 521S	Biotechniques I: Molecular and Genomic Methods
MIIM 522S	Biotechniques II: Immunological Methods
MIIM 540S	Viruses and Viral Infections
MIIM 541S	Bacteria and Bacterial Infections
MIIM 542S	Mycology and Fungal Infections
MIIM 543S	Parasitology and Parasitic Diseases
MIIM 545S	Introduction to Infectious Diseases
MIIM 546S	Introduction to Immunology
MIIM 606S	Microbiology and Immunology Seminar
MIIM 613S	Emerging Infectious Diseases
MIIM 653S	Clinical Correlations in Infectious Disease
Digital Media ***	
DIGM 501	New Media: History, Theory and Methods
DIGM 508	Digital Cultural Heritage
DIGM 520	Interactivity I
DIGM 521	Interactivity II
DIGM 526	Animation II
DIGM 531	Game Design II
ANIM 588	Spatial Data Capture
GMAP 545	Game Development Foundations
GMAP 547	Serious Games
GMAP 548	Experimental Games
GMAP 560	Game Design from the Player's Perspective
DIGM T580	Special Topics in Digital Media
Entrepreneurship ***	
ENTP 611	Learning from Failure
ENTP 621	Innovation & Ideation
ENTP 641	Innovation in Established Companies

* Substitutions: MIIM 515S and MIIM 516S; or MIIM 530S or MIIM 531S

** Substitution: MIIM 535S and MIIM 536S

*** Science courses are offered on a semester basis; digital media and entrepreneurship courses are offered on a quarter basis. Semesters and quarters overlap. Credits shown for digital media and entrepreneurship courses are quarter credits (3 quarter credits = 2 semester credits). This program requires a minimum of 36.0 semester credits to meet the degree requirements. This requirement can be met through a combination of science, digital media and entrepreneurship courses.

Sample Plan of Study

To learn more about part-time options, please contact a Program Director:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

Sample Plans of Study

These are samples of customizable plans of study. Variations may occur depending on course availability and each student's interest.

This program is only available as a hybrid program, starting in the fall semester.

Full-time, Fall Start

First Year

Fall		Credits
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
DIGM 505*	Design and Interactivity Bootcamp	3.0
DIGM 506*	Animation and Game Design Bootcamp	3.0
Elective Course(s)		
MIIM 645S	Biomedical Career Explorations	2.0
Term Credits		11.0

Spring

Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
MIIM 503S	Biomedical Ethics	2.0
Elective Course(s)		
DIGM 530*	Game Design I	3.0
ENTP 621*	Innovation & Ideation	3.0
Term Credits		11.0

Summer

Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
CR 525S	Scientific Writing and Medical Literature	3.0
ENTP 641*	Innovation in Established Companies	3.0
Term Credits		8.0-12.0

Second Year

Fall		Credits
Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
Elective Course(s)		
CR 515S	Intro to Clinical Trials	3.0
DIGM 525*	Animation I	3.0
Term Credits		11.0

Total Credit: 41.0-45.0

* **This is a full-time plan with #9.0 semester credits/semester.** Digital media and entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 4 terms (1 year), completing 3-4 courses per term, all terms are eligible for financial aid.

Part-time, Fall Start

First Year (Part-Time)

Fall		Credits
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
DIGM 505*	Design and Interactivity Bootcamp	3.0

DIGM 506*	Animation and Game Design Bootcamp	3.0
Term Credits		9.0

Spring

Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
MIIM 503S	Biomedical Ethics	2.0
Elective Course(s)		
DIGM 530*	Game Design I	3.0
Term Credits		8.0

Summer

Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
CR 525S	Scientific Writing and Medical Literature	3.0
ENTP 641*	Innovation in Established Companies	3.0
Term Credits		8.0-12.0

Second Year (Part-Time)

Fall		Credits
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
MIIM 540S	Viruses and Viral Infections	2.0
DIGM 525*	Animation I	3.0
Term Credits		8.0

Spring

Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
ENTP 621*	Innovation & Ideation	3.0
Term Credits		8.0

Total Credit: 41.0-45.0

* **This is a part-time plan with <9.0 semester credits/semester.** Digital media and entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 5 terms (1.5 years), completing 2-3 courses per term, all terms are eligible for financial aid

Program Goals

Upon completion of the degree requirements of this program students would have developed:

- A broad core knowledge in interactive digital media development for application in biomedical science and innovative technologies
- More in-depth analytical, research, and critical thinking skills applicable to the process of biomedical technology development
- Skills to identify professional ethical dilemmas and evaluate appropriate solutions
- Graduate-level communication and leadership skills
- Additional professional soft skills (e.g., teamwork, problem-solving, knowledge of career opportunities, networking)

Drexel Student Learning Priorities (DSLPS)

In the course of meeting these program-level goals, students would have also made progress in all of Drexel's Student Learning Priorities (DSLPS)

(<http://www.drexel.edu/provost/irae/assessment/outcomes/dslp/>) to help them build their future:

Core Intellectual and Practical Skills:

- Communication
- Creative and critical thinking
- Ethical reasoning
- Information literacy
- Self-directed learning

Experiential and Applied Learning:

- Global competence
- Leadership
- Professional practice
- Research, scholarship and creative expression
- Responsible citizenship

Biomedicine and Entrepreneurship

Major: Biomedicine and Entrepreneurship

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 36.0

Classification of Instructional Programs (CIP) code: 26.9999

Standard Occupational Classification (SOC) code: 19-1020

About the Program

Mission Statement

The MS in Biomedicine and Entrepreneurship program integrates training in technical and practical aspects of science, research and entrepreneurship for individuals interested in pursuing innovation-driven careers in the life sciences. The program helps develop individual initiative and entrepreneurial thinking around scientific discoveries and innovation. The program is designed to facilitate not only new venture creation but also individual initiative and entrepreneurial thinking.

Graduates of the program will be prepared to progress into more advanced graduate studies in science or entrepreneurship and/or careers in scientifically oriented management jobs in the public or private sector. These graduates will especially be equipped to lead or have top management roles in new biomedical or life sciences ventures.

Curriculum

This is an interdisciplinary online program offered by the College of Medicine. The science courses, which are offered online are taught by faculty from Drexel University College of Medicine. Drexel University's Charles D. Close School of Entrepreneurship (<http://drexel.edu/close/>) teach the entrepreneurship courses.

- Non-thesis program (36.0 semester credits needed to graduate)
- No thesis requirement
- Required and elective courses in each discipline
- Flexible internship (experiential learning)
- Customizable plan of study

Format

- Online (select courses in both disciplines are offered face-to-face on-campus)
- Accelerated: 1-year MS (full-time) or 2.5 years (part-time)

Program Contact Information

For questions about the curriculum and program goals, please contact one of the Program Directors:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

For questions about how to apply to the program, please contact an enrollment counselor at duonline@drexel.edu or visit the Drexel University Online MS in Biomedicine and Business web page (<https://online.drexel.edu/online-degrees/biomedical-degrees/ms-biomedicine-business/>).

For information regarding financial aid, please visit Drexel Central (<http://www.drexel.edu/drexelcentral/>).

Admission Requirements

Post-college applicants must have completed a four-year degree program. An undergraduate degree in science is preferred but not required. Although a minimum cumulative grade point average (GPA) of 3.0 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

Applicants must also fulfill the following requirements for consideration:

- Official transcripts from all colleges and universities attended;
- Official test scores from graduate and professional admission exams are highly desirable, such as the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), Law School Admission Test (LSAT), or Medical College Admission Test (MCAT); and
- References from at least three instructors or professionals.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL). IELTS scores may be submitted in lieu of TOEFL scores. An evaluation by World Education Services (WES) is required for transcripts from institutions outside the United States.

Online applications (https://banner.drexel.edu/pls/duprod/bwskalog.P_displginnon/) are accepted all year round for consideration for either fall or spring admission. Students may defer admission by one year. All admission decisions are made at the College of Medicine.

Program Contact Information

For questions about the curriculum and program goals, please contact one of the Program Directors:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

For questions about how to apply to the program, please contact an enrollment counselor at duonline@drexel.edu.

For information regarding financial aid, please visit Drexel Central (<http://www.drexel.edu/drexelcentral/>).

Degree Requirements

Science courses are offered by Drexel University College of Medicine and are taught in **semester terms** (fall and spring). Entrepreneurship courses are taught in **quarter terms** (fall, winter, spring, and summer).

Three (3.0) credit quarter courses confer the equivalent of 2.0 semester credits. The program required the completion of 36.0 semester credits for graduation. Semesters and quarters overlap sufficiently to allow full-time students to meet the degree requirements for this program in two years.

There are several ways to customize the internship or experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student's own personal needs and career aspirations. The duration of the internship may vary. Shorter rotations may require that the student enrolls in elective courses to meet the semester credit requirements for the degree.

Required Courses

Science		
MIIM 503S	Biomedical Ethics	2.0
	or IDPT 500S Responsible Conduct of Research	
MIIM 518S	Foundations of Applied Biomedicine *	3.0
MIIM 519S	Commercialization of Biomedical Technology	3.0
MIIM 631S	Biomedical Innovation Development and Management	5.0
Entrepreneurship		
ENTP 501	Entrepreneurship Essentials **	3.0
ENTP 540	Methods of Entrepreneurship **	3.0
Electives		
Choose at least 1 program-specific science elective and 2 entrepreneurship electives		6.0
Science, Program-Specific (Pick at least 1, but more than 1 is recommended)		
MIIM 517S	Applied Statistics for Biomedical Sciences	
	or IDPT 501S Biostatistics I	
MIIM 550S	Biomedicine Seminar	
MIIM 605S	Experiential Learning	
MIIM 645S	Biomedical Career Explorations	
MIIM T680S	Special Topics in Microbiology & Immunology	
Science, Clinical Research		
CR 501S	Emerging Trends in Medical Device Regulation	
CR 513S	Business Processes and Contemporary Concerns in Pharmaceutical R & D	
CR 514S	World Wide Regulatory Submissions	
CR 515S	Intro to Clinical Trials	
CR 525S	Scientific Writing and Medical Literature	
CR 535S	Current Federal Regulatory Issues in Biomedical Research	
CR 545S	Pharmaceutical Law	
CR 555S	Compliance & Monitoring Issues	
CR 600S	Designing the Clinical Trial	
Science, Basic Science & Research		
MIIM 530S	Fundamentals of Molecular Medicine I	
	or MIIM 515S Concepts in Biomedicine I	
MIIM 531S	Fundamentals of Molecular Medicine II	
	or MIIM 516S Concepts in Biomedicine II	
MIIM 534S	Molecular Medicine Journal Club I	
MIIM 533S	Molecular Medicine Journal Club II	
MIIM 521S	Biotechniques I: Molecular and Genomic Methods	

MIIM 522S	Biotechniques II: Immunological Methods
MIIM 540S	Viruses and Viral Infections
MIIM 541S	Bacteria and Bacterial Infections
MIIM 542S	Mycology and Fungal Infections
MIIM 543S	Parasitology and Parasitic Diseases
MIIM 545S	Introduction to Infectious Diseases
MIIM 546S	Introduction to Immunology
MIIM 606S	Microbiology and Immunology Seminar
MIIM 613S	Emerging Infectious Diseases
MIIM 653S	Clinical Correlations in Infectious Disease
Entrepreneurship **	
ENTP 535	Social Entrepreneurship
ENTP 555	Dynamics of the Family Firm
ENTP 565	Franchising
ENTP 611	Learning from Failure
ENTP 621	Innovation & Ideation
ENTP 641	Innovation in Established Companies
ENTP 651	Leading New Ventures
ENTP 631	Building Internal & External Relationships
ENTP 660	Early Stage Venture Funding
ENTP 670	Clean Venture Lab
ENTP 690	The Lean Launch
ENTP T580	Special Topics in Entrepreneurship

* Substitutions: MIIM 515S and MIIM 516S OR MIIM 530S OR MIIM 531S

** Science courses are offered on a semester basis; entrepreneurship courses are offered on a quarter basis. Semesters and quarters overlap. Credits shown for ENTP courses are quarter credits (3 quarter credits = 2 semester credits). This program requires a minimum of 36.0 semester credits to meet the degree requirements. This requirement can be met through a combination of science and entrepreneurship courses.

Sample Plan of Study

To learn more about part-time options, please contact a Program Director:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

Sample Plans of Study

These are samples of customizable plans of study. Variations may occur depending on course availability and each student's interest.

Full-Time, Fall Start

First Year

Fall		Credits
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
CR 525S	Scientific Writing and Medical Literature	3.0
		Term Credits
		9.0

Spring

Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
MIIM 503S	Biomedical Ethics	2.0
or IDPT 500S	Responsible Conduct of Research	
ENTP 540 *	Methods of Entrepreneurship	3.0
Elective Course(s)		

ENTP 631 [†]	Building Internal & External Relationships	3.0
	Term Credits	11.0
Summer		
Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
MIIM 645S	Biomedical Career Explorations	2.0
ENTP 651 [†]	Leading New Ventures	3.0
	Term Credits	7.0-11.0
Second Year		
Fall		
Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
ENTP 501 [†]	Entrepreneurship Essentials	3.0
Elective Course(s)		
ENTP 631 [†]	Building Internal & External Relationships	3.0
	Term Credits	11.0
Total Credit: 38.0-42.0		

* **This is a full-time plan with # 9.0 semester credits/ semester.** Entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 4 terms (1 year), completing 3-4 courses per term, all terms are eligible for financial aid.

Full-Time, Spring Start

First Year		
Spring		
Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
MIIM 503S	Biomedical Ethics	2.0
ENTP 540 [†]	Methods of Entrepreneurship	3.0
Elective Course(s)		
ENTP 660 [†]	Early Stage Venture Funding	3.0
	Term Credits	11.0
Summer		
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
Elective Course(s)		
MIIM 645S	Biomedical Career Explorations	2.0
ENTP 641 [†]	Innovation in Established Companies	3.0
ENTP 651 [†]	Leading New Ventures	3.0
	Term Credits	11.0
Second Year		
Fall		
Required Course(s)		
ENTP 501 [†]	Entrepreneurship Essentials	3.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
MIIM 605S	Experiential Learning	2.0-6.0
	Term Credits	8.0-12.0
Spring		
Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
Elective Course(s)		
ENTP 621 [†]	Innovation & Ideation	3.0
	Term Credits	8.0
Total Credit: 39.0-43.0		

CR 501S	Emerging Trends in Medical Device Regulation	3.0
ENTP 690 [†]	The Lean Launch	3.0
	Term Credits	11.0
Total Credit: 41.0-45.0		

* **This is a full-time plan with # 9.0 semester credits/ semester.** Entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 4 terms (1 year), completing 3-4 courses per term, all terms are eligible for financial aid.

Part-Time, Fall Start

First Year (Part-Time)		
Fall		
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
ENTP 501 [†]	Entrepreneurship Essentials	3.0
Elective Course(s)		
CR 525S	Scientific Writing and Medical Literature	3.0
	Term Credits	9.0
Spring		
Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
MIIM 503S	Biomedical Ethics	2.0
ENTP 540 [†]	Methods of Entrepreneurship	3.0
	Term Credits	8.0
Summer		
Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
ENTP 651 [†]	Leading New Ventures	3.0
	Term Credits	5.0-9.0
Second Year (Part-Time)		
Fall		
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
CR 515S	Intro to Clinical Trials	3.0
ENTP 611 [†]	Learning from Failure	3.0
	Term Credits	9.0
Spring		
Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
Elective Course(s)		
ENTP 621 [†]	Innovation & Ideation	3.0
	Term Credits	8.0
Total Credit: 39.0-43.0		

* **This is a part-time plan with <9.0 semester credits/semester.** Entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 5 terms (1.5 years), completing 3-4 courses per term, all terms are eligible for financial aid.

Part-Time, Spring Start

First Year (Part-Time)

Spring

Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
MIIM 503S	Biomedical Ethics	2.0
Term Credits		5.0

Summer

Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
Elective Course(s)		
CR 515S	Intro to Clinical Trials	3.0
ENTP 641*	Innovation in Established Companies	3.0
Term Credits		9.0

Second Year (Part-Time)

Fall

Required Course(s)		
ENTP 540*	Methods of Entrepreneurship	3.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
CR 535S	Current Federal Regulatory Issues in Biomedical Research	3.0
Term Credits		9.0

Spring

Required Course(s)		
ENTP 540*	Methods of Entrepreneurship	3.0
Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
Term Credits		5.0-9.0

Summer

Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
Elective Course(s)		
ENTP 651*	Leading New Ventures	3.0
Term Credits		8.0

Total Credit: 36.0-40.0

* **This is a part-time plan with <9.0 semester credits/semester.** Entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 5 terms (1.5 years), completing 3-4 courses per term, all terms are eligible for financial aid.

Program Goals

Upon completion of the degree requirements for this MS program, students would have achieved the following program-level goals:

- 1. Develop broad core knowledge in biological sciences, entrepreneurship and biomedical innovation**
 - Be proficient in fundamental concepts in molecular and cellular biology, and other major areas within the biological sciences
 - Be proficient in fundamental concepts in entrepreneurship
 - Be proficient in the process of biomedical innovation development and commercialization
- 2. Develop analytical and critical thinking skills**
 - Be able to critically analyze the ideas and concepts related to science and entrepreneurship presented written or orally by others (e.g., textbooks, journals, mass media, presentations by peers and subject matter experts)
 - Be able to identify, analyze, and evaluate the need for innovative solutions to problems or challenges in biomedicine and innovation management
 - Be able to identify and analyze challenges faced in biomedical innovation development and management
 - Be able to discuss the commercial viability of innovative biomedical products (e.g., drugs, devices, diagnostics, digital media content)
 - Be able to draft and analyze strategic and tactical plans to deliver a biomedical product to the market
 - Be able to articulate and defend their analysis
- 3. Develop research skills**
 - Be proficient at conducting primary research
 - Be proficient in collecting data from electronic databases, the World Wide Web, the library, and other sources
 - Be able to interpret data
- 4. Develop professional ethics**
 - Be able to identify and evaluate professional ethical dilemmas, and discuss appropriate resolutions
 - Apply professional ethical standards such as appropriate attribution of ideas, good recordkeeping, and truthful presentation of data/facts and conclusions
 - Be able identify and evaluate the economic and social impact of strategic decisions
- 5. Develop communication and leadership skills**
 - Be proficient at developing oral and/or written comprehensive reports, presenting facts, analysis, and conclusions
 - Be proficient at using appropriate technologies for communication
 - Be able to interact and work effectively with others in work settings involving cultural and demographic diversity
- 6. Develop other "work readiness" soft skills (e.g., teamwork, problem-solving, knowledge of career opportunities, networking)**
 - Be knowledgeable of career opportunities in their desired field
 - Be proficient at presenting a professional profile of oneself
 - Be proficient at time-management
 - Be able to work in teams
 - Begin to develop problem-solving skills for use in the workplace
 - Begin to develop a professional network

Drexel Student Learning Priorities (DSLPs)

In the course of meeting these program-level goals, students would have also made progress in all of Drexel's Student Learning Priorities (DSLPs (<http://drexel.edu/provost/assessment/outcomes/dslp/>)) (<http://www.drexel.edu/provost/irae/assessment/outcomes/dslp/>) to help them build their future:

Core Intellectual and Practical Skills:

- Communication
- Creative and critical thinking
- Ethical reasoning
- Information literacy
- Self-directed learning

Experiential and Applied Learning:

- Global competence
- Leadership
- Professional practice
- Research, scholarship and creative expression
- Responsible citizenship

Biomedicine and Law

Major: Biomedicine and Law

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 36.0

Classification of Instructional Programs (CIP) code: 26.9999

Standard Occupational Classification (SOC) code: 19-1020; 23-2000

About the Program

The Masters of Science in Biomedicine and Law degree program comprehensive training in technical and practical aspects of science and innovation, as well as in the legal aspects related to new biomedical product development, entrepreneurship and regulatory compliance. This program is geared to individuals interested in careers focused in technology development.

Graduates of this program will be prepared to progress into more advanced graduate studies in science and/or careers in scientifically oriented management jobs in the public or private sector (e.g., technology commercialization offices, patent agencies). These individuals will also be competitive Law School applicants, if they so chose to continue their professional studies, even though credits for their legal coursework in this program will not be transferable for Law School credits.

Curriculum

This is an interdisciplinary online program offered by the College of Medicine. The science courses, which are offered online are taught by faculty from Drexel University College of Medicine. Faculty from Drexel University's Kline School of Law teach the entrepreneurship courses.

- Non-thesis program (36.0 semester credits needed to graduate)
- No thesis requirement
- Required and elective courses in each discipline
- Flexible internship (experiential learning)
- Customizable plan of study

Format

- Online (select courses in both disciplines are offered face-to-face on-campus)
- Accelerated: 1-year MS (full-time) or 2.5 years (part-time)

Program Contact Information

For questions about the curriculum and program goals, please contact one of the Program Directors:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

For questions about how to apply to the program, please contact an enrollment counselor at duonline@drexel.edu.

For information regarding financial aid, please visit Drexel Central (<http://www.drexel.edu/drexelcentral/>).

Program Goals

Upon completion of the degree requirements for this MS program, students would have developed:

1. A broad core knowledge in biological sciences and legal aspects of biomedical innovation
2. More in-depth analytical, research, and critical thinking skills
3. An advanced understanding of professional ethics
4. Graduate-level communication and leadership skills
5. Other "work readiness" soft skills such as teamwork, problem-solving, knowledge of career opportunities, and networking.

Drexel Student Learning Priorities (DSLPs)

In the course of meeting these program-level goals, students would have also made progress in all of Drexel's Student Learning Priorities (DSLPs) (<http://www.drexel.edu/provost/irae/assessment/outcomes/dslp/>) to help them build their future:

Core Intellectual and Practical Skills:

- Communication
- Creative and critical thinking
- Ethical reasoning
- Information literacy
- Self-directed learning

Experiential and Applied Learning:

- Global competence
- Leadership
- Professional practice
- Research, scholarship and creative expression
- Responsible citizenship

Admission Requirements

Post-college applicants must have completed a four-year degree program. An undergraduate degree in science is preferred but not required. Although a minimum cumulative grade point average (GPA) of 3.0

is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

Applicants must also fulfill the following requirements for consideration:

- Official transcripts from all colleges and universities attended;
- Essay/Personal statement
- Resume; and
- References from at least three instructors or professionals.

Official test scores from graduate admission exams, such as the Graduate Record Examination (GRE), are optional but highly desirable.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL). IELTS scores may be submitted in lieu of TOEFL scores. An evaluation by World Education Services (WES) is required for transcripts from institutions outside the United States.

Online applications (<https://online.drexel.edu/online-degrees/biomedical-degrees/ms-biomedicine-business/#apply>) are accepted all year round for consideration for either fall or spring admission. Students may defer admission by one year. All admission decisions are made at the College of Medicine.

Program Contact Information

For questions about the curriculum and program goals, please contact one of the Program Directors:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

For information regarding financial aid, please visit Drexel Central (<http://www.drexel.edu/drexelcentral/>).

For questions about how to apply to the program, please contact an enrollment counselor at duonline@drexel.edu.

Degree Requirements

There are several ways to customize the experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student's own personal situation. The duration of the internship may vary. Shorter rotations may require that the student enroll in elective courses to meet the semester credit requirements for degree.

Program Requirements

Required Courses

Science Requirements		
MIIM 503S	Biomedical Ethics	2.0
	or IDPT 500S Responsible Conduct of Research	
MIIM 518S	Foundations of Applied Biomedicine *	3.0
MIIM 519S	Commercialization of Biomedical Technology **	3.0
MIIM 631S	Biomedical Innovation Development and Management	5.0
Law Requirements		
LAW 783S	Bioethics	2.0
	or MIIM 503S Biomedical Ethics	
LSTU 500S	Introduction to the Legal System	3.0
LSTU 506S	Patients and Privacy: HIPAA and Related Regulations	3.0

Electives

Choose at least 1 program-specific science elective and 2 law electives	
Science, Program-Specific (Required to pick at least 1 course, but more than 1 is recommended)	
MIIM 517S	Applied Statistics for Biomedical Sciences or IDPT 501 Biostatistics I
MIIM 550S	Biomedicine Seminar
MIIM 605S	Experiential Learning
MIIM 645S	Biomedical Career Explorations
MIIM T680S	Special Topics in Microbiology & Immunology
Science, Clinical Research	
CR 501S	Emerging Trends in Medical Device Regulation
CR 511S	The History of Misconduct in Biomedical Research
CR 514S	World Wide Regulatory Submissions
CR 515S	Intro to Clinical Trials
CR 525S	Scientific Writing and Medical Literature
CR 535S	Current Federal Regulatory Issues in Biomedical Research
CR 545S	Pharmaceutical Law
CR 555S	Compliance & Monitoring Issues
CR 600S	Designing the Clinical Trial
Science, Basic Science & Research	
MIIM 530S	Fundamentals of Molecular Medicine I or MIIM 515 Concepts in Biomedicine I
MIIM 531S	Fundamentals of Molecular Medicine II or MIIM 516 Concepts in Biomedicine II
MIIM 533S	Molecular Medicine Journal Club II
MIIM 534S	Molecular Medicine Journal Club I
MIIM 521S	Biotechniques I: Molecular and Genomic Methods
MIIM 522S	Biotechniques II: Immunological Methods
MIIM 540S	Viruses and Viral Infections
MIIM 541S	Bacteria and Bacterial Infections
MIIM 542S	Mycology and Fungal Infections
MIIM 543S	Parasitology and Parasitic Diseases
MIIM 545S	Introduction to Infectious Diseases
MIIM 546S	Introduction to Immunology
MIIM 606S	Microbiology and Immunology Seminar
MIIM 613S	Emerging Infectious Diseases
MIIM 653S	Clinical Correlations in Infectious Disease
Law (Required to pick at least 2 courses) ***	
LAW 610S	Reproductive Rights Law
LAW 674S	Health Care Fraud and Abuse
LAW 703S	Law and Entrepreneurship
LAW 780S	Health Care Quality Regulation
LAW 781S	Health Care Cost and Access Regulation
LAW 782S	Health Policy Colloquium
LAW 784S	Health Care Finance
LAW 785S	Legal Regulation of Pharmaceutical and Medical Device Research and Development
LAW 787S	Legal Regulation of Pharmaceutical and Medical Device Sales and Marketing Practices
LAW 788S	Law of Medical Malpractice
LAW 792S	Food and Drug Law
LAW 872S	Health Law Legal Research
LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting
LSTU 503S	Legal Research and Analysis
LSTU 504S	Health Care Rules and Regulations
LSTU 505S	Health Care Quality, Patient Safety and Risk Management
LSTU 507S	Risk Assessment and Management
Entrepreneurship ***	
ENTP 611	Learning from Failure
ENTP 621	Innovation & Ideation
ENTP 641	Innovation in Established Companies

* Substitutions: MIIM 515S and MIIM 516S OR MIIM 530S OR MIIM 531S

** Substitutions: MIIM 535S and MIIM 536S

*** Science and law courses are offered on a semester basis, and entrepreneurship courses are offered on a quarter basis. Semesters and quarters overlap. Credits shown for entrepreneurship courses are quarter credits (3 quarter credits = 2 semester credits). This program requires a minimum of 36.0 semester credits to meet the degree requirements. This requirement can be met through a combination of science, digital media and entrepreneurship courses.

Sample Plan of Study

To learn more about part-time options, please contact a Program Director:

- Sandra Urdaneta-Hartmann, MD, PhD, MBA (slu22@drexel.edu)
- Sandhya Kortagere, PhD (sk673@drexel.edu)

Sample Plans of Study

These are samples of customizable plans of study. Variations may occur depending on course availability and each student's interest.

Full-time, Fall Start

First Year		
Fall		Credits
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
LSTU 500S*	Introduction to the Legal System	3.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
Term Credits		9.0
Spring		
Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
LSTU 506S*	Patients and Privacy: HIPAA and Related Regulations	3.0
Elective Course(s)		
CR 545S	Pharmaceutical Law	3.0
Term Credits		9.0
Summer		
Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
LSTU 503S*	Legal Research and Analysis	2.0-3.0
Term Credits		4.0-9.0
Second Year		
Fall		
Required Course(s)		
MIIM 503S	Biomedical Ethics	2.0
MIIM 631S	Biomedical Innovation Development and Management (Capstone Course)	5.0
Elective Course(s)		
LSTU 501S*	Compliance Skills: Auditing, Investigation & Reporting	3.0
Term Credits		10.0
Total Credit: 32.0-37.0		

* **This is a full-time plan with # 9.0 semester credits/semester.** Both science and Law courses are listed in semester credits. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 4 terms (1 year), completing 3-4 courses per term, all terms are eligible for financial aid.

Full-time, Spring Start

First Year		
Fall		Credits
Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
MIIM 550S	Biomedicine Seminar	3.0
LSTU 503S*	Legal Research and Analysis	2.0-3.0
Term Credits		7.0-12.0
Spring		
Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
LSTU 500S*	Introduction to the Legal System	3.0
Elective Course(s)		
CR 545S	Pharmaceutical Law	3.0
Term Credits		9.0
Summer		
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
LSTU 506S*	Patients and Privacy: HIPAA and Related Regulations	2.0-3.0
Elective Course(s)		
CR 515S	Intro to Clinical Trials	3.0
Term Credits		8.0-9.0
Second Year		
Spring		
Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
MIIM 503S	Biomedical Ethics	2.0
Elective Course(s)		
ENTP 621*	Innovation & Ideation	3.0
Term Credits		10.0
Total Credit: 34.0-40.0		

* **This is a full-time plan with # 9.0 semester credits/semester.** Both science and Law courses are listed in semester credits, and are offered in overlapping semester terms. Entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 4 terms (1 year), completing 3-4 courses per term, all terms are eligible for financial aid.

Part-time, Fall Start

First Year (Part-Time)

Fall		Credits
Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
Term Credits		6.0

Spring

Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
MIIM 503S	Biomedical Ethics	2.0
LSTU 500S ⁺	Introduction to the Legal System	3.0
Term Credits		8.0

Summer

Required Course(s)		
LSTU 506S ⁺	Patients and Privacy: HIPAA and Related Regulations	2.0-3.0
Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
Term Credits		4.0-9.0

Second Year (Part-Time)

Fall		Credits
Elective Course(s)		
CR 545S	Pharmaceutical Law	3.0
MIIM 645S	Biomedical Career Explorations	2.0
LSTU 503S ⁺	Legal Research and Analysis	2.0-3.0
Term Credits		7.0-8.0

Spring

Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management (Capstone Course)	5.0
Elective Course(s)		
LSTU 501S ⁺	Compliance Skills: Auditing, Investigation & Reporting	2.0-3.0
Term Credits		7.0-8.0

Total Credit: 32.0-39.0

* **This is a part-time plan with <9.0 semester credits/semester.** Both science and law courses are listed in semester credits, and are offered in overlapping semesters. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 5 terms (1.5 years), completing 3-4 courses per term, all terms are eligible for financial aid.

Part-time, Spring Start

First Year (Part-Time)

Fall		Credits
Required Course(s)		
MIIM 503S	Biomedical Ethics	2.0
Elective Course(s)		
MIIM 550S	Biomedicine Seminar	3.0
LSTU 503S ⁺	Legal Research and Analysis	2.0-3.0
Term Credits		7.0-8.0

Spring

Required Course(s)		
MIIM 519S	Commercialization of Biomedical Technology	3.0
LSTU 500S ⁺	Introduction to the Legal System	3.0
Term Credits		6.0

Summer

Required Course(s)		
MIIM 518S	Foundations of Applied Biomedicine	3.0
LSTU 506S ⁺	Patients and Privacy: HIPAA and Related Regulations	2.0-3.0
Elective Course(s)		
MIIM 645S	Biomedical Career Explorations	2.0
Term Credits		7.0-8.0

Second Year (Part-Time)

Spring

Elective Course(s)		
MIIM 605S	Experiential Learning	2.0-6.0
LSTU 504S ⁺	Health Care Rules and Regulations	3.0
Term Credits		5.0-9.0

Summer

Required Course(s)		
MIIM 631S	Biomedical Innovation Development and Management	5.0
Elective Course(s)		
ENTP 621 ⁺	Innovation & Ideation	3.0
Term Credits		8.0

Total Credit: 33.0-39.0

* **This is a part-time plan with #9.0 semester credits/semester.** Both science and law courses are listed in semester credits, and are offered in overlapping semester terms. Entrepreneurship courses are listed in quarter credits, since they are offered in quarter terms (overlap with semester terms). However, 2.0 semester credits will be awarded for 3.0 quarter credits completed. **To qualify for financial aid, each semester students must enroll in #4.5 credits in science courses offered by the College of Medicine.** Students must enroll in at least 1 College of Medicine course in order to enroll in any course offered by another Drexel College or School. Students graduate after 5 terms (1.5 years), completing 3-4 courses per term, all terms are eligible for financial aid.

Biotechnology

Major: *Biotechnology*

Degree Awarded: *Master of Science (MS)*

Calendar Type: *Semester*

Total Credit Hours: *42.5*

Classification of Instructional Programs (CIP) code: *41.0101*

Standard Occupational Classification (SOC) code: *11-9121; 19-1029; 25-2031*

About the Program

The MS in Biotechnology program is designed to train laboratory personnel in the theory and practice of state-of-the-art technologies for biochemical analysis. The program is targeted to individuals who will be seeking employment in biotechnology/pharmaceutical firms or academic laboratories and is appropriate for recent college graduates or experienced technicians. Graduates of this program will possess a set of technical skills that will make them very competitive for laboratory jobs in the academic or industrial sectors, or, if they are already employed, enhance their potential for advancement.

This program includes both academic coursework and hands-on practica.

For more information, please visit Drexel College of Medicine's Biotechnology Program (<http://drexel.edu/medicine/academics/graduate-school/biotechnology/>) web page.

Additional Information

Jane Azizkhan-Clifford, PhD
Interim Program Director
Department of Biochemistry and Molecular Biology
Drexel University College of Medicine
biotechnology@drexelmed.edu

Admission Requirements

For acceptance to the program, the applicant must have completed a four-year biology or chemistry-based bachelor's degree program, or equivalent. While there are no minimum requirements, applicants should be competitive with regard to grades, entrance exam scores and letters of recommendation. Students must fulfill all requirements for consideration as defined by the Executive Committee of the Division of Biomedical Science Programs:

- official transcripts from all colleges and universities attended
- official transcript evaluation such as WES, for transcripts from international institutions that are not in English, or that do not use a 4 point GPA scale;
- official entrance exam scores such as the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT);
- references from at least three instructors or industry professionals;
- an application fee of \$75;
- international applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS, with the exception of those who have received their undergraduate degree in an accredited US institution;

Students applying to the program will be expected to have undergraduate experience in chemistry, cell biology, biochemistry, and mathematics--including, at a minimum--two semesters each of inorganic chemistry, organic chemistry, physics, calculus and biology.

To learn more about applying to Drexel College of Medicine programs visit the College of Medicine's Graduate School of Biomedical Sciences and Professional Studies (<http://www.drexel.edu/medicine/Academics/Graduate-School/>) website.

About the Curriculum

This program offers a set of required didactic courses designed to provide students with the theoretical underpinnings of modern Biochemistry and Biotechnology, and will form a foundation for the four hands-on practica. These practica will provide detailed exposure and experience in four different aspects of biochemistry/biotechnology: protein expression and purification; crystallography; gene expression and manipulation; protein-protein and protein-ligand interaction with SPR; and imaging/microscopy. Each practica will be conducted under the close supervision of a faculty member with expertise in the area, and will progress from an initial set of experiments in which the results are already known (allowing students to become familiar with techniques), then progressing to a project tightly associated with the ongoing research in the mentor's laboratory. The third practicum will be 8.0 semester credit hours, and will include preparation of a scholarly paper that reviews a topic related to the techniques associated with that particular practicum.

Program Requirements

Required Courses		
BIOC 507S	Biochemistry Seminar Series *	4.0
BIOC 508S	Experimental Approaches to Biochemical Problems	3.0
BIOC 603S	Advanced Topics in Biochemistry and Molecular Biology	1.5
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
Required Practica		
BIOC 513S	Biotechnology Practicum I	4.0
BIOC 514S	Biotechnology Practicum II	4.0
BIOC 515S	Biotechnology Practicum III	8.0
BIOC 516S	Biotechnology Practicum IV	4.0
Advanced Electives		
BIOC 521S	Introduction to Biochemical Data	
BIOT 502S	Group Dynamics in STEM	
BIOT 503S	Professional Portfolio Development	
Total Credits		42.5

* Taken each semester for one credit.

Sample Plan of Study

First Year		
Fall		Credits
BIOC 507S	Biochemistry Seminar Series	1.0
BIOC 513S	Biotechnology Practicum I	4.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
Advanced Electives		
BIOC 521S	Introduction to Biochemical Data	
BIOT 502S	Group Dynamics in STEM	
Term Credits		11.0
Spring		
BIOC 507S	Biochemistry Seminar Series	1.0
BIOC 514S	Biotechnology Practicum II	4.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
Term Credits		11.0
Second Year		
Fall		Credits
BIOC 507S	Biochemistry Seminar Series	1.0
BIOC 515S	Biotechnology Practicum III	8.0
IDPT 500S	Responsible Conduct of Research	2.0
Term Credits		11.0
Spring		
BIOC 507S	Biochemistry Seminar Series	1.0
BIOC 508S	Experimental Approaches to Biochemical Problems	3.0
BIOC 516S	Biotechnology Practicum IV	4.0
BIOC 603S	Advanced Topics in Biochemistry and Molecular Biology	1.5
Term Credits		9.5
Total Credit:		42.5

Cancer Biology

Major: Cancer Biology

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 46.0 (non-thesis); 55.0 (thesis)

Classification of Instructional Programs (CIP) code: 26.0911
Standard Occupational Classification (SOC) code: 19-1042

About the Program

The goal of the MS in Cancer Biology program is to provide a master's degree focused on the fundamentals of cancer from an interdisciplinary perspective, including:

- biology and molecular biology of cancer initiation;
- metastasis;
- treatment; and
- bioinformatics/systems biology.

The program is designed to meet the needs of two groups of individuals: (1) new or recent college graduates who wish to increase their marketability for jobs in academic or industrial laboratories through the acquisition of knowledge and skills more developed than obtained through a standard college curriculum; and (2) currently employed technical staff in the pharmaceutical or biotechnology industry (or academia) who wish to advance their position.

Consisting of both classroom and laboratory instruction, the program fills a need to train laboratory personnel in cancer theory and research. Graduates of this program will possess knowledge in both the theoretical as well as the practical level.

Additional Information

For more information about the program, and how to apply, please visit the College of Medicine's Cancer Biology Program (<http://drexel.edu/medicine/academics/graduate-school/cancer-biology/>) web page.

Mauricio Reginato, PhD
Program Director
Department of Biochemistry and Molecular Biology
Drexel University College of Medicine
mjr53@drexel.edu

Admission Requirements

For acceptance to the program, the applicant must have completed a four-year biology or chemistry-based bachelor's degree program, or equivalent, with at least a 3.0 GPA. Students must fulfill all requirements for consideration as defined by the Executive Committee of the Division of Biomedical Science Programs:

- official transcripts from all colleges and universities attended;
- official transcript evaluation such as WES, for transcripts from international institutions that are not in English, or that do not use a 4 point GPA scale;
- official entrance exam scores such as the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT);
- references from at least three instructors or industry professionals;
- an application fee of \$75;
- international applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS, with the exception of those who have received their undergraduate degree in an accredited U.S. institution;

Students applying to the program will be expected to have undergraduate experience in chemistry, cell biology, biochemistry, and mathematics--including, at a minimum--two semesters each of inorganic chemistry, organic chemistry, physics, calculus and biology.

To learn more about applying to Drexel College of Medicine programs visit the College of Medicine's Graduate School of Biomedical Sciences and Professional Studies (<http://www.drexel.edu/medicine/Academics/Graduate-School/>) website.

Degree Requirements

Thesis Option

55.0 semester credits

Required Courses		
CBIO 503S	Cancer Biology Journal Club *	4.0
CBIO 504S	Cancer Biology 1st Lab Rotation	4.0
CBIO 505S	Cancer Biology 2nd Lab Rotation	4.0
CBIO 506S	Cancer Biology Thesis Research **	18.0
CBIO 510S	Cancer Biology	3.0
CBIO 512S	Advanced Cancer Biology	2.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
MCBG 513S	Molec & Cell Biology Seminar *	4.0

Approved Electives		
BIOC 508S	Experimental Approaches to Biochemical Problems	
BIOC 603S	Advanced Topics in Biochemistry and Molecular Biology	
CBIO 501S	Infection, Inflammation and Cancer	
CBIO 508S	Cancer Biomarkers and Therapeutics	
EPI 551	Epidemiology of Cancer	
IDPT 507S	Teaching Practicum I	
IDPT 508S	Teaching Practicum II	
IDPT 509S	Teaching Practicum III	
IDPT 600S	Thesis Defense	
MCBG 506S	Advanced Cell Biology	
MCBG 514S	Cell Cycle and Apoptosis	
PHRM 525S	Drug Discovery and Development I	

Total Credits 55.0

* Taken each semester

** Taken a minimum of two times in the second year.

Non-Thesis Option

46.0 semester credits

Required Courses		
CBIO 503S	Cancer Biology Journal Club *	4.0
CBIO 504S	Cancer Biology 1st Lab Rotation	4.0
CBIO 505S	Cancer Biology 2nd Lab Rotation	4.0
CBIO 510S	Cancer Biology	3.0
CBIO 512S	Advanced Cancer Biology	2.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0

IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
MCBG 513S	Molec & Cell Biology Seminar *	4.0
Advanced Electives		5.0
Select a minimum of five credits of Advanced Electives		
BIOC 508S	Experimental Approaches to Biochemical Problems	
BIOC 603S	Advanced Topics in Biochemistry and Molecular Biology	
CBIO 501S	Infection, Inflammation and Cancer	
CBIO 508S	Cancer Biomarkers and Therapeutics	
EPI 551	Epidemiology of Cancer **	
MCBG 506S	Advanced Cell Biology	
MCBG 514S	Cell Cycle and Apoptosis	
PHRM 525S	Drug Discovery and Development I	
General Electives		
CBIO 506S	Cancer Biology Thesis Research	
IDPT 507S	Teaching Practicum I	
IDPT 508S	Teaching Practicum II	
IDPT 509S	Teaching Practicum III	
Total Credits		46.0

* Taken every semester

** Note that this is a three credit quarter course which converts to two semester credits

Sample Plan of Study

Plan of Study: Thesis Option

First Year		Credits
Fall		
CBIO 503S	Cancer Biology Journal Club	1.0
CBIO 504S	Cancer Biology 1st Lab Rotation	4.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
MCBG 513S	Molec & Cell Biology Seminar	1.0
Term Credits		14.0
Spring		
CBIO 503S	Cancer Biology Journal Club	1.0
CBIO 505S	Cancer Biology 2nd Lab Rotation	4.0
IDPT 501S	Biostatistics I	2.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
MCBG 513S	Molec & Cell Biology Seminar	1.0
Term Credits		14.0
Second Year		
Fall		
CBIO 503S	Cancer Biology Journal Club	1.0
CBIO 510S	Cancer Biology	3.0
CBIO 506S	Cancer Biology Thesis Research	9.0
MCBG 513S	Molec & Cell Biology Seminar	1.0
Term Credits		14.0
Spring		
CBIO 503S	Cancer Biology Journal Club	1.0
CBIO 506S	Cancer Biology Thesis Research	9.0
CBIO 512S	Advanced Cancer Biology	2.0
MCBG 513S	Molec & Cell Biology Seminar	1.0
Term Credits		13.0
Total Credit:		55.0

Plan of Study: Non-Thesis Option

First Year		Credits
Fall		
CBIO 503S	Cancer Biology Journal Club	1.0
CBIO 504S	Cancer Biology 1st Lab Rotation	4.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
MCBG 513S	Molec & Cell Biology Seminar	1.0
Term Credits		14.0
Spring		
CBIO 503S	Cancer Biology Journal Club	1.0
CBIO 505S	Cancer Biology 2nd Lab Rotation	4.0
IDPT 501S	Biostatistics I	2.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
MCBG 513S	Molec & Cell Biology Seminar	1.0
Term Credits		14.0
Second Year		
Fall		
CBIO 503S	Cancer Biology Journal Club	1.0
CBIO 510S	Cancer Biology	3.0
MCBG 513S	Molec & Cell Biology Seminar	1.0
Elective(s)		4.0
Term Credits		9.0
Spring		
CBIO 503S	Cancer Biology Journal Club	1.0
CBIO 512S	Advanced Cancer Biology	2.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
MCBG 513S	Molec & Cell Biology Seminar	1.0
Elective		1.0
Term Credits		9.0

Total Credit: 46.0

Clinical Research for Health Professionals

Major: Clinical Research for Health Professionals

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 36.0

Classification of Instructional Programs (CIP) code: 51.0000

Standard Occupational Classification (SOC) code: 11-9199

About the Program

The MS in Clinical Research for Health Professionals program is a non-thesis curriculum designed for residents, fellows, and clinicians seeking knowledge in the conduct of translational and investigator-initiated research. The degree often acts as an advanced preparation for independent investigators and other practicing researchers familiar with clinical research, while developing their clinical careers.

The program is also available to other clinical health professionals such as nurses (with a minimum of a bachelor's degree required), medical technologists, etc., to help these individuals advance their professional opportunities.

Online course work coupled with supervised independent research activities will allow health care professionals in any academic hospital

setting throughout the US to receive an MS degree from Drexel University College of Medicine (DUCoM).

Research Project

While the MS in Clinical Research for Health Professionals program does not require a thesis, the program is consistent with a master's level education that challenges students to clearly express well-organized thoughts in written form. The collection, analysis and refinement of scientific information to produce a professional-level written document are crucial skills for those in the health professions. This requirement will expose students to the entire process of developing an independent research project and reporting on that research project up to and including experiencing a facsimile of the peer review and re-submission process. The research project will provide students with the opportunity to develop, test and report on research hypotheses.

It is anticipated that each student will conduct a minimum of nine hours research per week for 3.0 credits per semester. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or, development/evaluation of new medical devices. Research mentors must be established researchers with a doctoral degree. A key requirement of this mentored research is the support of a doctoral level mentor/advisor located at the institution where the student's research will be conducted. A curriculum vitae of the proposed research mentor must be submitted with the student's application for evaluation by the admissions committee and the program director. The appropriateness of the mentor will be evaluated by an ad hoc committee whose members come from the Graduate School faculty. The student must submit a 7-10 page journal-format paper at the end of each semester documenting their research and demonstrating that each successive semester's work builds upon their prior work.

For more information about the program and to apply, visit the Drexel University Online (<http://online.drexel.edu/online-degrees/biomedical-degrees/ms-crhp/>) web site.

Additional Information

Richard Mangano, PhD
Director, Graduate Programs in Clinical Research
rmm379@drexel.edu
215-762-3812

Degree Requirements

The MS in Clinical Research for Health Professionals program requires completing a minimum of 15.0 semester credits, composed of three required courses and two clinical research electives. In addition, students will register for a total of 21.0 research credits.

Curriculum

Select three of the following: 9.0

CR 500S	Epidemiology
CR 515S	Intro to Clinical Trials
CR 520S	Applications of Clinical Research Biostatistics
CR 525S	Scientific Writing and Medical Literature
CR 545S	Pharmaceutical Law
CR 612S	Fundamentals of Compliance

Select two of the following: 6.0

New Product Research and Development

CR 515S	Intro to Clinical Trials
---------	--------------------------

CR 525S	Scientific Writing and Medical Literature
CR 600S	Designing the Clinical Trial
CR 609S	Innovative Product Development
CR 614S	Introduction to Clinical Pharmacology
CR 620S	Regulatory, Scientific and Social Issues Affecting Biotech Research
Compliance and Safety Surveillance	
CR 555S	Compliance & Monitoring Issues
CR 570S	Principles and Practice of Pharmacovigilance
CR 612S	Fundamentals of Compliance
CR 633S	Quality Assurance Audits
Ethics and Law	
CR 505S	Ethical Issues in Research
CR 511S	The History of Misconduct in Biomedical Research
CR 545S	Pharmaceutical Law
CR 565S	Contemporary Issues in Human Research Protection
Regulatory	
CR 501S	Emerging Trends in Medical Device Regulation
CR 508S	Medical Device Combination Product Regulation
CR 514S	World Wide Regulatory Submissions
CR 523S	Current Issues in Review Boards
CR 535S	Current Federal Regulatory Issues in Biomedical Research
CR 551S	International Regulatory Affairs
Biostatistics and Data Management	
CR 500S	Epidemiology
CR 520S	Applications of Clinical Research Biostatistics
CR 527S	Clinical Data Management
CR 631S	Applications of Clinical Research Biostatistics II
Clinical Research Management	
CR 510S	Sponsored Projects Finance
CR 512S	Fundamentals of Academic Research Administration
CR 536S	Clinical Project Management
CR 541S	Patient Recruitment and Informed consent
CR 550S	Leadership Skills
New Therapeutic Product Business and Strategic Planning	
CR 513S	Business Processes and Contemporary Concerns in Pharmaceutical R & D
CR 518S	Clinical Trial Budgeting
CR 546S	Clinical Outsourcing
CR 617S	Informatics in Pharm Res & Development
CR 625S	Health Policy and Economics
CR 635S	Strategic Planning
Research/Journal-type paper requirement (min 21.0 credits)	
Each student conducts a minimum of 9 hours research/week for 3 credits per semester	21.0
CRHP 501S	Research Health Professions I
CRHP 502S	Research Health Professions II
CRHP 503S	Research Health Professions III
CRHP 504S	Research Health Professions IV
CRHP 505S	Research Health Professions V
CRHP 506S	Research Health Professions VI
CRHP 507S	Research Health Professions VII
Total Credits	36.0

* Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/ techniques; or, development/evaluation of new clinical devices.

Research mentors must be established researchers with a doctoral degree. A curriculum vitae of the proposed research mentor must be

submitted with the student's application. The appropriateness of the mentor will be evaluated by an ad hoc committee whose members come from the Graduate School faculty.

The student must submit a 7-10 page journal-format paper at the end of each semester documenting their research and demonstrating that each successive semester's work builds upon their prior work. Contact the program director for additional requirements.

Sample Plan of Study

Term 1		Credits
CRHP 501S	Research Health Professions I	3.0
CR 515S	Intro to Clinical Trials	3.0
Term Credits		6.0
Term 2		
CR 500S	Epidemiology	3.0
CRHP 502S	Research Health Professions II	3.0
Term Credits		6.0
Term 3		
CRHP 503S	Research Health Professions III	3.0
CR 520S	Applications of Clinical Research Biostatistics	3.0
Term Credits		6.0
Term 4		
CRHP 504S	Research Health Professions IV	3.0
Elective		3.0
Term Credits		6.0
Term 5		
CRHP 505S	Research Health Professions V	3.0
Elective		3.0
Term Credits		6.0
Term 6		
CRHP 506S	Research Health Professions VI	3.0
Term Credits		3.0
Term 7		
CRHP 507S	Research Health Professions VII	3.0
Term Credits		3.0
Total Credit: 36.0		

Clinical Research Organization and Management

Major: Clinical Research Organization and Management

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 36.0

Classification of Instructional Programs (CIP) code: 51.0000

Standard Occupational Classification (SOC) code: 11-9199

About the Program

The Master of Science in Clinical Research Organization and Management is an online program designed for individuals already trained in the area of clinical sciences, as well as for others who desire a focused education in the proper conduct of clinical research.

The Master of Science in Clinical Research Organization and Management program offers students a rigorous graduate education taught by leaders from the pharmaceutical, biotechnology and medical device industries, as well as from academic research centers. The program provides online courses that include scientific rationale related to the design and analysis of clinical trials, epidemiology and

biostatistics, ethics-based reasoning for the conduct of research, clinical trial management and monitoring processes, and federal regulatory rules and policies essential to the development of a broadly-educated and well-prepared professional in clinical research and new therapeutic product investigation.

The program is designed so that graduates will be able to:

- Successfully apply the framework and philosophies of research to the management of clinical trials, employing quality principles of current good clinical practice to produce valid and useful data;
- Ensure that sound ethical principles and values are always recognized and upheld in research involving a human population;
- Use current statistical knowledge and methods in the design, implementation, conduct, and assessment of clinical trial programs; and
- Describe the scientific and clinical research literature to effectively interpret the results of clinical research, thereby enhancing the decision-making process.

Students work with advisors to customize their course plans to meet their career goals.

Program Delivery Options

All Clinical Research (CR) courses are offered solely online. Visit Drexel University Online for details.

Additional Information

Richard Mangano, PhD

Director, Graduate Programs in Clinical Research

rmm379@drexel.edu

215-762-3812

For more information about the program, visit the Master of Science in Clinical Research Organization and Management (<http://online.drexel.edu/crom/>) page on the Drexel University Online site.

For information about applying to the program, visit the Drexel University Online Admissions Criteria (<http://www.drexel.com/online-degrees/biomedical-degrees/ms-crom/admissions.aspx>) web page.

Degree Requirements

The Master of Science in Clinical Research Organization and Management program consists of 12 courses (36.0 credits). Any courses offered by the Clinical Research Organization Management program (Subject code "CR") may be applied to fulfill the requirements of this major. No master's thesis is required.

The program is organized into five areas of study devoted to clinical research and related administrative and regulatory issues. Students may take courses within their preferred area of study, a cross-section of courses within other areas of study, **or any other Clinical Research (CR) courses being offered.**

Program Requirements		36.0
New Product Research and Development		
CR 515S	Intro to Clinical Trials	
CR 525S	Scientific Writing and Medical Literature	
CR 600S	Designing the Clinical Trial	
CR 609S	Innovative Product Development	
CR 614S	Introduction to Clinical Pharmacology	

CR 620S	Regulatory, Scientific and Social Issues Affecting Biotech Research
Compliance and Safety Surveillance	
CR 555S	Compliance & Monitoring Issues
CR 570S	Principles and Practice of Pharmacovigilance
CR 612S	Fundamentals of Compliance
CR 633S	Quality Assurance Audits
Ethics and Law	
CR 505S	Ethical Issues in Research
CR 511S	The History of Misconduct in Biomedical Research
CR 545S	Pharmaceutical Law
CR 565S	Contemporary Issues in Human Research Protection
Regulatory	
CR 501S	Emerging Trends in Medical Device Regulation
CR 508S	Medical Device Combination Product Regulation
CR 514S	World Wide Regulatory Submissions
CR 523S	Current Issues in Review Boards
CR 535S	Current Federal Regulatory Issues in Biomedical Research
CR 551S	International Regulatory Affairs
Biostatistics and Data Management	
CR 500S	Epidemiology
CR 520S	Applications of Clinical Research Biostatistics
CR 527S	Clinical Data Management
CR 631S	Applications of Clinical Research Biostatistics II
Clinical Research Management	
CR 510S	Sponsored Projects Finance
CR 512S	Fundamentals of Academic Research Administration
CR 536S	Clinical Project Management
CR 541S	Patient Recruitment and Informed consent
CR 550S	Leadership Skills
New Therapeutic Product Business and Strategic Planning	
CR 513S	Business Processes and Contemporary Concerns in Pharmaceutical R & D
CR 518S	Clinical Trial Budgeting
CR 546S	Clinical Outsourcing
CR 617S	Informatics in Pharm Res & Development
CR 625S	Health Policy and Economics
CR 635S	Strategic Planning
Total Credits	36.0

Sample Plan of Study

Term	Credits
Term 1	
Electives	6.0
Term Credits	6.0
Term 2	
Electives	6.0
Term Credits	6.0
Term 3	
Electives	6.0
Term Credits	6.0
Term 4	
Electives	6.0
Term Credits	6.0
Term 5	
Electives	6.0
Term Credits	6.0
Term 6	
Electives	6.0
Term Credits	6.0
Total Credit:	36.0

Criminalistic Science

Major: Criminalistic Science

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 44.5

Classification of Instructional Programs (CIP) code: 43.0111

Standard Occupational Classification (SOC) code: 19-4092; 33-3021

About the Program

The School of Biomedical Sciences and Professional Studies offers the Master of Science in Criminalistic Science. The Master of Science in Criminalistic Science is designed to introduce students to the basic principles of Criminalistic Science while also providing opportunities to pursue either more traditional and/or more innovative concentrations of study.

Criminalistics is defined as the scientific study and analysis of crime scenes and the evidence within those scenes to solve a crime and apprehend the perpetrator of the crime. The disciplines within criminalistics are science based, with most using multiple combinations of the natural sciences to conduct examinations and analysis of evidence and crime scenes.

In addition to required courses in criminal law, trial process and the use of evidence, the Master of Science in Criminalistic Science program offers courses in fingerprint science, forensic engineering, motor vehicle crash reconstruction, firearms and tool mark analysis, fire and explosion analysis, footwear and tire track analysis, bloodstain pattern analysis, trace materials and forensic geology and botany, and nuclear, biological, chemical terrorism/mass disaster management.

Admission Requirements

Applicants must have a bachelor's degree from an accredited US college or university or its equivalent. Official general GRE scores are required for admission. Typical applicants would have a minimum 3.0 GPA.

Selection is based upon academic qualifications, standardized test scores, references, an evaluation of the candidate's goals and commitment, and a telephone interview.

Each applicant's academic record will be evaluated based upon its individual merits. Since consideration for employment within the field of criminalistic science necessitates the absence of a criminal background, it is expected that all individuals applying to this program will have no history of criminal behavior, including prior illicit drug and/or prescription drug abuse.

For additional information on how to apply for this program, contact:

Ms. Safia Dias
215.762.4283
shd42@drexel.edu

Drexel University College of Medicine
Graduate School of Biomedical Sciences and Professional Studies
Master of Criminalistic Science Program
Mail Stop 344, 245 North 15th Street
Philadelphia, PA 19102-1192

Degree Requirements

Required Courses:

FCA 505S	Physical Aspects of Forensic Science	3.0
FCA 506S	Medico-legal Death Investigation	2.0
FCA 510S	Gross Human Skeletal Biology	3.0
MFSP 550S	Biological Aspects of the Forensic Sciences	2.0
MFSP 556S	Forensic Anthropology and Topics in Human Identification	3.0
MFSP 559S	Criminal Law and the Court: Use of Evidence I	3.5
MFSP 561S	Techniques of Crime Scene Investigation	3.0
MFSP 575S	Introduction to Criminal Law and Trial Process	3.0
MFSP 576S	Ethics for the Forensic Scientist	2.0
MFSP 602S	Professional Courtroom Testimony & Moot Court	3.0
Introduction to Scientific Writing *		2.0

Elective Courses **15.0**

MFSP 560S	Criminal Law and the Court: Use of Evidence II	
MFSP 562S	Arson and Explosive Analysis	
MFSP 563S	Latent Fingerprint Analysis	
MFSP 565S	Firearms and Tool Mark Analysis	
MFSP 566S	Techniques of interview and interrogation	
MFSP 568S	Vehicle Accident Reconstruction and Analysis	
MFSP 569S	Footwear and Tire Track Analysis	
MFSP 570S	Nuclear/Biological/Chemical Terrorism	
MFSP 571S	Bloodstain Pattern Analysis	
MFSP 578S	Forensic Photography	
MFSP 590S	Homicide Investigation	
MFSP 591S	Criminal Investigative Analysis I	
MFSP 593S	Cyber Crime	
MFSP 595S	Criminal Investigative Analysis II	
MFSP 596S	Advanced Vehicle Accident Analysis	
MFSP 597S	Forensic Serology	

Total Credits 44.5

* Introduction to Scientific Writing will be offered as a Special Topics Course, IHS T580S, during the 2017-2018 academic year.

Sample Plan of Study

First Year

Fall		Credits
FCA 505S	Physical Aspects of Forensic Science	3.0
FCA 510S	Gross Human Skeletal Biology	3.0
MFSP 575S	Introduction to Criminal Law and Trial Process	3.0
Introduction to Scientific Writing		2.0
Term Credits		11.0

Spring

FCA 506S	Medico-legal Death Investigation	2.0
MFSP 556S	Forensic Anthropology and Topics in Human Identification	3.0
MFSP 559S	Criminal Law and the Court: Use of Evidence I	3.5
MFSP 602S	Professional Courtroom Testimony & Moot Court	3.0
Term Credits		11.5

Second Year

Fall		Credits
MFSP 550S	Biological Aspects of the Forensic Sciences	2.0
MFSP 561S	Techniques of Crime Scene Investigation	3.0
Electives		6.0
Term Credits		11.0

Spring

MFSP 576S	Ethics for the Forensic Scientist	2.0
-----------	-----------------------------------	-----

Electives	9.0
Term Credits	11.0

Total Credit: 44.5

Drexel Pathway to Medical School

Major: Drexel Pathway to Medical School

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 48.0

Classification of Instructional Programs (CIP) code: 26.9999

Standard Occupational Classification (SOC) code: 19-1029

About the Program

This intensive, one-year master's degree program provides qualifying candidates a conditional acceptance for matriculation into Drexel University's College of Medicine following successful completion of the program. Small-group instruction is provided during the intensive introductory summer enrichment portion of the curriculum and individual counseling with an administrative advocate is available throughout the program.

More information:

Drexel University College of Medicine
Division of Pre-medical and Pre-health Programs
Graduate School of Biomedical Sciences and Professional Studies
New College Building, Room 4104
245 North 15th Street, Mail Stop 344
Philadelphia, PA 19102

Phone: 215-762-4692

Email: CoM_MedicalSciences@drexel.edu

Visit the Drexel University College of Medicine's website: Drexel Pathway to Medical School Program (<http://www.drexelmed.edu/Home/AcademicPrograms/GraduateSchoolofBiomedSciencesProfStudies/DrexelPathwaytoMedicalSchool.aspx>).

Admission Requirements

The program is open to all premedical students who have successfully completed the prerequisite coursework for medical school with a grade of C or better. All applications to the DPMS program are considered by the College of Medicine which utilizes a holistic review process. While there are no specific minimum or maximum GPA or score requirements, a typical competitive applicant has a GPA above 2.9 and an MCAT above the 25th percentile. If an applicant is chosen for an interview, they will be notified by the College of Medicine.

Degree Requirements

Required Courses

DPMS 500S	Medical Science Preparation	1.0
DPMS 501S	Critical Thinking and Scientific Communication Seminar	2.0
DPMS 502S	Accelerated Introductory Medical Biostatistics	3.0
IMSP 513S	Medical Biochemistry	8.0
MSPA 520S	Medical Terminology	3.0
IMSP 506S	Medical Professionalism and Leadership	3.0
IMSP 522S	Medical Physiology I	3.5
IMSP 523S	Medical Physiology II	3.5
IMSP 542S	Medical Microanatomy I	5.0
MSP 513S	Advanced Human Anatomy	4.0

Electives		12.0
DPMS 503S	Neurobiology of Mental Illness	
DPMS 504S	Functional Neuroanatomy	
IMSP 544S	Medical Immunology I	
IMSP 545S	Medical Immunology II	
MSPP 404S	Concepts in Science and Verbal Reasoning I	
MSPP 405S	Concepts in Science and Verbal Reasoning II	
Total Credits		48.0

Sample Plan of Study

Term 1		Credits
DPMS 500S	Medical Science Preparation	1.0
DPMS 501S	Critical Thinking and Scientific Communication Seminar	2.0
DPMS 502S	Accelerated Introductory Medical Biostatistics	3.0
MSPA 520S	Medical Terminology	3.0
Term Credits		9.0
Term 2		
IMSP 513S	Medical Biochemistry	8.0
IMSP 522S	Medical Physiology I	3.5
IMSP 542S	Medical Microanatomy I	5.0
Electives - Select from list below:		6.0
DPMS 503S	Neurobiology of Mental Illness	
IMSP 544S	Medical Immunology I	
MSPP 404S	Concepts in Science and Verbal Reasoning I	
Term Credits		22.5
Term 3		
IMSP 506S	Medical Professionalism and Leadership	3.0
IMSP 523S	Medical Physiology II	3.5
MSPP 513S	Advanced Human Anatomy	4.0
Electives - Select from list below:		6.0
DPMS 504S	Functional Neuroanatomy	
IMSP 545S	Medical Immunology II	
MSPP 405S	Concepts in Science and Verbal Reasoning II	
Term Credits		16.5
Total Credit: 48.0		

Drug Discovery and Development

Major: Drug Discovery and Development

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 38.0

Classification of Instructional Programs (CIP) code: 26.1001

Standard Occupational Classification (SOC) code: 19-1029

About the Program

The MS in Drug Discovery and Development program provides in-depth exposure to the multiple elements involved in the discovery and development of marketed drugs. This unique program provides the rigorous scientific and technical training necessary to succeed in the complex and multidisciplinary field of drug discovery. It has been designed to prepare students for a smooth transition into an enduring and productive career within the pharmaceutical and biotechnology industry. It covers all aspects of drug discovery and development beginning with the identification of a drug target and proceeding through to clinical trials, regulatory approval and commercialization. Students will also be introduced to business aspects as well as to other areas of biotechnology and to the basic sciences of pharmacology and physiology.

The MS in Drug Discovery and Development is available to individuals who have already obtained a BS or BA degree in the biomedical sciences, life sciences, health sciences or related fields who wish to pursue an industry-focused master's-level degree or enhance their qualifications for a doctoral program in the biomedical sciences or medicine. This includes individuals who plan to pursue a career in the pharmaceutical or biotechnical industries.

This program is also intended for individuals from other disciplines who wish to have a broader base of information about drug discovery and development, those who may wish to transition into the industry, or those who are already active in the industry and seek to increase their knowledge. The curriculum has been designed with the recognition that the pharmaceutical and biotechnical industries require a diversity of experience and expertise.

For more information about this program, visit the College of Medicine's Biomedical Graduate Studies (<https://drexel.edu/medicine/admissions/overview/>) page.

Admission Requirements

For acceptance to the program, the applicant must have completed a four-year biology or chemistry-based bachelor's degree program, or equivalent, with at least a 3.0 GPA. Students must fulfill all requirements for consideration as defined by the Drexel University College of Medicine Biomedical Graduate Education Committee:

- official transcripts from all colleges and universities attended;
- official copies of entrance test scores and official test scores from the Graduate Record Examination (GRE) for applicants to the full-time program;
- references from at least three instructors or professionals;
- an application fee is required for the full-time program;
- International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS.

Students applying to the program will be expected to have undergraduate experience in chemistry, cell biology, biochemistry, and mathematics and are encouraged to have training in inorganic chemistry, organic chemistry, physics, calculus and biology.

Visit Drexel University's Graduate Admissions (<http://www.drexel.edu/grad/programs/ducom/>) site for additional information regarding specific requirements for applying to the Graduate School of Biomedical Science and Professional Studies in the College of Medicine as well as important application dates.

For additional information on how to apply, visit Drexel's Admissions page for Biomedical Graduate Studies (<http://www.drexel.edu/grad/programs/ducom/apply/>).

Degree Requirements

The curriculum is designed to provide students with a with a comprehensive understanding of the entire process of drug discovery and development and its scientific foundation, while simultaneously offering multiple options to pursue specialized areas of interest.

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0-3.0
or CR 612S	Fundamentals of Compliance	
NEUR 500S	Statistics for Neuro/Pharm Research	2.0-3.0
or IDPT 501S	Biostatistics I	
or CR 520S	Applications of Clinical Research Biostatistics	
PHRM 512S	Graduate Pharmacology	3.0
PHRM 525S	Drug Discovery and Development I	3.0
PHRM 526S	Drug Discovery and Development II	3.0
PHRM 527S	Current Topics in Drug Discovery and Development	1.0
PHRM 605S	Research in Drug Discovery and Development	4.0
or PHRM 610S	Practicum in Drug Discovery and Development	

Electives * 20.0-21.0

Elective Options

CBIO 510S	Cancer Biology	
CR 500S	Epidemiology	
CR 501S	Emerging Trends in Medical Device Regulation	
CR 505S	Ethical Issues in Research	
CR 508S	Medical Device Combination Product Regulation	
CR 510S	Sponsored Projects Finance	
CR 511S	The History of Misconduct in Biomedical Research	
CR 512S	Fundamentals of Academic Research Administration	
CR 513S	Business Processes and Contemporary Concerns in Pharmaceutical R & D	
CR 514S	World Wide Regulatory Submissions	
CR 515S	Intro to Clinical Trials	
CR 518S	Clinical Trial Budgeting	
CR 520S	Applications of Clinical Research Biostatistics	
CR 523S	Current Issues in Review Boards	
CR 525S	Scientific Writing and Medical Literature	
CR 527S	Clinical Data Management	
CR 535S	Current Federal Regulatory Issues in Biomedical Research	
CR 536S	Clinical Project Management	
CR 541S	Patient Recruitment and Informed consent	
CR 545S	Pharmaceutical Law	
CR 546S	Clinical Outsourcing	
CR 550S	Leadership Skills	
CR 551S	International Regulatory Affairs	
CR 555S	Compliance & Monitoring Issues	
CR 565S	Contemporary Issues in Human Research Protection	
CR 570S	Principles and Practice of Pharmacovigilance	
CR T580S	Special Topics in Clinical Research	
CR 600S	Designing the Clinical Trial	
CR 609S	Innovative Product Development	
CR 612S	Fundamentals of Compliance	
CR 614S	Introduction to Clinical Pharmacology	
CR 617S	Informatics in Pharm Res & Development	
CR 620S	Regulatory, Scientific and Social Issues Affecting Biotech Research	
CR 625S	Health Policy and Economics	
CR 631S	Applications of Clinical Research Biostatistics II	
CR 633S	Quality Assurance Audits	
CR 635S	Strategic Planning	
MIIM 521S	Biotechniques I: Molecular and Genomic Methods	
MIIM 522S	Biotechniques II: Immunological Methods	
MIIM 524S	Vaccines and Vaccine Development	
MIIM 527S	Immunology, Immunopathology and Infectious Diseases	
MIIM 530S	Fundamentals of Molecular Medicine I	
MIIM 531S	Fundamentals of Molecular Medicine II	
MLAS 536S	Animal Models for Biomedical Research	
NEUR 508S	Graduate Neuroscience I	
PATH 601S	Cell and Molecular Pathobiology of Cancer	

PHGY 503S	Graduate Physiology	
PHRM 502S	Current Topics in Pharmacology & Physiology	
PHRM 503S	Pharm & Phys 1st Lab Rotation	
PHRM 507S	Prin of Neuropharmacology	
PHRM 516S	Advanced Topics in Physiology	
PHRM 517S	Advanced Topics in Pharmacology	
PHRM 518S	New Frontiers in Therapy	
PHRM 519S	Methods in Biomedical Research	
PHRM 520S	Internship in Drug Discovery and Development	
PHRM 521S	Intensive Internship in Drug Discovery and Development	
Quarter Elective Course Options (must be approved by advisor)		
PHRM T580S	Special Topics in Pharmacology	
BMES 604	Pharmacogenomics	
MGMT 910	Readings in Strategic Management	
MGMT 940	Seminar in Organizational Behavior	
ORGB 625	Leadership and Professional Development	
PBHL 530	Principles of Epidemiology	
PROJ 501	Introduction to Project Management	
PROJ 535	International Project Management	

Total Credits 38.0-41.0

* Courses that are not listed above may be taken as electives only with the approval of the program director.

Sample Plan of Study**Full Time Sample Plan of Study**

Term 1		Credits
IDPT 500S	Responsible Conduct of Research	2.0
PHGY 503S	Graduate Physiology	4.0
PHRM 516S	Advanced Topics in Physiology	1.0
PHRM 525S	Drug Discovery and Development I	3.0
Term Credits		10.0
Term 2		
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 526S	Drug Discovery and Development II	3.0
PHRM 605S	Research in Drug Discovery and Development	4.0
Term Credits		10.0
Term 3		
PHRM 512S	Graduate Pharmacology	3.0
Electives		6.0
Term Credits		9.0
Term 4		
Electives OR Thesis		9.0
Term Credits		9.0
Total Credit: 38.0		

Part Time Sample Plan of Study

Term 1		Credits
CR 612S	Fundamentals of Compliance	3.0
PHRM 525S	Drug Discovery and Development I	3.0
Term Credits		6.0
Term 2		
PHRM 526S	Drug Discovery and Development II	3.0
Elective 1		3.0
Term Credits		6.0
Term 3		
CR 520S	Applications of Clinical Research Biostatistics	3.0

Elective		3.0
Term Credits		6.0
Term 4		
PHRM 512S	Graduate Pharmacology	3.0
PHRM 527S	Current Topics in Drug Discovery and Development	1.0
Electives		6.0
Term Credits		10.0
Term 5		
PHRM 610S	Practicum in Drug Discovery and Development	4.0
Elective		3.0
Term Credits		7.0
Term 6		
Electives		6.0
Term Credits		6.0

Total Credit: 41.0

Forensic Science

Major: Forensic Science

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 42.0- 43.0

Classification of Instructional Programs (CIP) code: 43.0106

Standard Occupational Classification (SOC) code: 19-4092

About the Program

The Master of Science in Forensic Science (MSFS) program is a two-year graduate program leading to the Master of Science degree. Students in this program will gain theoretical and practical expertise in various aspects of forensic investigation. Graduates from the MSFS program will be prepared to work as analysts in forensic laboratories or in the biotech and pharmaceutical industry and gain a foundation for additional degrees in science and healthcare.

The core curriculum, taken by all students, provides foundational skills in forensic chemistry, biology, criminalistics, statistics, and law. For enhanced study, students can further specialize through concentrations in Molecular Biology or Forensic Medicine, leveraging the areas of expertise within the College of Medicine. Students will also complete a thesis-quality mentored research project in an area of their interest within the different disciplines represented at the College.

For more information about this program, visit the College of Medicine's Master of Science in Forensic Science (<http://www.drexel.edu/medicine/Academics/Graduate-School/Forensic-Science/>) web page.

Admission Requirements

Applicants to the MS in Forensic Science Program must have completed a four-year BA or BS degree program with a focus in biology, chemistry or related disciplines with undergraduate coursework in biology, general and organic chemistry, physics, mathematics, or related subjects. Although a minimum cumulative grade point average (GPA) of 3.0 on a 4.0 system is strongly desired, applicants with a lower cumulative GPA will be considered based on overall experience, such as research and/or professional, and other strengths that are demonstrated in the application.

The following must be submitted for consideration:

- Application with \$75.00 fee
- Official transcripts from each college and/or university attended
- Three letters of recommendation (two must be academic)

- Official GRE or other standardized test scores (e.g. MCAT test scores)
- A personal statement describing the interest in this field, personal goals and career aspirations
- International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS.

Contact information

For additional information on how to apply for this program, contact:

Ms. Safia Dias
215.762.4283
shd42@drexel.edu

Division of Interdisciplinary and Career-Oriented Programs
Graduate School of Biomedical Sciences and Professional Studies
Drexel University College of Medicine
245 North 15th Street, Mail Stop 344
New College Building
Philadelphia, PA 19102-1192

Degree Requirements

Requirements

Required Core Courses:

MFSP 541S	Fundamentals of Forensic Chemistry	3.0
MFSP 542S	Foundations of Physical Evidence	3.0
MFSP 550S	Biological Aspects of the Forensic Sciences	2.0
MFSP 575S	Introduction to Criminal Law and Trial Process	3.0
MFSP 602S	Professional Courtroom Testimony & Moot Court	3.0
IHS 514S	Molecular Biology & Biochemistry of the Cell	3.0
MFSP 589S	Forensic DNA Analysis	4.0
MFSP 572S	Forensic Research Project I	1.0
MFSP 573S	Forensic Research Project II	3.0
MFSP 598S	Forensic Research Project III	4.0
MFSP 592S	Forensic Graduate Seminar	2.0
IHS 510S	Introductory Biostatistics	2.0
	or IDPT 501S Biostatistics I	

Select 9 credits from the following: For a concentration in Molecular Biology or Forensic Medicine, complete the coursework required for each concentration. For general study, complete 9 credits of coursework from either concentration or additional electives with Program Director approval.

Total Credits 42.0

Forensic Medicine Concentration

Required Coursework

MFSP 551S	Human Function	3.0
MFSP 552S	Structure of the Human Body	3.0
MFSP 554S	Principles of Forensic Pathology	3.0
Total Credits		9.0

Molecular Biology Concentration

Required Coursework

MFSP 577S	Genetics for the Forensic Scientist	2.0
MFSP 579S	Forensic Microbiology	2.0
MFSP 580S	Principles of Immunology	2.0

MFSP 597S	Forensic Serology	3.0
Total Credits		9.0
Additional Electives		
MFSP 553S	Human Structure Lab	1.0
MFSP 555S	Forensic Science Practicum	3.0
MFSP 556S	Forensic Anthropology and Topics in Human Identification	3.0
MFSP 557S	Drug Chemistry	2.0
MFSP 558S	Instrumental Analysis	2.0
MFSP 578S	Forensic Photography	3.0
MFSP 581S	Human Osteology and Calcified Tissue Biology I	3.0
MFSP 582S	Human Osteology and Calcified Tissue Biology II	2.0
MFSP 583S	The Autopsy in Clinical Forensic Medicine	2.0
MFSP 584S	Introduction to Forensic Radiology	2.0
MFSP 585S	Clinical Forensic Emergency Medicine and Traumatology	2.0
MFSP 587S	Introduction to Forensic Psychology	2.0
MFSP 588S	Advanced Topics in Cell Biology	2.0
MFSP T580S	Special Topics in Forensic Science	1.0-4.0
IHS 513S	Scientific Writing for Healthcare Professionals	2.0
CHEM 755	Mass Spectrometry	3.0

* Quarter course credits have been converted to semester credits.

Sample Plan of Study

General Plan of Study

First Year

Fall		Credits
MFSP 541S	Fundamentals of Forensic Chemistry	3.0
MFSP 542S	Foundations of Physical Evidence	3.0
MFSP 550S	Biological Aspects of the Forensic Sciences	2.0
MFSP 575S	Introduction to Criminal Law and Trial Process	3.0
Term Credits		11.0

Spring

IHS 514S	Molecular Biology & Biochemistry of the Cell	3.0
MFSP 589S	Forensic DNA Analysis	4.0
MFSP 572S	Forensic Research Project I	1.0
IDPT 501S or IHS 510S	Biostatistics I Introductory Biostatistics	2.0
Term Credits		10.0

Second Year

Fall		Credits
MFSP 573S	Forensic Research Project II	3.0
MFSP 602S	Professional Courtroom Testimony & Moot Court	3.0
Select courses from concentration or additional electives		5.0-6.0
Term Credits		11.0-12.0

Spring

MFSP 598S	Forensic Research Project III	4.0
MFSP 592S	Forensic Graduate Seminar	2.0
Select courses from concentration or additional electives		4.0
Term Credits		10.0

Total Credit: 42.0-43.0

Specific Plans of Study for Concentrations

Molecular Biology Concentration

First Year

Fall		Credits
MFSP 541S	Fundamentals of Forensic Chemistry	3.0
MFSP 542S	Foundations of Physical Evidence	3.0

MFSP 550S	Biological Aspects of the Forensic Sciences	2.0
MFSP 575S	Introduction to Criminal Law and Trial Process	3.0
Term Credits		11.0

Spring

IHS 514S	Molecular Biology & Biochemistry of the Cell	3.0
MFSP 589S	Forensic DNA Analysis	4.0
IDPT 501S or IHS 510S	Biostatistics I Introductory Biostatistics	2.0
MFSP 572S	Forensic Research Project I	1.0
Term Credits		10.0

Second Year

Fall

MFSP 573S	Forensic Research Project II	3.0
MFSP 602S	Professional Courtroom Testimony & Moot Court	3.0
MFSP 597S	Forensic Serology	3.0
MFSP 579S	Forensic Microbiology	2.0
Term Credits		11.0

Spring

MFSP 598S	Forensic Research Project III	4.0
MFSP 592S	Forensic Graduate Seminar	2.0
MFSP 577S	Genetics for the Forensic Scientist	2.0
MFSP 580S	Principles of Immunology	2.0
Term Credits		10.0

Total Credit: 42.0

Forensic Medicine Concentration

First Year

Fall		Credits
MFSP 541S	Fundamentals of Forensic Chemistry	3.0
MFSP 542S	Foundations of Physical Evidence	3.0
MFSP 550S	Biological Aspects of the Forensic Sciences	2.0
MFSP 575S	Introduction to Criminal Law and Trial Process	3.0
Term Credits		11.0

Spring

IHS 514S	Molecular Biology & Biochemistry of the Cell	3.0
MFSP 589S	Forensic DNA Analysis	4.0
IDPT 501S or IHS 510S	Biostatistics I Introductory Biostatistics	2.0
MFSP 572S	Forensic Research Project I	1.0
Term Credits		10.0

Second Year

Fall

MFSP 573S	Forensic Research Project II	3.0
MFSP 602S	Professional Courtroom Testimony & Moot Court	3.0
MFSP 551S	Human Function	3.0
MFSP 552S	Structure of the Human Body	3.0
Term Credits		12.0

Spring

MFSP 598S	Forensic Research Project III	4.0
MFSP 592S	Forensic Graduate Seminar	2.0
MFSP 554S	Principles of Forensic Pathology	3.0
Term Credits		9.0

Total Credit: 42.0

Histotechnology

Major: Histotechnology

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 46.0

Classification of Instructional Programs (CIP) code: 51.1007

Standard Occupational Classification (SOC) code: 29-2011; 29-2012

About the Program

The Graduate School of Biomedical Sciences and Professional Studies offers the Master of Science in Histotechnology program. This one-year (12-month) program combines academic studies with a clinical practicum to prepare the students to perform complex tissue specimen preparations in the histology laboratory. The program provides advanced training and is designed to enable graduates to work as highly qualified histotechnologists under the supervision of pathologists.

Coursework includes histology, biochemistry, advanced histotechnology, anatomy, physiology, microbiology, medical ethics, laboratory management and leadership skills. In addition to the course work, students complete a three-month practicum designed to allow students to apply the knowledge and techniques learned during their didactic courses in a clinical hospital setting. The practicum allows the student the opportunity to perform routine as well as specialized, histotechnology techniques under the supervision of a qualified histotechnologist.

Program Accreditation

The *National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)* has established national standards for Histotechnology training programs. The standards include both didactic course work and clinical experiences necessary to properly educate a Histotechnologist. The Master of Histotechnology program at Drexel University College of Medicine is accredited by NAACLS. Visit the NAACLS (<http://www.naacls.org/>) website for more information about the professional activities of this organization.

Professional Certification

The *American Society for Clinical Pathology Board of Certification (ASCP BOC)* has established a national certification program for Histotechnologists. Graduates of the Master of Histotechnology program are eligible to sit for the national certification examination for Histotechnology. Visit the ASCP BOC (<http://www.ascp.org/Board-of-Certification/>) website to read more about the certification program and the professional activities of this organization.

Professional Affiliation

The *National Society for Histotechnology (NSH)* is a non-profit organization, committed to the advancement of Histotechnology, its practitioners and quality standards of practice through leadership, education and advocacy. Visit the NSH website to read more about the professional activities of this organization.

Career Opportunities

Histotechnologists are employed in community hospitals, academic centers such as medical schools and university hospitals, private pathology laboratories, medical research centers, government hospitals. Additional opportunities are available in clinical and industrial research, veterinary pathology, marine biology and forensic pathology.

For more information about this program, visit the College of Medicine's Master of Science in Histotechnology (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/AlliedHealthProfessionPrograms/HistotechnologyProgram.aspx>) page.

Admission Requirements

A bachelor's degree in a biological or allied health science, with a cumulative GPA of approximately 2.75, is the minimum requirement for acceptance into the Master's Degree Program. Prerequisite course work includes mathematics, English composition, general chemistry, organic and/or biochemistry and biological science. Microbiology, anatomy and histology are recommended but not required.

All candidates will be required to have a formal interview with one of the program director's prior to final acceptance. Deadline for submission of the application is the second Friday in June of the year in which the students plan to enroll.

Candidates for admission must provide the following credentials:

- Completed application form
- Resume
- Official Transcripts from all schools attended or where coursework was attempted or taken
- Official General Graduate Record Examination (GRE) scores
- Three letters of evaluation
- Self-assessment essays:
 - A. Discuss personal goals, conditions, or career aspirations that motivate you to pursue graduate study at Drexel University.
 - B. What are your most important accomplishments?
 - C. What do you expect to achieve through this program?

The application and supporting material must be received no later than the program deadline date.

For further information, contact:

Tina Rader, MHS, PA(ASCP)^{CM}
 Co-Director Pathologists' Assistant and Histotechnology Programs
 Drexel University College of Medicine
 New College Building, NCB4313
 245 N. 15th Street, Mail Stop 344
 Philadelphia, PA 19102-1192
 215-762-4113
tina.rader@drexelmed.edu

Degree Requirements

Required Courses		
IHS 514S	Molecular Biology & Biochemistry of the Cell	3.0
MFSP 551S	Human Function	3.0
MFSP 552S	Structure of the Human Body	3.0
MFSP 553S	Human Structure Lab	1.0
MHPP 500S	Advanced Histotechnology	4.0
MHPP 502S	Histotechnology Capstone Project	3.0
MHPP 503S	Histotechnology Practicum	9.0
MLAS 545S	Fundamentals of Histology	3.0
MSPA 510S	Laboratory Management	2.0
MSPA 520S	Medical Terminology	3.0
MSPA 540S	Histotechnology I	3.0
MSPA 560S	Medical Ethics	2.0
MSPA 580S	Medical Microbiology I	4.0
MSPA 590S	Leadership Skills for the Medical Profession	3.0
Total Credits		46.0

Sample Plan of Study

First Year

Fall		Credits
MLAS 545S	Fundamentals of Histology	3.0
MSPA 520S	Medical Terminology	3.0
MSPA 540S	Histotechnology I	3.0
MFSP 552S	Structure of the Human Body	3.0
MFSP 553S	Human Structure Lab	1.0
MSPA 590S	Leadership Skills for the Medical Profession	3.0
Term Credits		16.0
Spring		
MFSP 551S	Human Function	3.0
MHPP 500S	Advanced Histotechnology	4.0
MHPP 502S	Histotechnology Capstone Project	3.0
MSPA 580S	Medical Microbiology I	4.0
IHS 514S	Molecular Biology & Biochemistry of the Cell	3.0
Term Credits		17.0
Summer		
MHPP 503S	Histotechnology Practicum	9.0
MSPA 510S	Laboratory Management	2.0
MSPA 560S	Medical Ethics	2.0
Term Credits		13.0

Total Credit: 46.0

Immunology

Major: Immunology

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 36.0

Classification of Instructional Programs (CIP) code: 26.0507

Standard Occupational Classification (SOC) code: 11-9121

About the Program

Mission Statement

The Master of Science in Immunology, offered by the Department of Microbiology and Immunology and the Institute for Molecular Medicine and Infectious Disease (IMMID), is a **non-thesis degree program**. The program provides education and training in areas of research in basic and clinical immunology and immunologically-based diseases. Students in this program acquire theoretical and practical knowledge about the normal functions of the immune system and disease pathogenesis associated with immunological dysfunction. Students also learn how this knowledge is applied to develop tools for diagnosis, treatment, prognosis, and prevention of immunologically based diseases. Graduates from this program will be ready to enter the biotechnology workforce and are attractive candidates for doctoral programs in science and medicine.

The Master of Science in Immunology program is designed to provide academic and practical biotechnical knowledge in translational research, particularly in the areas of immunotherapeutics and vaccine development.

Curriculum

The two year non-thesis program encompasses fundamental requirements to establish a sound grounding in immunology, biochemistry, genetics, cellular and molecular biology. The program is typically completed in two full-time years (four semesters of at least nine credits) of required and elective graduate courses, and one or more experiential research components in the first or second year. The flexibility

of the curriculum enables students to complete the degree requirement within 18 months on an accelerated basis, and up to 4 years on a part-time basis. The successful completion of the degree will be determined by grades obtained in the graduate courses, participation in seminars and journal clubs, and performance in the research component. A minimum of 36.0 credits is required to graduate, with at least 6 of those earned as research credits.

The experiential research component of the curriculum can be fulfilled by two alternative approaches. Most students choose to engage in an intensive 6.0 credit hands-on research internship in which a 12-16 week research program will be undertaken in a laboratory at Drexel University, another academic institution, or at a biotechnology or biopharmaceutical company. Alternatively, students may choose to engage in a less intensive experience spanning two semesters, or conduct an independent research project, with the approval and supervision of Program Directors.

Traditional (Face-to-Face), Hybrid, or Online Learning Options

Classes can be attended at any of Drexel College of Medicine locations: Center City and Queen Lane campuses in Philadelphia. State-of-the-art video conferencing provides real-time interactive learning at these locations. Most classes are held in the late afternoon/early evening to facilitate participation of working professionals. The program may also be completed fully online, offered through Drexel University Online (<https://online.drexel.edu/online-degrees/biomedical-degrees/ms-immunology/>). All required courses and most electives have online sections and online students experience the same curriculum as face-to-face or hybrid students. Online sections are designed to maximize interactions among students and faculty, and may include live web sessions. Individual students also may choose a mix of traditional and online (hybrid) courses. The goal is to provide maximum scheduling flexibility.

Program Contact information

For more detailed information about the curriculum and program goals, please contact either:

Stephen Jennings, PhD

Email: srj32@drexel.edu (stephen.jennings@drexelmed.edu)

or

Pooja Jain, PhD

Email: pj27@drexel.edu (pooja.jain@drexelmed.edu)

Program Goals

Over the course of completing the program, students will develop

1. Core knowledge of molecular and cellular disciplines that constitute biomedical sciences
2. Working knowledge of normal functions of the immune system at the cellular and molecular level and how immunological dysfunction contributes to immunologically based disease
3. Practical knowledge and skills that help identify gaps in the biomedical field for the development of molecular diagnostic and therapeutic tools.
4. Skills in basic, translational, or clinical research
5. Professional ethics necessary for the responsible conduct of research

6. Communication and leadership skills
7. Other soft skills (e.g., collaboration, problem solving, career planning, networking) that facilitate career advancement and promotion

In the course of meeting these program-level goals, students will have also made progress in all of the Drexel Student Learning Priorities (DSLPs) to help them build their futures.

Core Intellectual and Practical Skills:

- Communication
- Critical and creative thinking
- Ethical reasoning
- Information literacy
- Self-directed learning
- Technology use

Experiential and Applied Learning:

- Global competence
- Leadership
- Professional practice
- Research, scholarship and creative expression
- Responsible citizenship

Admission Requirements

For acceptance into the Master of Science in Immunology program, the applicant must have completed a four-year biology or chemistry-based BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

- Official transcripts from all colleges and universities attended
- A current *curriculum vitae* (CV) or resume
- References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant's undergraduate curriculum, cumulative GPA, GRE/MCAT scores, recommendation letters, and relevant research and professional experience.

Online applications are considered year round. Potential students are encouraged to apply no later than July 1 for Fall admission, or December 1 for Spring admission.

For additional information about the program and to access the online application, view the Master of Science in Immunology (<http://drexel.edu/medicine/academics/Graduate-School/immunology/>) page on the College of Medicine's website.

Degree Requirements

About the Curriculum

Through the combination of required and elective courses, a total of 36.0 credits is required to successfully obtain the degree of Masters of Science in Molecular Medicine. In order to maintain full-time student status, a minimum of 9.0 credits must be taken in any given academic semester. In most cases, there are both traditional (face-to-face) and online sections for each course). Students should work with their program advisors to plan their course of study.

Research Requirements

The research component of the curriculum can be fulfilled by two alternative approaches. Most student choose to engage in a hands-on research internship in which a 12 week research program will be undertaken in a laboratory at Drexel, another academic institution, or at a biotechnology or biopharmaceutical company. Alternatively, students may choose to engage in an independent research project, with the approval and supervision of Program Directors.

For an individualized plan of study listing the sequence of courses to be completed, students should work with their program advisor.

Program Requirements

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
or MIIM 503S	Biomedical Ethics	
IDPT 501S	Biostatistics I	2.0
or MIIM 517S	Applied Statistics for Biomedical Sciences	
MIIM 527S	Immunology, Immunopathology and Infectious Diseases	3.0
MIIM 530S	Fundamentals of Molecular Medicine I	3.0
MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MIIM 532S	Fundamentals of Molecular Medicine III	2.0
MIIM 533S	Molecular Medicine Journal Club II	1.0
MIIM 534S	Molecular Medicine Journal Club I	1.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
MIIM 654S	Clinical Correlations in Immunology	3.0

To complete the MS in Immunology degree, 36.0 credits must be accrued. Students may choose from a menu of additional electives, depending on their academic goals.

Possible Electives

MIIM 502S	Microbiology and Immunology Journal Club
MIIM 521S	Biotechniques I: Molecular and Genomic Methods
MIIM 522S	Biotechniques II: Immunological Methods
MIIM 524S	Vaccines and Vaccine Development
MIIM 525S	Principles of Biocontainment
MIIM 540S	Viruses and Viral Infections
MIIM 541S	Bacteria and Bacterial Infections
MIIM 542S	Mycology and Fungal Infections
MIIM 543S	Parasitology and Parasitic Diseases
MIIM 555S	Molecular Mechanisms of Microbial Pathogenesis
MIIM 607S	Immunology II
MIIM 612S	Molecular Mechanisms of Viral Pathogenesis

MIIM 613S	Emerging Infectious Diseases
MIIM 615S	Experimental Therapeutics
MIIM 621S	Biomedical Research I
MIIM 622S	Biomedical Research II
MIIM 625S	Advanced Molecular Virology
MIIM 630S	Advanced Molecular Biology
MIIM 651S	Research Internship in Immunology
MIIM 660S	Current Concepts in Molecular Medicine I
MLAS 529S	Molecular Genetics
Total Credits	
36.0	

Infectious Disease

Major: Infectious Disease

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 36.0

Classification of Instructional Programs (CIP) code: 26.0508

Standard Occupational Classification (SOC) code: 19-1022; 19-1029

About the Program

Mission Statement

The Master of Science in Infectious Disease (<http://www.drexel.edu/medicine/Academics/Graduate-School/Infectious-Disease/>) program, offered by the Department of Microbiology and Immunology (<http://www.drexel.edu/medicine/About/Departments/Microbiology-Immunology/>) and by the Institute for Molecular Medicine and Infectious Disease (<http://www.drexel.edu/medicine/About/Departments/Institute-for-Molecular-Medicine-Infectious-Disease/>) (IMMID), provides graduate-level training in the area of infectious disease. Classroom activities, online learning, and research experiences cover fundamentals of molecular biology, cell biology, and immunology, as well as basic, translational, and clinical aspects of diseases caused by important infectious pathogens, including HIV, methicillin-resistant *Staphylococcus aureus* (MRSA), malarial parasites, influenza virus, and Zika virus. Elective courses offer highly focused studies of topics relevant to infectious disease, including: vaccines and vaccine development; viral, bacterial, parasitic, and fungal pathogens; emerging pathogens; principles of biocontainment; and experimental therapeutics.

The program is designed to prepare students for careers in infectious disease in government, industry, and academic settings. The program is ideally suited for enhancing the scientific credentials of recent college graduates, early career scientists, premedical students, employees in industry, and clinical laboratory technicians.

Curriculum

This non-thesis degree program comprises numerous required and elective graduate courses, as well as an elective research internship that can be completed during the course of the training program. Although most learners will complete the program in two years (four semesters) as full-time students, some may opt to enroll on a part-time basis, taking up to seven years to complete the degree program. Elective courses available to students in the program provide knowledge and expertise in areas relevant to infectious disease research, such as emerging infectious diseases, vaccines and vaccine development, biotechniques and laboratory research, and principles of biocontainment. The successful completion of the degree will be determined by grades obtained in the graduate courses, participation in seminars and journal clubs, and (if applicable) performance in the experiential learning component. The

degree is conferred upon successful completion of a minimum of 36.0 credits of course work.

Learning Options

The Master of Science in Infectious Disease Program is available in two learning formats. Students can enroll in the face-to-face/hybrid program and attend classes on the Center City and Queen Lane campuses of the Drexel University College of Medicine in Philadelphia. Most classes are held in the late afternoon/early evening to facilitate participation of working professionals. Required and elective courses are offered both live (face-to-face) and online, providing the student the flexibility to formulate a hybrid plan of study that includes a mix of traditional, face-to-face courses and online courses.

The online degree program, which is offered through Drexel University Online, features the same curriculum as the face-to-face/hybrid program, including the experiential research internship. Online courses are designed with activities that maximize interactions among students and faculty, including live web sessions with faculty and guest speakers.

These different program formats provide students with maximum flexibility to meet their schedule demands and accommodate their learning preferences.

Experiential Learning

A signature element of the Program is the Research Internship in Infectious Disease. The internship encompasses one of three specific areas of research in the field of infectious disease:

- basic discovery involving infectious bacterial, viral, fungal, or parasitic pathogens that cause human disease;
- translational research focused on the development of new approaches to diagnose, prevent, or treat infectious diseases; and
- clinical infectious disease research focused on infectious diseases in humans.

Most students choose to engage in a hands-on research internship consisting of a 17-week research project in a laboratory at Drexel University, another academic institution, or at a biotechnology or biopharmaceutical company. Students in the online program can make arrangements with academic or industrial institutions at their own locations rather than in the Greater Philadelphia region. Alternatively, traditional and online students may choose to engage in independent research projects with the approval and supervision of the Program Director.

Because the Research Internship in Infectious Disease is an elective course, students can instead choose to earn all 12 elective credits by completing other elective courses offered as part of the curriculum.

Program Contact Information

For more detailed information about the curriculum and program goals, please contact:

Fred Krebs, Ph.D. (Director)
Email: fck23@drexel.edu

Visit the websites for the face-to-face/hybrid and online Master of Science in Infectious Disease programs for more detailed information. For additional information regarding application deadlines, the online application process, and specific requirements for applying to the College

of Medicine, visit Drexel University's Graduate Admissions (<http://www.drexel.edu/grad/programs/ducom/infectious-disease/>) site.

Program Goals

Upon completion of the Master of Science in Infectious Disease Program, students will have achieved the following program-level goals:

1. **Develop broad core knowledge in the biological sciences.**
 - Demonstrate proficiency in fundamental concepts in molecular biology, biochemistry, and cell biology.
 - Demonstrate proficiency in these areas as they are described and applied in the primary scientific literature.
2. **Develop a working knowledge of infectious disease pathogens and the diseases that they cause.**
 - Demonstrate basic science knowledge of pathogens that cause human disease in the fields of virology, parasitology, bacteriology, mycology, and others.
 - Identify diseases caused by these pathogens and the mechanisms of pathogenesis.
 - Be able to critically analyze and evaluate publications in the primary literature that describe basic, translational, and clinical infectious disease research.
3. **Develop skills in analytical and critical thinking.**
 - Develop proficiency in critical analyses of ideas and concepts related to infectious disease research documented in the primary literature.
 - Use critical thinking skills in collegial presentations and discussions of research focused on infectious diseases and the pathogens that cause them.
4. **Develop skills in basic, translational, and/or clinical research.**
 - Develop new laboratory skills or enhance pre-existing skills.
 - Be proficient in collecting information and data from electronic source material and databases.
 - Apply analytical skills and critical thinking to data analyses.
5. **Develop professional ethics necessary for the responsible conduct of research.**
 - Be able to identify and evaluate professional ethical dilemmas, and discuss appropriate resolutions.
 - Apply professional ethical standards such as appropriate attribution of ideas, good recordkeeping, and truthful presentation of data/facts and conclusions.
6. **Develop communication and leadership skills.**
 - Be proficient at developing oral and/or written comprehensive reports, presenting facts, conducting analyses, and reaching conclusions.
 - Be proficient at using appropriate technologies for communication.
 - Be able to interact and work effectively with others in work settings involving cultural and demographic diversity.
7. **Develop other soft skills (e.g. collaboration, problem solving, career planning, networking) that facilitate career advancement and promotion.**
 - Develop a working knowledge of career opportunities in the desired field.
 - Effectively present a professional profile of oneself.
 - Be proficient at time and task management.
 - Be able to work effectively in collaborative and team-driven settings.

- Begin the development of problem-solving skills to be used in the workplace.
- Begin to establish a professional network.

Drexel Student Learning Priorities (DSLPS)

In the course of meeting these program-level goals, students will have also made progress in all of the Drexel Student Learning Priorities (DSLPS) (<http://drexel.edu/provost/assessment/outcomes/dslp/>) to help them build their futures:

Core Intellectual and Practical Skills

- Communication
- Critical and creative thinking
- Ethical reasoning
- Information literacy
- Self-directed learning
- Technology use

Experiential and Applied Learning

- Global competence
- Leadership
- Professional practice
- Research, scholarship, and creative expression
- Responsible citizenship

Admission Requirements

For acceptance into the Master of Science in Infectious Disease program, the applicant must have completed a four-year biology or chemistry-related BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

- Official transcripts from all colleges and universities attended
- A current *curriculum vitae* (cv) or resume
- References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant's undergraduate curriculum, cumulative GPA, GRE/MCAT

scores (if provided), recommendation letters, and relevant research or professional experiences.

Visit the websites for the face-to-face/hybrid and online Masters of Science in Infectious Disease programs for more detailed information. For additional information regarding application deadlines, the online application process, and specific requirements for applying to the College of Medicine, visit Drexel University's Graduate Admissions (<http://www.drexel.edu/grad/programs/ducom/infectious-disease/>) site.

Degree Requirements

Courses with an MIIM or IDPT designation are offered by the Drexel University College of Medicine and are taught on a semester schedule (fall and spring). These courses are available in traditional (face-to-face), hybrid, and/or online formats. Some of these traditional courses and hybrid courses are offered as evening classes at locations on either the Center City Campus or the Queen Lane Campus.

At least 36.0 credits are required to complete the program and earn a Master's Degree in Infectious Disease.

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
or MIIM 503S	Biomedical Ethics	
IDPT 501S	Biostatistics I	2.0
or MIIM 517S	Applied Statistics for Biomedical Sciences	
MIIM 527S	Immunology, Immunopathology and Infectious Diseases	3.0
MIIM 530S	Fundamentals of Molecular Medicine I	3.0
MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MIIM 532S	Fundamentals of Molecular Medicine III	2.0
MIIM 533S	Molecular Medicine Journal Club II	1.0
MIIM 534S	Molecular Medicine Journal Club I	1.0
MIIM 545S	Introduction to Infectious Diseases	4.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
MIIM 653S	Clinical Correlations in Infectious Disease	3.0

Electives		12.0-15.0
MIIM 521S	Biotechniques I: Molecular and Genomic Methods	
MIIM 522S	Biotechniques II: Immunological Methods	
MIIM 523S	Molecular Virology	
MIIM 524S	Vaccines and Vaccine Development	
MIIM 525S	Principles of Biocontainment	
MIIM 540S	Viruses and Viral Infections	
MIIM 541S	Bacteria and Bacterial Infections	
MIIM 542S	Mycology and Fungal Infections	
MIIM 543S	Parasitology and Parasitic Diseases	
MIIM 555S	Molecular Mechanisms of Microbial Pathogenesis	
MIIM 613S	Emerging Infectious Diseases	
MIIM 615S	Experimental Therapeutics	
MIIM 621S	Biomedical Research I	
MIIM 622S	Biomedical Research II	
MIIM 625S	Advanced Molecular Virology	
MIIM 652S	Research Internship in Infectious Disease	
MIIM 660S	Current Concepts in Molecular Medicine I	
MLAS 529S	Molecular Genetics	
Total Credits		36.0-39.0

Sample Plan of Study

First Year

Fall		Credits
Required Course(s):		
IDPT 500S	Responsible Conduct of Research	2.0
or MIIM 503S	Biomedical Ethics	
MIIM 527S	Immunology, Immunopathology and Infectious Diseases	3.0
MIIM 530S	Fundamentals of Molecular Medicine I	3.0
MIIM 534S	Molecular Medicine Journal Club I	1.0
Term Credits		9.0

Spring

Required Course(s):		
IDPT 501S	Biostatistics I	2.0
or MIIM 517S	Applied Statistics for Biomedical Sciences	
MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MIIM 533S	Molecular Medicine Journal Club II	1.0
MIIM 545S	Introduction to Infectious Diseases	4.0
Term Credits		9.0

Second Year

Fall

Required Course(s):		
MIIM 532S	Fundamentals of Molecular Medicine III	2.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
MIIM 653S	Clinical Correlations in Infectious Disease	3.0
Elective(s):		
MIIM 525S	Principles of Biocontainment	1.0
MIIM 540S	Viruses and Viral Infections	2.0
Term Credits		9.0

Spring

Elective(s):		
MIIM 524S	Vaccines and Vaccine Development	3.0
MIIM 652S	Research Internship in Infectious Disease	6.0
Term Credits		9.0

Total Credit: 36.0

First Year (Part-Time)

Fall

Required Course(s):		
IDPT 500S	Responsible Conduct of Research	2.0
or MIIM 503S	Biomedical Ethics	
MIIM 530S	Fundamentals of Molecular Medicine I	3.0
MIIM 534S	Molecular Medicine Journal Club I	1.0
Term Credits		6.0

Spring

Required Course(s):		
MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MIIM 533S	Molecular Medicine Journal Club II	1.0
MIIM 545S	Introduction to Infectious Diseases	4.0
Term Credits		7.0

Second Year (Part-Time)

Fall

Required Course(s):		
MIIM 527S	Immunology, Immunopathology and Infectious Diseases	3.0
MIIM 532S	Fundamentals of Molecular Medicine III	2.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		6.0

Spring

Required Course(s):		
IDPT 501S	Biostatistics I	2.0
or MIIM 517S	Applied Statistics for Biomedical Sciences	
Elective(s):		

MIIM 524S	Vaccines and Vaccine Development	3.0
MIIM 540S	Viruses and Viral Infections	2.0
Term Credits		7.0

Third Year (Part-Time)**Fall**

Required Course(s):		
MIIM 653S	Clinical Correlations in Infectious Disease	3.0
Elective(s):		
MIIM 525S	Principles of Biocontainment	1.0
Term Credits		4.0

Spring

Elective(s):		
MIIM 652S	Research Internship in Infectious Disease	6.0
Term Credits		6.0

Total Credit: 36.0

Interdisciplinary Health Sciences

Major: Interdisciplinary Health Sciences

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 48.0

Classification of Instructional Programs (CIP) code: 51.1099

Standard Occupational Classification (SOC) code: 29-2011; 29-2012

About the Program

The Graduate School of Biomedical Sciences and Professional Studies, Division of Pre-Medical and Pre-Health (PMPH) Programs, offers the Master of Science degree in Interdisciplinary Health Sciences (IHS). This program provides students with an opportunity to enhance their academic credentials and to succeed in challenging biomedical science courses with content relevant to their chosen healthcare profession.

IHS students complete multiple required courses throughout their first and second years. These courses provide general knowledge and training essential for a career in healthcare. Students are also offered personalized guidance from a program advisor as they select from a broad range of elective courses to best meet their needs and interests. Students entering their second year in IHS must decide upon a concentration track and complete a specified number of courses within that concentration track prior to graduation. In this way, the IHS curriculum is both flexible and structured, with the ultimate goal of reinforcing the healthcare career interests of each student.

During the second year of IHS, students complete a rigorous one-year research project. These projects teach students to communicate complex scientific information and hone their critical thinking and analysis skills. Students with a dedicated interest in biomedical research may choose to complete a mentored research project in a laboratory or clinic. Alternatively, students may choose to complete an independent literature analysis project on the biomedical topic of their choice.

Upon completion of IHS, students will have a strong, integrated view of the biomedical sciences, which provides numerous advantages to graduates, whether using the degree as a springboard for further professional education, or for direct entry into the healthcare workforce.

Students must complete a minimum of 48.0 credits to graduate, and must complete all required courses. The Master of Science degree will be awarded contingent upon satisfactory completion of all program requirements, including an earned GPA of no less than 3.0.

For more information about the program, visit the College of Medicine's MS in Interdisciplinary Health Sciences (<http://www.drexel.edu/medicine/Academics/Graduate-School/Interdisciplinary-Health-Sciences/>) page.

Admission Requirements

Applicants to the IHS program must meet the following criteria:

- Earned a minimum undergraduate math/science GPA of 2.5
- Successfully completed all pre-medical prerequisite courses
- Received MCAT scores in the 20th-50th percentile range, or minimum GRE – 50th percentile

Qualifying students participating in other PMPH Master of Science programs may have the option to transition into IHS, if healthcare career goals deem the transfer appropriate.

Applicants with lower scores may be considered if they can demonstrate recent upward academic trends, or exemplary healthcare experience or community service activities.

For more information about applying to the program, visit the College of Medicine's MS in Interdisciplinary Health Science Admissions (<http://www.drexel.edu/medicine/Academics/Graduate-School/Interdisciplinary-Health-Sciences/>) web page.

Degree Requirements

Required Courses

IHS 500S	Career Development in the Health Sciences Seminar I	1.0
IHS 501S	Career Development in the Health Sciences Seminar II	1.0
IHS 507S	Initiating Biomedical Research	2.0
IHS 508S	MIHS Research Project	1.5
IHS 509S	MIHS Research Paper	1.5
IHS 510S	Introductory Biostatistics	3.0
IHS 513S	Scientific Writing for Healthcare Professionals	2.0
MSPP 525S	Community Dimensions of Medicine	2.0
Concentration Courses and Electives *		34.0
Total Credits		48.0

* Number of elective credits may vary depending on concentration selected.

Concentrations:

Biochemical and Pharmacologic Principles**Select six of the following:**

CR 614S	Introduction to Clinical Pharmacology	3.0
IHS 502S	Neuropharmacology	3.0
IHS 514S	Molecular Biology & Biochemistry of the Cell	3.0
IHS 525S	Human Nutrition	3.0
IHS T580S	Special Topics in Interdisciplinary Health Science *	3.0
MFSP 551S	Human Function	3.0
MFSP 557S	Drug Chemistry	2.0
MFSP 580S	Principles of Immunology	2.0
MLAS 529S	Molecular Genetics	3.0
MSPA 580S	Medical Microbiology I	4.0
MSPA 581S	Medical Microbiology II	3.0
MSPP 515S	Advanced Human Physiology	4.0
MSPP 511S	Concepts in Biochemistry and Cell Biology	4.0
PHRM 512S	Graduate Pharmacology	3.0

Concepts in Anatomy and Pathology**Select six of the following:**

CR 500S	Epidemiology	3.0
FCA 510S	Gross Human Skeletal Biology	3.0
IHS 514S	Molecular Biology & Biochemistry of the Cell	3.0
IHS 525S	Human Nutrition	3.0
IHS T580S	Special Topics in Interdisciplinary Health Science *	3.0
MFSP 551S	Human Function	3.0
MFSP 554S	Principles of Forensic Pathology	3.0
MFSP 556S	Forensic Anthropology and Topics in Human Identification	3.0
MFSP 580S	Principles of Immunology	2.0
MFSP 584S	Introduction to Forensic Radiology	2.0
MLAS 531S	Embryology	3.0
MLAS 536S	Animal Models for Biomedical Research	1.0
MLAS 545S	Fundamentals of Histology	3.0
MSPP 511S	Concepts in Biochemistry and Cell Biology	4.0
MSPP 513S	Advanced Human Anatomy	4.0
MSPP 515S	Advanced Human Physiology	4.0

Laboratory Techniques**Required courses for this concentration**

IHS 522S	Enhanced Laboratory Investigation I	2.0
IHS 523S	Enhanced Laboratory Investigation II	2.0

Select four of the following:

BIOT 502S	Group Dynamics in STEM	3.0
BIOT 503S	Professional Portfolio Development	2.0
CR 505S	Ethical Issues in Research	3.0
CR 511S	The History of Misconduct in Biomedical Research	3.0
CR 515S	Intro to Clinical Trials	3.0
CR 565S	Contemporary Issues in Human Research Protection	3.0
CR 600S	Designing the Clinical Trial	3.0
CR 612S	Fundamentals of Compliance	3.0
MFSP 556S	Forensic Anthropology and Topics in Human Identification	3.0
MFSP 577S	Genetics for the Forensic Scientist	2.0
MFSP 578S	Forensic Photography	3.0
MFSP 579S	Forensic Microbiology	2.0
MFSP 589S	Forensic DNA Analysis	4.0
MFSP T580S	Special Topics in Forensic Science *	3.0
MLAS 523S	Organizational Management	3.0
MLAS 525S	Animal Anatomy	2.0
MLAS 535S	Biology & Care Of Lab Animals	4.0
MLAS 536S	Animal Models for Biomedical Research	1.0
MLAS 545S	Fundamentals of Histology	3.0
MLAS 610S	Diseases of Laboratory Animals	3.0
MSPA 520S	Medical Terminology	3.0
MSPA 580S	Medical Microbiology I	4.0
MSPA 581S	Medical Microbiology II	3.0
MSPP 505S	Laboratory Techniques in Biochemistry & Molecular Biology	2.0

Medical Science**Required Courses for this Concentration**

IMSP 502S	Medicine and Society	3.0
IMSP 506S	Medical Professionalism and Leadership	3.0
IMSP 513S	Medical Biochemistry	8.0
IMSP 522S	Medical Physiology I	3.5
IMSP 523S	Medical Physiology II	3.5
IMSP 542S	Medical Microanatomy I	5.0
IMSP 543S	Medical Microanatomy II	3.0
IMSP 562S	Medical Neuroanatomy	6.0

Optional

IMSP 544S	Medical Immunology I	1.5
IMSP 545S	Medical Immunology II	1.5
IMSP 552S	Medical Nutrition	1.0

Additional Electives

CR 609S	Innovative Product Development	3.0
IHS 515S	Exploring Diversity in Healthcare	2.0
IHS 516S	Strategic Communication and Professional Development	2.0
MFSP 558S	Instrumental Analysis	2.0
MFSP 567S	Basic Techniques for the Analysis of Biomolecules	3.0
MFSP 581S	Human Osteology and Calcified Tissue Biology I	3.0
MFSP 582S	Human Osteology and Calcified Tissue Biology II	2.0
MFSP 585S	Clinical Forensic Emergency Medicine and Traumatology	2.0
MFSP 586S	Introduction to Forensic Pediatrics	3.0
MFSP 587S	Introduction to Forensic Psychology	2.0
MFSP 588S	Advanced Topics in Cell Biology	2.0

* Please see your advisor for the course numbers and topics that are acceptable.

Sample Plan of Study

First Year

Fall		Credits
IHS 500S	Career Development in the Health Sciences Seminar I	1.0
IHS 510S	Introductory Biostatistics	3.0
IHS 513S	Scientific Writing for Healthcare Professionals	2.0
	Minimum of 6.0 additional credits selected from list of electives in conjunction with program director	6.0
	Term Credits	12.0

Spring

IHS 501S	Career Development in the Health Sciences Seminar II	1.0
MSPP 525S	Community Dimensions of Medicine	2.0
IHS 507S***	Initiating Biomedical Research	2.0
	Minimum of 6.0 additional credits selected from list of electives in conjunction with program director	6.0
	Term Credits	11.0

Second Year

Fall		
IHS 508S	MIHS Research Project	1.5
	Additional credits selected from list of electives in conjunction with program director, with at least 5.0 credits coming from concentration track [†]	10.0
	Term Credits	11.5
Spring		
IHS 509S	MIHS Research Paper	1.5
	Additional credits selected from list of electives in conjunction with program director, with at least 5.0 credits coming from concentration track [†]	12.0
	Term Credits	13.5

Total Credit: 48.0

* Students taking the Medical Sciences track are also required to take all IMS fall courses except for IMSP 544S, IMSP 545S, IMSP 552S.

** Please see your advisor for acceptable course numbers.

*** Students may also take this course in the Fall of Year two with approval of the Program Director.

† Number of credits is only a suggestion and may be split differently between Semesters.

Laboratory Animal Science

Major: Laboratory Animal Science

Degree Awarded: Master of Laboratory Animal Science (MLAS)

Calendar Type: Semester

Total Credit Hours: 49.0

Classification of Instructional Programs (CIP) code: 01.0999

Standard Occupational Classification (SOC) code: 19-1011

About the Program

The Graduate School of Biomedical Sciences and Professional Studies offers the Master of Laboratory Animal Science (MLAS) degree. The MLAS program is designed for individuals who have a bachelor's degree in animal science or a related field and who are seeking advanced career positions in laboratory animal science and laboratory animal facility management. Alternatively, the MLAS degree is also a powerful means to enhance students' credentials for admission to veterinary medical school.

The MLAS program is a full-time, two-year program that begins in August of each year. The first two years of the program consists primarily of classroom instruction, while the last semester is reserved for experiential learning. The program is flexible for traditional and non-traditional students alike due to the availability of evening courses.

Available Online

For individuals who are currently working in the laboratory animal science field, the MLAS program is available online as well. Please review our website (<http://www.drexel.edu/medicine/Academics/Graduate-School/Master-of-Laboratory-Animal-Science/Online-MLAScience/>) for specific details about the online program.

Curriculum

The MLAS curriculum consists of basic science courses, laboratory animal science courses, and a practicum. The basic science courses were designed to build a solid foundation required for a successful career in laboratory animal science. The laboratory animal science courses focus on all aspects of laboratory animal science, including facility management. The practicum provides the student with the opportunity to apply the theoretical knowledge they have learned to the field of Laboratory Animal Science. The outcome is a highly trained laboratory animal science professional with a solid foundation in the sciences.

Pre-Veterinary Graduate Minor

Students desiring to attend veterinary medical school have the option to elect to complete a pre-vet minor (<http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences/preveterinarygminor/>) within the Master of Laboratory Animal Science (MLAS) program. The addition of these courses to the MLAS program will help to further enhance the student's application to veterinary medical school by providing additional rigorous and relevant graduate level coursework.

Practicum

MLAS faculty and administration assist the students in identifying and securing practicum sites at universities, biotechnology organizations, and pharmaceutical companies. Practicum sites are available in Pennsylvania, New Jersey, New York, Delaware, Virginia, Kentucky, North Carolina, and Texas. The list expands every year. In many instances, the practicum sites have offered our students a permanent position within their organization upon completion of the MLAS degree.

Career Opportunities

MLAS graduates hold positions in laboratory animal facilities of universities, biotechnology companies, government agencies, and pharmaceutical companies. There they serve as veterinarians, supervisors, managers, IACUC administrators, trainers, educators, consultants, and sales representatives.

Veterinary Medical School

Successful completion of the MLAS program can also significantly improve a student's academic credentials for application to veterinary medical school. Please review our website (<http://www.drexel.edu/medicine/Academics/Graduate-School/Master-of-Laboratory-Animal-Science/>) for a comprehensive list of veterinary medical schools that have been attended by MLAS alumni.

Additional Information

Erin Vogelsong
Program Director, MLAS
Assistant Professor
Graduate School of Biomedical Sciences and Professional Studies
College of Medicine
Drexel University
245 N. 15th St., Room 15305
Philadelphia, PA 19102
Tel. 215.762.7968 | Fax: 215-762-7961
Erin.Vogelsong@Drexel.edu | drexel.edu/medicine (<http://drexel.edu/medicine/>)

Admission Requirements

Students will be selected on the basis of adequate educational background and veterinary/ research/ animal care experience.

Prerequisite coursework includes: chemistry, biology, organic chemistry, and physics.

Candidates for admission must provide the following credentials:

- Bachelor's degree from an accredited U.S. college or university
- Cumulative GPA of 3.0 or higher
- General Graduate Record Exam (GRE) scores at or above the 50th percentile in all areas obtained within the last 5 years
- Official transcript from all post-secondary institutions attended
- Three letters of reference, two must be from science professors
- Personal statement stating the applicant's academic and professional goals

The deadline for submission of applications is the second Friday in July of the year the student seeks admission.

Contact Information:

Erin Vogelsong
Program Director, MLAS
Assistant Professor
Graduate School of Biomedical Sciences and Professional Studies
College of Medicine
Drexel University
245 N. 15th St., Room 15305
Philadelphia, PA 19102
Tel. 215.762.7968 | Fax: 215-762-7961
Erin.Vogelsong@Drexel.edu | drexel.edu/medicine (<http://drexel.edu/medicine/>)

Degree Requirements

The MLAS degree can be completed full-time in two years and one summer practicum, or part-time in three or less years. Students must

successfully complete a minimum of 49.0 credit hours for graduation. A minimum grade point average of 3.0 is required for graduation as well as grades of "C" or better.

Required Courses

MLAS 501S	Laboratory Animal Seminar	2.0
MLAS 503S	The Institutional Animal Care and Use Committee's (IACUC) Role in Animal Research	3.0
MLAS 510S	Clinical Orientation In Laboratory Animal Facilities	1.0
MLAS 520S	Financial Mgmt In Lab Anim Sci	3.0
MLAS 521S	Arch Eng & Plan For Anim Fac	4.0
MLAS 523S	Organizational Management	3.0
MLAS 525S	Animal Anatomy	2.0
MLAS 535S	Biology & Care Of Lab Animals	4.0
MLAS 536S	Animal Models for Biomedical Research	1.0
MLAS 606S	Clinical Laboratory Techniques and Concepts	1.0
MLAS 610S	Diseases of Laboratory Animals	3.0
MLAS 801S	Laboratory Animal Practicum	12.0
MSPA 580S	Medical Microbiology I	4.0

Electives

Students must select a minimum of 6.0 credits from the following: 6.0

IHS 514S	Molecular Biology & Biochemistry of the Cell	
MLAS 500S	Animal Nutrition	
MLAS 502S	Occupational Safety and Health in Laboratory Animal Care and Use Programs	
MLAS 504S	Public Outreach for Animal Research	
MLAS 513S	Biochemical Basis of Disease (Upenn)	
MLAS 514S	Hematopoiesis (Upenn)	
MLAS 529S	Molecular Genetics	
MLAS 530S	Biostats In Vet Science	
MLAS 531S	Embryology	
MLAS 545S	Fundamentals of Histology	
MSPP 511S	Concepts in Biochemistry and Cell Biology	
PHGY 503S	Graduate Physiology	
PHRM 512S	Graduate Pharmacology	

Total Credits 49.0

Sample Plan of Study**Online MLAS Plan of Study****First Year (Part-Time)**

Fall		Credits
MLAS 510S	Clinical Orientation In Laboratory Animal Facilities	1.0
MLAS 801S ⁺	Laboratory Animal Practicum	12.0
MSPA 580S	Medical Microbiology I	4.0
	Term Credits	17.0
Spring		
MLAS 520S	Financial Mgmt In Lab Anim Sci	3.0
MLAS 523S	Organizational Management	3.0
	Term Credits	6.0

Second Year (Part-Time)

Fall		Credits
MLAS 525S	Animal Anatomy	2.0
MLAS Elective		3.0
	Term Credits	5.0
Spring		
MLAS 503S	The Institutional Animal Care and Use Committee's (IACUC) Role in Animal Research	3.0
MLAS 535S	Biology & Care Of Lab Animals	4.0
	Term Credits	7.0

Third Year (Part-Time)

Fall		Credits
------	--	---------

MLAS 606S	Clinical Laboratory Techniques and Concepts	1.0
MLAS 610S	Diseases of Laboratory Animals	3.0
MLAS Elective		3.0
	Term Credits	7.0

Spring

MLAS 501S	Laboratory Animal Seminar	2.0
MLAS 521S	Arch Eng & Plan For Anim Fac	4.0
MLAS 536S	Animal Models for Biomedical Research	1.0
	Term Credits	7.0

Total Credit: 49.0

* Students will be able to satisfy this requirement with relevant laboratory animal science experience.

On Campus (Face-to-Face) MLAS Plan of Study**First Year**

Fall		Credits
MLAS 510S	Clinical Orientation In Laboratory Animal Facilities	1.0
MLAS 523S	Organizational Management	3.0
MLAS 536S	Animal Models for Biomedical Research	1.0
MSPA 580S	Medical Microbiology I	4.0
	Term Credits	9.0

Spring

MLAS 520S	Financial Mgmt In Lab Anim Sci	3.0
MLAS 535S	Biology & Care Of Lab Animals	4.0
MLAS Elective ⁺		3.0
	Term Credits	10.0

Second Year

Fall		Credits
MLAS 525S	Animal Anatomy	2.0
MLAS 606S	Clinical Laboratory Techniques and Concepts	1.0
MLAS 610S	Diseases of Laboratory Animals	3.0
MLAS Elective ⁺		3.0
	Term Credits	9.0

Spring

MLAS 501S	Laboratory Animal Seminar	2.0
MLAS 521S	Arch Eng & Plan For Anim Fac	4.0
MLAS 503S	The Institutional Animal Care and Use Committee's (IACUC) Role in Animal Research	3.0
MLAS 801S ^{**}	Laboratory Animal Practicum	12.0
	Term Credits	21.0

Total Credit: 49.0

* Students must choose a minimum of 2 elective courses to reach the 49.0 total credits.

** Students will begin their practicum in the spring, but it may continue into the summer depending on their location.

Medical Science

Major: Medical Science

Degree Awarded: Master of Science (MS) or Medical Doctor/Master of Science (MD/MS)

Calendar Type: Semester

Total Credit Hours: 62.0 (MS); 30 (MD/MS)

Classification of Instructional Programs (CIP) code: 26.9999

Standard Occupational Classification (SOC) code: 11-9121

About the MS Program

The Master of Science in Medical Science (MMS) program is a rigorous, direct-entry two-year degree program that couples a challenging and rich curriculum with engaged and personalized student advisement.

The program is designed to provide talented students with both medical knowledge and research competencies.

The first and second years of study focus on honing different skill sets. This sequence allows students to develop strong, well-rounded academic portfolios and become competitive candidates for seats in medical school or as they continue their graduate medical education.

About the MD/MS Program

The MD-MS in Medical Science (MD-MS) dual-degree program is designed to prepare physician scientists for careers as lifetime learners. The program is built on the foundation that clinical medicine and biomedical research enjoy a unique synergy. Physician scientists are uniquely poised to recognize, understand, apply, and expand clinical applications of basic research or identify novel or emerging areas of scientific inquiry that are needed to support clinical efforts.

The MD-MS degree in Medical Science would accept Drexel medical students who are in good academic standing following completion of the required medical school coursework as outlined in the plan of study and transfer them into the Graduate School of Biomedical Sciences and Professional Studies where they would be enrolled in the second year of the MMS program. At the end of this year, if they successfully complete MMSP 501S, MMSP 502S, MMSP 503S, and MMSP 504S, as well as Responsible Conduct in Research, these students are eligible for the Master of Science in Medical Science.

At the conclusion of this one year course of study, students will transfer back to the medical school to complete their requirements for the MD degree.

Additional Information

Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
245 North 15th Street, Mail Stop 344, Room 4104 NCB
Philadelphia, PA 19102
215.762.4692
medicalsciences@drexelmed.edu

Degree Requirements (MS)

Students must satisfactorily complete all coursework and conduct a full year of either bench-top or clinical research with a Primary Investigator. Successful completion of the program requires a minimum GPA of 3.0.

IMSP 502S	Medicine and Society	3.0
IMSP 506S	Medical Professionalism and Leadership	3.0
IMSP 513S	Medical Biochemistry	8.0
IMSP 522S	Medical Physiology I	3.5
IMSP 523S	Medical Physiology II	3.5
IMSP 542S	Medical Microanatomy I	5.0
IMSP 543S	Medical Microanatomy II	3.0
IMSP 562S	Medical Neuroanatomy	6.0
MMSP 503S	Research Seminar I	3.0
MMSP 504S	Research Seminar II	3.0
MMSP 501S	Research in Medical Science I	6.0

MMSP 502S	Research in Medical Science II	6.0
Select one statistics course from the following:		3.0
CR 520S	Applications of Clinical Research Biostatistics	
MLAS 530S	Biostats In Vet Science	
IHS 510S	Introductory Biostatistics	
Optional		
IMSP 544S	Medical Immunology I	
IMSP 545S	Medical Immunology II	
IMSP 552S	Medical Nutrition	
Electives		6.0
CR 505S	Ethical Issues in Research	
CR 515S	Intro to Clinical Trials	
CR 525S	Scientific Writing and Medical Literature	
CR 535S	Current Federal Regulatory Issues in Biomedical Research	
CR 565S	Contemporary Issues in Human Research Protection	
CR 600S	Designing the Clinical Trial	
CR 609S	Innovative Product Development	
CR 612S	Fundamentals of Compliance	
CR 614S	Introduction to Clinical Pharmacology	
CR 617S	Informatics in Pharm Res & Development	
IHS 505S	Healthcare in Spanish I	
IHS 506S	Healthcare in Spanish II	
IHS 511S	Biology of Cancer	
MFSP 583S	The Autopsy in Clinical Forensic Medicine	
MFSP 584S	Introduction to Forensic Radiology	
MFSP 585S	Clinical Forensic Emergency Medicine and Traumatology	
MFSP 586S	Introduction to Forensic Pediatrics	
MFSP 589S	Forensic DNA Analysis	
MFSP 581S	Human Osteology and Calcified Tissue Biology I	
MFSP 582S	Human Osteology and Calcified Tissue Biology II	
MLAS 523S	Organizational Management	
MLAS 529S	Molecular Genetics	
MLAS 531S	Embryology	
MSPP 513S	Advanced Human Anatomy	
PHRM 512S	Graduate Pharmacology	
MMSP 520S	Medical Pathology I	
MMSP 521S	Medical Pathology II	
Total Credits		62.0

Degree Requirements (MD/MS)

MMSP 501S	Research in Medical Science I	6.0
MMSP 502S	Research in Medical Science II	6.0
MMSP 503S	Research Seminar I	3.0
MMSP 504S	Research Seminar II	3.0
IDPT 500S	Responsible Conduct of Research	2.0
Transfer credits from MD program		10.0
Total Credits		30.0

Sample Plan of Study (MS)

First Year		
Fall		Credits
IMSP 513S	Medical Biochemistry	8.0
IMSP 522S	Medical Physiology I	3.5
IMSP 542S	Medical Microanatomy I	5.0
IMSP 502S	Medicine and Society	3.0
Optional		
IMSP 544S	Medical Immunology I	
Term Credits		19.5
Spring		
IMSP 523S	Medical Physiology II	3.5

IMSP 543S	Medical Microanatomy II	3.0
IMSP 506S	Medical Professionalism and Leadership	3.0
IMSP 562S	Medical Neuroanatomy	6.0
Optional		
IMSP 552S	Medical Nutrition	
IMSP 545S	Medical Immunology II	
Term Credits		15.5
Second Year		
Fall		
MMSP 503S	Research Seminar I	3.0
MMSP 501S	Research in Medical Science I	6.0
Term Credits		9.0
Spring		
MMSP 504S	Research Seminar II	3.0
MMSP 502S	Research in Medical Science II	6.0
A statistics course*		3.0
Minimum of 6 additional graduate level science credits from list of electives*		6.0
Term Credits		18.0
Total Credit: 62.0		

* Can be taken in either the fall or spring semester of second year

Sample Plan of Study (MD/MS)

Second Year		Credits
Fall		
MMSP 501S	Research in Medical Science I	6.0
MMSP 503S	Research Seminar I	3.0
IDPT 500S	Responsible Conduct of Research	2.0
Transfer credits from MD program		10.0
Term Credits		21.0
Spring		
MMSP 502S	Research in Medical Science II	6.0
MMSP 504S	Research Seminar II	3.0
Term Credits		9.0
Total Credit: 30.0		

Medical and Healthcare Simulation

Major: Medical Healthcare Simulation

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 39.0

Classification of Instructional Programs (CIP) code: 51.1199

Standard Occupational Classification (SOC) code: 11-9121

About the Program

The goal of the MS in Medical Healthcare Simulation program is to educate healthcare professionals using simulation based methodology to bring a new level of standards and rigor in addition to creating new leaders to help shape the future of simulation education. The MS in Medical Healthcare Simulation program is a combination of both required and elective graduate courses, together with an intensive immersive educational experience. The majority of the educational experience will occur via an e-learning experience with three one-week mandatory in person simulation laboratory experiences.

Program Delivery

The curriculum is planned for a two-year time frame with each group to complete the curriculum as a cohort. However, the program may be extended, if appropriate, to accommodate part-time students or potential conflicts that might arise. These decisions will be determined by the program directors and in consultation with the student's mentor/advisor.

Admission Requirements

For acceptance into the MS in Medical and Healthcare Simulation program, the applicant must have, at a minimum, completed a four-year bachelor's degree, nursing degree program or equivalent, with a preferred GPA of 3.0 and must also have fulfilled all of the requirements for consideration as defined by the program committee.

All students must submit three confidential letters of evaluation and all previous official educational transcripts. If you have taken any standardized test, such as GRE and MCAT, the scores must be submitted for review. No standardized test is required for admission at this time. Each student will be assessed holistically based on the requirements by the program's committee.

As the degree program is directed toward medical simulation the background in medical care is required. The applicant must have graduated from medical school, or have a nursing or Bachelor's Degree or other health professional training (approved by the program director on individual basis) with an interest in simulation. A record of achievement in medical education, as provided by letters of reference, publications, teaching evaluations, or prior specialized training or experience in medical education is desired, but not required.

Degree Requirements

Required Courses

MSMS 501S	Simulation Curriculum and Design I	3.0
MSMS 503S	Biostatistics in Healthcare Literature	3.0
MSMS 504S	Principles of Assessment: Measurement Theory, Assessment Principles & Tools	3.0
MSMS 506S	Debriefing in Simulation	3.0
MSMS 701S	Simulation Laboratory Practicum I	4.0
MSMS 702S	Simulation Laboratory Practicum II	4.0
MSMS 703S	Simulation Laboratory Practicum III	4.0
MSMS 801S	Capstone	1.0
MSMS 802S	Capstone Project Implementation	2.0

Elective Courses

Students must select a minimum of 12 credits from the following:		12.0
CR 510S	Sponsored Projects Finance	
CR 525S	Scientific Writing and Medical Literature	
CR 550S	Leadership Skills	
CR 635S	Strategic Planning	
MSMS 505S	Standardized Patient Course	
MSMS 507S	High Fidelity, Low Fidelity and Task Trainers	
MSMS 508S	Interprofessional Education	
MSMS 509S	Fundamentals of Simulation Program Administration	
MSMS 511S	Patient Safety and Simulation	
MSMS 600S	Adult Learning in Healthcare	
MSMS I899S	MSMS Independent Study	

Total Credits 39.0

Sample Plan of Study

First Year (Part-Time)

Term 1		Credits
MSMS 701S	Simulation Laboratory Practicum I	4.0
MSMS 501S	Simulation Curriculum and Design I	3.0
Term Credits		7.0
Term 2		
MSMS 504S	Principles of Assessment: Measurement Theory, Assessment Principles & Tools	3.0
MSMS 506S	Debriefing in Simulation	3.0
Term Credits		6.0
Term 3		
MSMS 503S	Biostatistics in Healthcare Literature	3.0
MSMS 801S	Capstone	1.0
MSMS 802S	Capstone Project Implementation	2.0
Term Credits		6.0

Second Year (Part-Time)

Term 4		Credits
MSMS 702S	Simulation Laboratory Practicum II	4.0
MSMS Simulation in Healthcare Electives*		3.0
Term Credits		7.0
Term 5		
MSMS 703S	Simulation Laboratory Practicum III	4.0
MSMS Simulation in Healthcare Electives		3.0
Term Credits		7.0
Term 6		
MSMS Simulation in Healthcare Electives*		6.0
Term Credits		6.0

Total Credit: 39.0

* For a list of Medical and Healthcare Simulation electives, view the program's degree requirements.

Microbiology and Immunology

Major: Microbiology and Immunology

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Semester

Total Credit Hours: 46.0 (MS, non-thesis); 55.0 (MS, thesis); 131.0 (PhD)

Classification of Instructional Programs (CIP) code: 26.0599

Standard Occupational Classification (SOC) code: 19-1022

About the Program

The Department of Microbiology and Immunology offers students MS and PhD degrees. The programs are designed to promote understanding of the molecular mechanisms of infectious diseases. The department has research programs in the areas of parasitic, viral, and opportunistic infections; bacterial pathogenesis and genomics; inflammation and immunology; and drug development driven by investigators with national and international reputations and with extended histories of extramural funding from the NIH, as well as other sources of funding. Students are provided with a curriculum of integrated courses that include the essentials for biomedical research as well as courses that emphasize host-pathogen interactions through a molecular pathogenesis series of courses on viruses, bacteria, fungi, and parasites, as well as immunology. Upon completing these programs, students pursue careers in academic, governmental, or industrial settings.

MS in Microbiology and Immunology

The MS program provides students a broad background in microbiology and immunology and the techniques used in microbiology and immunology research. There are both a thesis and non-thesis option for an MS degree. The thesis option combines course-work with a novel research project. The non-thesis degree program allows students to earn the degree without a research project by taking additional classes and writing a literature review paper. Students who wish to continue their graduate training after the MS degree may apply to the PhD program, and their credits may be applied to the doctoral program. The average amount of time to completion is two years.

PhD in Microbiology and Immunology

The PhD program trains individuals to conduct independent hypothesis-driven research and to teach in the fields of microbiology and immunology. The program includes two years of coursework as well as original research leading to published thesis work. Laboratory rotations begin in the fall of the first year. The average amount of time to completion is five years.

For more information, including scheduling a plan of study, visit the College of Medicine's Microbiology and Immunology Program (<https://drexel.edu/medicine/academics/graduate-school/microbiology-immunology/>) website.

Admission Requirements

Students interested in all types of pathogens (viral, bacterial, fungal, parasitic) and the host response to these interactions are encouraged to apply. There are no minimal requirements, but applicants should be competitive with regard to grades, GRE scores, research experience, and letters of recommendation. Applicants are encouraged to use email to contact the program director or any of the faculty of the program with whom they may share scientific interests to discuss their suitability to the program and/or potential projects in relevant laboratories.

The Drexel University College of Medicine: School of Biomedical Sciences and Professional Studies has a rolling admissions policy, which means that complete applications are reviewed as they are received. Applicants are therefore advised to apply early, as decisions to accept or deny admission may be made before the official deadlines.

To learn more about applying to the Microbiology and Immunology program please visit the Microbiology and Immunology Program specific website (<http://drexel.edu/medicine/academics/graduate-school/microbiology-immunology/how-to-apply/>).

To learn more about applying to Drexel College of Medicine programs, please visit the College of Medicine's Graduate School of Biomedical Sciences and Professional Studies (<http://www.drexel.edu/medicine/Academics/Graduate-School/>) (<http://drexel.edu/medicine/academics/graduate-school/>) website.

Non-Thesis Option

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0

MIIM 502S	Microbiology and Immunology Journal Club *	4.0
MIIM 508S	Immunology I	3.0
MIIM 512S	Molecular Pathogenesis I (Viral Pathogenesis)	2.0
MIIM 513S	Molecular Pathogenesis II	3.0
MIIM 606S	Microbiology and Immunology Seminar *	4.0
Advanced Electives		9.0

Select a minimum of nine credits of Advanced Electives.

MIIM 504S	Microbiology and Immunology 1st Rotation	
MIIM 514S	Grant Building	
MIIM 524S	Vaccines and Vaccine Development	
MIIM 528S	Structural Bioinformatics	
MIIM 555S	Molecular Mechanisms of Microbial Pathogenesis	
MIIM 607S	Immunology II	
MIIM 613S	Emerging Infectious Diseases	
MIIM 615S	Experimental Therapeutics	
MIIM 625S	Advanced Molecular Virology	
MIIM 630S	Advanced Molecular Biology	

General Electives

IDPT 507S	Teaching Practicum I	
IDPT 508S	Teaching Practicum II	
IDPT 509S	Teaching Practicum III	
MIIM 505S	Microbiology and Immunology 2nd Rotation	
MIIM 506S	Microbiology and Immunology 3rd Rotation	
MIIM 600S	Microbiology and Immunology Thesis Research	

Total Credits 45.0

* Taken each semester.

Thesis Option

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
MIIM 502S	Microbiology and Immunology Journal Club *	4.0
MIIM 504S	Microbiology and Immunology 1st Rotation	4.0
MIIM 508S	Immunology I	3.0
MIIM 512S	Molecular Pathogenesis I (Viral Pathogenesis)	2.0
MIIM 513S	Molecular Pathogenesis II	3.0
MIIM 600S	Microbiology and Immunology Thesis Research **	18.0
MIIM 606S	Microbiology and Immunology Seminar *	4.0

General Electives

IDPT 507S	Teaching Practicum I	
IDPT 508S	Teaching Practicum II	
IDPT 509S	Teaching Practicum III	
IDPT 600S	Thesis Defense	
MIIM 505S	Microbiology and Immunology 2nd Rotation	
MIIM 506S	Microbiology and Immunology 3rd Rotation	
MIIM 514S	Grant Building	
MIIM 524S	Vaccines and Vaccine Development	
MIIM 528S	Structural Bioinformatics	
MIIM 555S	Molecular Mechanisms of Microbial Pathogenesis	
MIIM 607S	Immunology II	
MIIM 612S	Molecular Mechanisms of Viral Pathogenesis	
MIIM 613S	Emerging Infectious Diseases	
MIIM 615S	Experimental Therapeutics	
MIIM 625S	Advanced Molecular Virology	

MIIM 630S	Advanced Molecular Biology	
Total Credits		54.0

* Taken each semester.

** Taken each semester starting in the Second Year, until Thesis Defense

Students may opt to take additional approved advanced or general electives in consultation with their advisor, but these are not required.

Additional courses from the Biograduate Medical programs may be taken as electives. Students should check with the College of Medicine's Graduate School of Biomedical Sciences and Professional Studies programs. (<http://drexel.edu/medicine/academics/graduate-school/>)

PhD Degree Requirements

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 600S	Thesis Defense	9.0
MIIM 502S	Microbiology and Immunology Journal Club *	9.0
MIIM 504S	Microbiology and Immunology 1st Rotation	4.0
MIIM 505S	Microbiology and Immunology 2nd Rotation	4.0
MIIM 506S	Microbiology and Immunology 3rd Rotation	4.0
MIIM 508S	Immunology I	3.0
MIIM 512S	Molecular Pathogenesis I (Viral Pathogenesis)	2.0
MIIM 513S	Molecular Pathogenesis II	3.0
MIIM 514S	Grant Building	2.0
MIIM 600S	Microbiology and Immunology Thesis Research **	63.0
MIIM 606S	Microbiology and Immunology Seminar *	9.0

Advanced Electives

Choose at least two Advanced Electives for a minimum of four credits		4.0-6.0
MIIM 528S	Structural Bioinformatics	
MIIM 555S	Molecular Mechanisms of Microbial Pathogenesis	
MIIM 607S	Immunology II	
MIIM 612S	Molecular Mechanisms of Viral Pathogenesis	
MIIM 613S	Emerging Infectious Diseases	
MIIM 615S	Experimental Therapeutics	
MIIM 625S	Advanced Molecular Virology	
MIIM 630S	Advanced Molecular Biology	

General Electives

IDPT 507S	Teaching Practicum I	
IDPT 508S	Teaching Practicum II	
IDPT 509S	Teaching Practicum III	

Total Credits 132.0-134.0

* Taken each semester until Thesis Defense

** Taken each semester starting in Year two until Thesis Defense

Sample Plan of Study

Non-Thesis Option

First Year

Fall		Credits
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0

MIIM 508S	Immunology I	3.0
MIIM 512S	Molecular Pathogenesis I (Viral Pathogenesis)	2.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		13.0

Spring

IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 513S	Molecular Pathogenesis II	3.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		11.0

Second Year**Fall**

IDPT 500S	Responsible Conduct of Research	2.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Advanced Elective		6.0
Term Credits		10.0

Spring

IDPT 501S	Biostatistics I	2.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Advanced Elective		3.0
Term Credits		11.0

Total Credit: 45.0

Thesis Option**First Year****Fall**

IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 504S	Microbiology and Immunology 1st Rotation	4.0
MIIM 508S	Immunology I	3.0
MIIM 512S	Molecular Pathogenesis I (Viral Pathogenesis)	2.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		17.0

Spring

IDPT 501S	Biostatistics I	2.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 513S	Molecular Pathogenesis II	3.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		13.0

Second Year**Fall**

IDPT 500S	Responsible Conduct of Research	2.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 600S	Microbiology and Immunology Thesis Research	9.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		13.0

Spring

MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 600S	Microbiology and Immunology Thesis Research	9.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		11.0

Total Credit: 54.0

Sample Plan of Study (PhD)**First Year**

Fall		Credits
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 504S	Microbiology and Immunology 1st Rotation	4.0
MIIM 508S	Immunology I	3.0
MIIM 512S	Molecular Pathogenesis I (Viral Pathogenesis)	2.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		17.0

Spring

IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 505S	Microbiology and Immunology 2nd Rotation	4.0
MIIM 506S	Microbiology and Immunology 3rd Rotation	4.0
MIIM 513S	Molecular Pathogenesis II	3.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		19.0

Second Year**Fall**

IDPT 501S	Biostatistics I	2.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 600S	Microbiology and Immunology Thesis Research	9.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Advanced Elective(s)		2.0-3.0
Term Credits		15.0-16.0

Spring

IDPT 500S	Responsible Conduct of Research	2.0
MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 514S	Grant Building	2.0
MIIM 600S	Microbiology and Immunology Thesis Research	9.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Advanced Elective(s)		2.0-3.0
Term Credits		17.0-18.0

Third Year**Fall**

MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 600S	Microbiology and Immunology Thesis Research	9.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		11.0

Spring

MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 600S	Microbiology and Immunology Thesis Research	9.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		11.0

Fourth Year**Fall**

MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 600S	Microbiology and Immunology Thesis Research	9.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		11.0

Spring

MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 600S	Microbiology and Immunology Thesis Research	9.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		11.0

Fifth Year**Fall**

MIIM 502S	Microbiology and Immunology Journal Club	1.0
MIIM 600S	Microbiology and Immunology Thesis Research	9.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Term Credits		11.0
Spring		
IDPT 600S	Thesis Defense	9.0
Term Credits		9.0

Total Credit: 132.0-134.0

Molecular and Cell Biology and Genetics

Major: Molecular and Cell Biology and Genetics

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Semester

Total Credit Hours: 38.5 (MS, non-thesis); 63.5 (MS, thesis); 96.0 (PhD)

Classification of Instructional Programs (CIP) code: 26.0210

Standard Occupational Classification (SOC) code: 11-9121

About the Program

The interdisciplinary, research-oriented Molecular and Cell Biology and Genetics program offers both MS and PhD degrees. The program provides a broad education-training program for graduate students interested in biomedical problems that cross disciplinary boundaries and offers the opportunity for students to choose from approximately 60 faculty members in 10 different departments/centers to pursue their research interests. Our curriculum and research activities are tailored to students' needs and interests. Consequently, students can pursue a diverse variety of projects that range from the design and development of new therapeutic treatment strategies to the characterization of the molecular mechanisms that underlie various cellular processes and diseases. This intensive and research-oriented program provides students with opportunities to perform cutting-edge biomedical research employing multidisciplinary strategies. Upon completing these programs, students pursue careers in academic, governmental, or industrial settings.

The MS Program in Molecular & Cell Biology & Genetics

In the MS program, the focus is on strengthening the student's grasp of molecular biology and biotechnology and on providing experience and knowledge of research methods available in this fast-expanding field. This program is designed to prepare students for competitive industry jobs and for acceptance into PhD programs. Our MS students take the same courses as our PhD students, while also gaining extensive biomedical research experience. Students who wish to continue their graduate training after the MS degree may apply to the PhD program, and their credits may be applied to the doctoral program. In addition to the thesis-based MS program, Drexel offers a non-thesis degree program in which students can earn the degree without a research project by taking additional classes and writing a literature review paper.

The PhD Program in Molecular & Cell Biology & Genetics

This program is research focused, with the ultimate goal of training students to become leaders of scientific research in academics and industry. In addition to completing the curriculum requirements, PhD students must pass a preliminary exam and qualifying exam at the end of their first and second years, respectively.

Additional Information

For more information about the program, please visit the College of Medicine's Molecular and Cell Biology and Genetics Program (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/MolecularCellBiologyGenetics.aspx>) website.

Amanda Mangano
Academic Administrator
Division of Biomedical Science Programs
Drexel University College of Medicine
245 N. 15th St., MS 344
Philadelphia, PA 19102
215.762.8217
amm523@drexel.edu

Admission Requirements

Drexel University College of Medicine has a rolling admissions policy, which means that complete applications are reviewed as they are received. Applicants are therefore advised to apply early, as decisions to accept or deny admission may be made before the official deadlines.

To learn more about applying to Drexel College of Medicine programs visit the College of Medicine's Graduate School of Biomedical Sciences and Professional Studies (<http://www.drexel.edu/medicine/Academics/Graduate-School/>) website.

About the Curriculum

Background courses in biochemistry, molecular and cell biology, and integrative biology are taken during the first academic year. In addition, every student carries out short research projects in three different laboratories during the first year. This exposure to research not only gives the student broad research training, but also helps the student to select a thesis advisor at the end of the first academic year. In the second year, the student begins thesis research and takes several advanced courses, tailored to the student's individual interests.

The program offers a weekly seminar series with invited external and intramural speakers who address the program's broad research interests. Journal Club members meet weekly in an informal setting to present results of interest from the current literature.

Courses Repeatable for Credit

As well as taking all required courses, MS and PhD students may re-enroll in courses having the status "repeatable for credit" (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

For more information, including scheduling a plan of study, visit the College of Medicine's Molecular and Cell Biology and Genetics Program (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/MolecularCellBiologyGenetics.aspx>) website.

Thesis Option

63.5 semester credits

Required Courses		
BIOC 603S	Advanced Topics in Biochemistry and Molecular Biology	1.5
IDPT 500S	Responsible Conduct of Research	2.0

IDPT 501S	Biostatistics I	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
MCBG 501S	MCBG 1st Lab Rotation	4.0
MCBG 506S	Advanced Cell Biology	2.0
MCBG 512S	MCBG Journal Club *	4.0
MCBG 513S	Molec & Cell Biology Seminar *	4.0
MCBG 600S	MCBG Thesis Research **	27.0
Advanced Electives		5.0

Select at least two advanced electives for a minimum of five credits.

BIOC 508S	Experimental Approaches to Biochemical Problems
BIOC 511S	Communication for Researchers
BIOC 520S	Macromolecular Structure & Function
BIOC 521S	Introduction to Biochemical Data
CBIO 510S	Cancer Biology
CBIO 512S	Advanced Cancer Biology
MCBG 514S	Cell Cycle and Apoptosis
MIIM 508S	Immunology I
MIIM 555S	Molecular Mechanisms of Microbial Pathogenesis
MIIM 607S	Immunology II
MIIM 613S	Emerging Infectious Diseases
MIIM 615S	Experimental Therapeutics
MIIM 630S	Advanced Molecular Biology
NEUR 508S	Graduate Neuroscience I
NEUR 511S	Advanced Cellular and Developmental Neuroscience
NEUR 512S	Advanced Systems and Behavioral Neuroscience
PHRM 507S	Prin of Neuropharmacology
PHRM 512S	Graduate Pharmacology
PHRM 525S	Drug Discovery and Development I
PHRM 526S	Drug Discovery and Development II
PHRM 602S	Research Methods in Pharmacology

General Electives

IDPT 507S	Teaching Practicum I
IDPT 508S	Teaching Practicum II
IDPT 509S	Teaching Practicum III
IDPT 600S	Thesis Defense
MCBG 502S	MCBG 2nd Lab Rotation
MCBG 503S	MCBG 3rd Lab Rotation

Total Credits 63.5

* Taken each semester in the two year program.

** Taken each semester starting in the spring semester of year one.

Non-Thesis Option

38.5 semester credits

Required Courses

BIOC 603S	Advanced Topics in Biochemistry and Molecular Biology	1.5
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
MCBG 506S	Advanced Cell Biology	2.0
MCBG 512S	MCBG Journal Club *	4.0
MCBG 513S	Molec & Cell Biology Seminar *	4.0
Advanced Electives		7.0

Select at least three Advanced Electives for a minimum of seven credits.

BIOC 508S	Experimental Approaches to Biochemical Problems
BIOC 511S	Communication for Researchers
BIOC 520S	Macromolecular Structure & Function
BIOC 521S	Introduction to Biochemical Data
CBIO 510S	Cancer Biology
CBIO 512S	Advanced Cancer Biology
MCBG 514S	Cell Cycle and Apoptosis
MIIM 508S	Immunology I
MIIM 555S	Molecular Mechanisms of Microbial Pathogenesis
MIIM 607S	Immunology II
MIIM 613S	Emerging Infectious Diseases
MIIM 615S	Experimental Therapeutics
MIIM 630S	Advanced Molecular Biology
NEUR 508S	Graduate Neuroscience I
NEUR 511S	Advanced Cellular and Developmental Neuroscience
NEUR 512S	Advanced Systems and Behavioral Neuroscience
PHRM 507S	Prin of Neuropharmacology
PHRM 512S	Graduate Pharmacology
PHRM 525S	Drug Discovery and Development I
PHRM 526S	Drug Discovery and Development II
PHRM 602S	Research Methods in Pharmacology

General Electives

IDPT 507S	Teaching Practicum I
IDPT 508S	Teaching Practicum II
IDPT 509S	Teaching Practicum III
MCBG 501S	MCBG 1st Lab Rotation
MCBG 502S	MCBG 2nd Lab Rotation
MCBG 503S	MCBG 3rd Lab Rotation
MCBG 600S	MCBG Thesis Research

Total Credits 38.5

* Taken each semester in the two year program.

PhD Degree Requirements

Students are required to complete 96.0 credits; for additional graduation requirements, refer to the Graduate School of Biomedical Sciences and Professional Studies Handbook and the Molecular and Cell Biology and Genetics PhD Program Policies and Procedures (http://drexel.edu/~media/Files/medicine/drexel-pdfs/programs/program-molecular-cell-bio-genetics/drexel_molecular_cell_biology_genetics_program_policies_phd.ashx?la=en).

Required Courses

BIOC 603S	Advanced Topics in Biochemistry and Molecular Biology	1.5
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 600S	Thesis Defense	9.0
MCBG 501S	MCBG 1st Lab Rotation	4.0
MCBG 502S	MCBG 2nd Lab Rotation	4.0
MCBG 503S	MCBG 3rd Lab Rotation	4.0
MCBG 506S	Advanced Cell Biology	2.0
MCBG 512S	MCBG Journal Club *	9.0
MCBG 513S	Molec & Cell Biology Seminar *	9.0
MCBG 600S	MCBG Thesis Research **	63.0

Advanced Electives 7.0

Select at least three Advanced Electives for a minimum of seven credits.

BIOC 508S	Experimental Approaches to Biochemical Problems
BIOC 511S	Communication for Researchers
BIOC 521S	Introduction to Biochemical Data
CBIO 510S	Cancer Biology
CBIO 512S	Advanced Cancer Biology
MCBG 514S	Cell Cycle and Apoptosis
MIIM 508S	Immunology I
MIIM 555S	Molecular Mechanisms of Microbial Pathogenesis
MIIM 607S	Immunology II
MIIM 613S	Emerging Infectious Diseases
MIIM 615S	Experimental Therapeutics
MIIM 630S	Advanced Molecular Biology
NEUR 508S	Graduate Neuroscience I
NEUR 511S	Advanced Cellular and Developmental Neuroscience
NEUR 512S	Advanced Systems and Behavioral Neuroscience
PHRM 507S	Prin of Neuropharmacology
PHRM 512S	Graduate Pharmacology
PHRM 525S	Drug Discovery and Development I
PHRM 526S	Drug Discovery and Development II
PHRM 602S	Research Methods in Pharmacology
General Electives	
IDPT 507S	Teaching Practicum I
IDPT 508S	Teaching Practicum II
IDPT 509S	Teaching Practicum III

Total Credits

128.5

* Taken each semester with the exception of the last, when only Thesis Defense is taken.

** Taken each semester starting in year 2, with the exception of the last semester when only Thesis Defense is taken.

Molecular Medicine

Major: Molecular Medicine

Degree Awarded: Master of Science (MS)

Calendar Type: Semester

Total Credit Hours: 36.0

Classification of Instructional Programs (CIP) code: 26.0204

Standard Occupational Classification (SOC) code: 19-1029

About the Program

Mission Statement

The Master of Science in Molecular Medicine program, offered by the Department of Microbiology and Immunology and by the Institute for Molecular Medicine and Infectious Disease (IMMID), provides education and training in areas of research in human health at the molecular level. Students in this program acquire theoretical and practical knowledge about normal body functions and disease pathogenesis at the molecular level. Students also learn how this knowledge is applied to develop novel tools for diagnosis, treatment, prognosis, and prevention of disease. Graduates from this program will be ready to enter the biotechnology workforce, and are attractive candidates for doctoral programs in science and medicine.

The Master of Science in Molecular Medicine program is designed to provide academic and practical biotechnological knowledge in translational research, particularly in the areas of molecular therapeutics and vaccine development.

Curriculum

The two year non-thesis program encompasses fundamental requirements to establish a sound grounding in microbiology, biochemistry, genetics, and molecular biology. The program is typically completed in two full-time years (four semesters of at least nine credits) of required and elective graduate courses, and one or more experiential research components in the first or second year. The flexibility of the curriculum enables students to complete the degree requirement within 18 months on an accelerated basis, and up to 4 years on a part-time basis. The successful completion of the degree will be determined by grades obtained in the graduate courses, participation in seminars and journal clubs, and performance in the research component. A minimum of 36.0 credits is required to graduate, with at least 6.0 of those earned as research credits.

The experiential research component of the curriculum can be fulfilled by two alternative approaches. Most students choose to engage in an intensive 6.0 credit hands-on research internship in which a 12-16 week research program will be undertaken in a laboratory at Drexel, another academic institution, or at a biotechnology or biopharmaceutical company. Alternatively, students may choose to engage in a less intensive experience spanning two semesters, or conduct an independent research project, with the approval and supervision of Program Directors.

Traditional (Face-to-Face), Hybrid, or Online Learning Options

Classes can be attended at any of Drexel College of Medicine locations: Center City and Queen Lane campuses in Philadelphia. State-of-the-art video conferencing provides real-time interactive learning at these locations. Most classes are held in the late afternoon/early evening to facilitate participation of working professionals. The program may also be completed fully online, offered through Drexel University Online. All required courses and most electives have online sections and online students experience the same curriculum as face-to-face or hybrid students. Online sections are designed to maximize interactions among students and faculty and may include live web sessions. Individual students also may choose a mix of traditional and online courses (hybrid). The goal is to provide maximum scheduling flexibility.

Program Contact information

For more detailed information about the curriculum and program goals, please contact either:

Pamela Norton, PhD
Email: pan29@drexel.edu

or

Stephen Jennings, PhD
Email: srj32@drexel.edu

Program Goals

Over the course of completing the program, students will develop:

1. Core knowledge of molecular and cellular disciplines that constitute biomedical sciences
2. Working knowledge of normal body functions at the molecular level and how these are altered in states of disease

3. Practical knowledge and skills that help identify gaps in the biomedical field for the development of molecular diagnostic and therapeutic tools
4. Skills in basic, translational, and/or clinical research
5. Professional ethics necessary for the responsible conduct of research
6. Communication and leadership skills
7. Other soft skills (e.g. collaboration, problem solving, career planning, networking) that facilitate career advancement and promotion

In the course of meeting these program-level goals, students will have also made progress in all of the Drexel Student Learning Priorities (DSLPS) to help them build their futures.

Core Intellectual and Practical Skills:

- Communication
- Critical and creative thinking
- Ethical reasoning
- Information literacy
- Self-directed learning
- Technology use

Experiential and Applied Learning:

- Global competence
- Leadership
- Professional practice
- Research, scholarship and creative expression
- Responsible citizenship

Admission Requirements

For acceptance into the Master of Science in Molecular Medicine program, the applicant must have completed a four-year biology or chemistry-based BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

- Official transcripts from all colleges and universities attended
- A current *curriculum vitae* (CV) or resume
- References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant's undergraduate curriculum, cumulative GPA, GRE/MCAT scores, recommendation letters, and relevant research or professional experiences.

Online applications are considered year round. Potential students are encouraged to apply no later than July 1 for Fall admission, or December 1 for Spring admission.

For additional information about the program and to access the online application, view the MS in Molecular Medicine (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/MolecularMedicine.aspx>) page on the College of Medicine's website.

Degree Requirements

About the Curriculum

Through the combination of required and elective courses, a total of 36.0 credits is required to successfully obtain the degree of Masters of Science in Molecular Medicine. In order to maintain full-time student status, a minimum of 9.0 credits must be taken in any given academic semester. In most cases, there are both traditional (face-to-face) and online sections for each course. Students should work with their program advisors to plan their course of study.

Research Requirements

The research component of the curriculum can be fulfilled by two alternative approaches. Most students choose to engage in a hands-on research internship in which a 12 week research program will be undertaken in a laboratory at Drexel, another academic institution, or at a biotechnology or biopharmaceutical company. Alternatively, students may choose to engage in an independent research project, with the approval and supervision of Program Directors.

For an individualized plan of study listing the sequence of courses to be completed, students should work with their program advisor.

Required Courses		
IDPT 500S	Responsible Conduct of Research	2.0
or MIIM 503S	Biomedical Ethics	
IDPT 501S	Biostatistics I	2.0
or MIIM 517S	Applied Statistics for Biomedical Sciences	
MIIM 527S	Immunology, Immunopathology and Infectious Diseases	3.0
MIIM 530S	Fundamentals of Molecular Medicine I	3.0
MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MIIM 532S	Fundamentals of Molecular Medicine III	2.0
MIIM 533S	Molecular Medicine Journal Club II	1.0
MIIM 534S	Molecular Medicine Journal Club I	1.0
MIIM 540S	Viruses and Viral Infections	2.0
MIIM 541S	Bacteria and Bacterial Infections	2.0
MIIM 542S	Mycology and Fungal Infections	2.0
MIIM 543S	Parasitology and Parasitic Diseases	2.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
MIIM 660S	Current Concepts in Molecular Medicine I	3.0
Electives		
To complete the 36.0 credits total, students select from a menu of additional electives, and complete their required research component.		
MIIM 521S	Biotechniques I: Molecular and Genomic Methods	
MIIM 522S	Biotechniques II: Immunological Methods	
MIIM 523S	Molecular Virology	
MIIM 524S	Vaccines and Vaccine Development	

MIIM 525S	Principles of Biocontainment	
MIIM 555S	Molecular Mechanisms of Microbial Pathogenesis	
MIIM 613S	Emerging Infectious Diseases	
MIIM 615S	Experimental Therapeutics	
MIIM 621S	Biomedical Research I	
MIIM 622S	Biomedical Research II	
MIIM 625S	Advanced Molecular Virology	
MIIM 650S	Research Internship in Molecular Medicine	
MLAS 529S	Molecular Genetics	
Total Credits		36.0

Sample Plan of Study

First Year

Fall		Credits
IDPT 500S or MIIM 503S	Responsible Conduct of Research Biomedical Ethics	2.0
MIIM 527S	Immunology, Immunopathology and Infectious Diseases	3.0
MIIM 530S	Fundamentals of Molecular Medicine I	3.0
MIIM 534S	Molecular Medicine Journal Club I	1.0
Term Credits		9.0

Spring

MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MIIM 533S	Molecular Medicine Journal Club II	1.0
MIIM 541S	Bacteria and Bacterial Infections	2.0
MIIM 542S	Mycology and Fungal Infections	2.0
MIIM 543S	Parasitology and Parasitic Diseases	2.0
Term Credits		9.0

Second Year

Fall		Credits
MIIM 532S	Fundamentals of Molecular Medicine III	2.0
MIIM 606S	Microbiology and Immunology Seminar	1.0
Electives		6.0
Term Credits		9.0

Spring

IDPT 501S or MIIM 517S	Biostatistics I Applied Statistics for Biomedical Sciences	2.0
MIIM 540S	Viruses and Viral Infections	2.0
MIIM 660S	Current Concepts in Molecular Medicine I	3.0
Elective		2.0
Term Credits		9.0

Total Credit: 36.0

Neuroscience

Major: Neuroscience

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Semester

Total Credit Hours: 45.5 (MS, non-thesis); 55.5 (MS, thesis); 123.5 (PhD)

Classification of Instructional Programs (CIP) code: 26.1501

Standard Occupational Classification (SOC) code: 11-9121

About the Program

The College of Medicine School of Biomedical Sciences and Professional Studies offers an interdepartmental and multidisciplinary graduate program in Neuroscience leading to MS and PhD degrees. The program provides a vibrant research component for both MS and PhD degrees leading to published scientific work in reputable journals, as well as training in the panoply of research and presentation skills required to conduct and disseminate the research. Students are provided with a curriculum of integrated courses that include the essentials for biomedical

research as well as courses that span cellular, developmental, systems, and behavioral neurosciences, as well as neuroanatomy and injury and disease of the nervous system. Upon completing these programs, students pursue careers in academic, governmental, or industrial settings.

The MS in Neuroscience Program

The MS program provides students a broad background in neuroscience and the techniques used in neuroscience research. In addition to the thesis-based MS program, Drexel offers a non-thesis degree program in which students can earn the degree without a research project by taking additional classes and writing a literature review paper. Students who wish to continue their graduate training after the MS degree may apply to the PhD program, and their credits may be applied to the doctoral program.

The PhD in Neuroscience Program

The PhD program trains individuals to conduct independent hypothesis-driven research and to teach in the neurosciences. The program includes two years of coursework as well as original research leading to published thesis work. Laboratory rotations begin in the fall of the first year.

Additional Information

For more information, visit the College of Medicine's Neuroscience Program (<http://www.drexel.edu/medicine/Academics/Graduate-School/Neuroscience/>) web site.

Admission Requirements

Students interested in cellular, systems (including neuro-engineering) and behavioral neuroscience are encouraged to apply. There are no minimal requirements but applicants should be competitive with regard to grades, GRE scores, research experience, and letters of recommendation.

Applicants are encouraged to use email to contact any of the faculty of the program with whom they may share scientific interests to discuss their suitability to the program and/or potential projects in relevant laboratories.

The Drexel University College of Medicine: School of Biomedical Sciences and Professional Studies has a rolling admissions policy, which means that complete applications are reviewed as they are received. Applicants are therefore advised to apply early, as decisions to accept or deny admission may be made before the official deadlines.

To learn more about applying to Drexel College of Medicine programs visit the College of Medicine's Graduate School of Biomedical Sciences and Professional Studies (<http://www.drexel.edu/medicine/Academics/Graduate-School/>) website.

About the Curriculum

Students in both the PhD and MS programs begin their coursework with a core curriculum. The curriculum consists of a series of core courses that are shared by all of the biomedical graduate programs in the medical school, and a series of programmatic courses. All students in the Neuroscience Program must take the core curriculum, although the possibility exists for students to be excused from a particular course if they are able to prove that they already have the necessary knowledge required of the particular course.

During the second year, students select elective courses and begin their thesis research in consultation with the Advisory-Examination Committee. At the end of the second year, students take a comprehensive examination to qualify for PhD candidacy.

There are three rotations in the curriculum for which the student will be assigned a grade. The purpose of these rotations is to enable the student to select the most appropriate Graduate Advisor to supervise the research project for the student. The Neuroscience Program Director and Steering Committee will advise each student on the selection of rotations, as well as on the progress and outcome of rotations. Flexibility will be afforded in certain situations in which the student may be able to select an advisor before completing all three rotations, or in situations wherein it is advisable to terminate a particular rotation early in favor of another choice.

Courses Repeatable for Credit

As well as taking all required courses, MS and PhD students may re-enroll in courses having the status "repeatable for credit" (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

MS Degree Requirements: Non-Thesis Option

MS without thesis: 45.5 semester credits

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
NEUR 501S	Neuroscience 1st Lab Rotation	4.0
NEUR 508S	Graduate Neuroscience I	2.5
NEUR 520S	Neurobiology Topics I *	4.0
NEUR 521S	Neurobiology Topics II *	4.0
NEUR 602S	Medical Neuroscience	6.0
NEUR 609S	Graduate Neuroscience II	4.0

Advanced Electives

Select at least one of the following:		1.0-4.0
NEUR 511S	Advanced Cellular and Developmental Neuroscience	
NEUR 512S	Advanced Systems and Behavioral Neuroscience	
NEUR 634S	Motor Systems	
Total Credits		45.5-48.5

* Taken twice in the two year program.

Approved Electives

Students may opt to take additional approved electives in consultation with their advisor.

Suggested Electives

MCBG 506S	Advanced Cell Biology	2.0
PHRM 507S	Prin of Neuropharmacology	3.0
PHRM 512S	Graduate Pharmacology	3.0

General Electives

IDPT 507S	Teaching Practicum I	1.0-4.0
IDPT 508S	Teaching Practicum II	1.0-4.0
IDPT 509S	Teaching Practicum III	1.0-4.0
NEUR 502S	Neuroscience 2nd Lab Rotation	4.0
NEUR 503S	Neuroscience 3rd Lab Rotatin	4.0
NEUR 600S	Neuroscience Thesis Research	9.0

* Additional courses from the Biograduate Medical programs may be taken as electives. Students should check with the College of Medicine's Graduate School of Biomedical Sciences and Professional Studies (<https://drexel.edu/medicine/academics/graduate-school/>) programs.

MS Degree Requirements: Thesis Option

MS with thesis: 55.5 minimum semester credits

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
or IDPT 550S	Biochemistry and Biophysics	
IDPT 526S	Cells to Systems	5.0
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
NEUR 501S	Neuroscience 1st Lab Rotation	4.0
NEUR 508S	Graduate Neuroscience I	2.5
NEUR 520S	Neurobiology Topics I	2.0
NEUR 521S	Neurobiology Topics II	2.0
NEUR 600S	Neuroscience Thesis Research *	18.0
NEUR 602S	Medical Neuroscience	6.0
NEUR 609S	Graduate Neuroscience II	4.0

Advanced Electives 1.0-4.0

Select at least one of the following Advanced Electives

NEUR 511S	Advanced Cellular and Developmental Neuroscience
NEUR 512S	Advanced Systems and Behavioral Neuroscience
NEUR 634S	Motor Systems

Total Credits 55.5-58.5

* Taken both semesters in the second year.

Approved Electives

Students may opt to take additional approved electives in consultation with their advisor.

Suggested Electives

IDPT 600S	Thesis Defense	9.0
MCBG 506S	Advanced Cell Biology	2.0
NEUR 502S	Neuroscience 2nd Lab Rotation	4.0
PHRM 507S	Prin of Neuropharmacology	3.0
PHRM 512S	Graduate Pharmacology	3.0

General Electives

IDPT 507S	Teaching Practicum I	1.0-4.0
IDPT 508S	Teaching Practicum II	1.0-4.0
IDPT 509S	Teaching Practicum III	1.0-4.0
NEUR 503S	Neuroscience 3rd Lab Rotatin	4.0

* Additional courses from the Biomedical Graduate Programs may be taken as electives. Students should check with the College of Medicine's Graduate School of Biomedical Sciences and Professional Studies (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx>) programs.

PhD Degree Requirements

Students are required to complete 123.5 credits; for additional graduation requirements, refer to the School of Biomedical Sciences and Professional Studies Handbook and the Neuroscience Program Policies

and Procedures (<https://drexel.edu/medicine/academics/graduate-school/neuroscience/>).

During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student's Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After concluding their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

PhD students may enroll in courses having the status "repeatable for credit" (such as journal club, seminar and research courses) for the duration of their program in order to meet the degree completion requirement of 123.5 credits.

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 600S	Thesis Defense	9.0
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
NEUR 501S	Neuroscience 1st Lab Rotation	4.0
NEUR 502S	Neuroscience 2nd Lab Rotation	4.0
NEUR 508S	Graduate Neuroscience I	2.5
NEUR 520S	Neurobiology Topics I *	8.0
NEUR 521S	Neurobiology Topics II **	6.0
NEUR 600S	Neuroscience Thesis Research *	63.0
NEUR 602S	Medical Neuroscience	6.0
NEUR 609S	Graduate Neuroscience II	4.0

Advanced Electives 1.0-4.0

Select at least one of the following Advanced Electives

NEUR 511S	Advanced Cellular and Developmental Neuroscience
NEUR 512S	Advanced Systems and Behavioral Neuroscience
NEUR 634S	Motor Systems

Suggested Electives

IDPT 507S	Teaching Practicum I
MCBG 506S	Advanced Cell Biology
NEUR 503S	Neuroscience 3rd Lab Rotatin
PHRM 507S	Prin of Neuropharmacology
PHRM 512S	Graduate Pharmacology

General Electives

IDPT 508S	Teaching Practicum II
IDPT 509S	Teaching Practicum III

Total Credits 123.5-126.5

* Taken each Fall semester starting in the Second Year, until Thesis Defense

** Taken each Spring semester starting in the Second Year, until Thesis Defense

*** Taken each semester starting the Second Year, until Thesis Defense

* Additional courses from the Biomedical Graduate programs may be taken as electives. Students should check with the College of Medicine's School of Biomedical Sciences and Professional Studies (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx>) programs.

Sample Plan of Study (MS)

First Year

Fall		Credits
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
NEUR 501S	Neuroscience 1st Lab Rotation	4.0
NEUR 508S	Graduate Neuroscience I	2.5
NEUR 520S	Neurobiology Topics I	2.0
Term Credits		14.5

Spring

IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
NEUR 521S	Neurobiology Topics II	2.0
NEUR 609S	Graduate Neuroscience II	4.0
Term Credits		12.0

Second Year

Fall

IDPT 500S	Responsible Conduct of Research	2.0
NEUR 520S	Neurobiology Topics I	2.0
NEUR 602S	Medical Neuroscience	6.0
Term Credits		10.0

Spring

IDPT 850S	Literature Review Non-Thesis MS	4.0
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
NEUR 521S	Neurobiology Topics II	2.0
Advanced Elective		1.0-4.0
Term Credits		9.0-12.0

Total Credit: 45.5-48.5

Sample Plan of Study (MS) Thesis

First Year

Fall		Credits
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
NEUR 501S	Neuroscience 1st Lab Rotation	4.0
NEUR 508S	Graduate Neuroscience I	2.5
Term Credits		12.5

Spring

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
NEUR 602S	Medical Neuroscience	6.0
Term Credits		14.0

Second Year

Fall

NEUR 520S	Neurobiology Topics I	2.0
NEUR 600S	Neuroscience Thesis Research	9.0
NEUR 609S	Graduate Neuroscience II	4.0
Term Credits		15.0

Spring

NEUR 500S	Statistics for Neuro/Pharm Research	2.0
NEUR 521S	Neurobiology Topics II	2.0
NEUR 600S	Neuroscience Thesis Research	9.0
Advanced Elective		1.0-4.0
Term Credits		14.0-17.0

Total Credit: 55.5-58.5

Sample Plan of Study (PhD)

		Credits
First Year		
Fall		
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
NEUR 501S	Neuroscience 1st Lab Rotation	4.0
NEUR 508S	Graduate Neuroscience I	2.5
	Term Credits	12.5
Spring		
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
NEUR 502S	Neuroscience 2nd Lab Rotation	4.0
NEUR 602S	Medical Neuroscience	6.0
	Term Credits	16.0
Second Year		
Fall		
IDPT 500S	Responsible Conduct of Research	2.0
NEUR 520S	Neurobiology Topics I	2.0
NEUR 600S	Neuroscience Thesis Research	9.0
NEUR 609S	Graduate Neuroscience II	4.0
	Term Credits	17.0
Spring		
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
NEUR 521S	Neurobiology Topics II	2.0
NEUR 600S	Neuroscience Thesis Research	9.0
Advanced Elective		1.0-4.0
	Term Credits	14.0-17.0
Third Year		
Fall		
NEUR 520S	Neurobiology Topics I	2.0
NEUR 600S	Neuroscience Thesis Research	9.0
	Term Credits	11.0
Spring		
NEUR 521S	Neurobiology Topics II	2.0
NEUR 600S	Neuroscience Thesis Research	9.0
	Term Credits	11.0
Fourth Year		
Fall		
NEUR 520S	Neurobiology Topics I	2.0
NEUR 600S	Neuroscience Thesis Research	9.0
	Term Credits	11.0
Spring		
NEUR 521S	Neurobiology Topics II	2.0
NEUR 600S	Neuroscience Thesis Research	9.0
	Term Credits	11.0
Fifth Year		
Fall		
NEUR 520S	Neurobiology Topics I	2.0
NEUR 600S	Neuroscience Thesis Research	9.0
	Term Credits	11.0
Spring		
IDPT 600S	Thesis Defense	9.0
	Term Credits	9.0
Total Credit: 123.5-126.5		

Pathologists' Assistant

Major: Pathologists' Assistant
 Degree Awarded: Master of Science (MS)
 Calendar Type: Semester

Total Credit Hours: 91.0

Classification of Instructional Programs (CIP) code: 51.0811

Standard Occupational Classification (SOC) code: 29-2055

About the Program

The School of Biomedical Sciences and Professional Studies offers the Master of Science in Pathologists' Assistant (PathA). The pathologists' assistant is an intensely trained allied health professional who provides anatomic pathology services under the direction and supervision of a pathologist. Pathologists' assistants interact with pathologists in the same manner that physicians' assistants carry out their duties under the direction of physicians in surgical and medical practice.

The PathA program offers students the opportunity to train in the highly specialized field of anatomic pathology. This two-year, full-time program begins in May of each year. The first year is comprised of the instructional portion of the program supplemented by pathology laboratory exposure. The second year of the program is composed of several hospital-based clinical rotations offering progressively responsible experience in autopsy and surgical pathology. These rotations are supplemented with informal classroom education.

Program Accreditation

The National Accrediting Agency for Clinical Laboratory Sciences (NAACLS): NAACLS, in conjunction with the AAPA, has established national standards for Pathologists' Assistant training programs. The standards include both didactic course work and clinical experiences necessary to properly educate a pathologists' assistant. The Master of Pathologists' Assistant program at the Drexel University College of Medicine is accredited by NAACLS. Visit the NAACLS (<http://www.naacls.org/>) website for more information about the professional activities of this organization.

Professional Certification

The American Society for Clinical Pathology Board of Registry (ASCP BOC): The ASCP BOC, in conjunction with the AAPA, has established a national certification program for Pathologists' Assistants. In 2005, the ASCP BOC first offered a national certification examination for Pathologists' Assistants. In order to be eligible for the BOC examination, applicants must be graduates of a pathologists' assistant educational program accredited by the National Accrediting Agency for Clinical Laboratory Science (NAACLS). Visit the ASCP BOC (<http://www.ascp.org/Board-of-Certification/>) website to read more about the certification program and the professional activities of this organization.

Professional Affiliation

The American Association of Pathologists' Assistants (AAPA): The AAPA is the only national professional organization for pathologists' assistants.

The AAPA:

- is a not-for-profit, volunteer organization dedicated to advancing the pathologists' assistant profession by providing its members with education, networking, and professional support;
- supports professional competency through program accreditation and individual certification;
- promotes public and professional awareness of the pathologist's assistant as an integral member of the healthcare team.

Visit the AAPA (<http://www.pathassist.org>) website for more additional information about this association.

Career Opportunities

Pathologists' assistants are employed in community hospitals, academic centers such as medical schools and university hospitals, private pathology laboratories, medical research centers, government hospitals and medical examiner offices.

For more information about this program, visit the College of Medicine's Master of Science in Pathologists' Assistant (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/AlliedHealthProfessionPrograms/PathologistsAssistantPathAProgram.aspx>) program's web page.

Admission Requirements

A pathologist's assistant is someone who has the ability to relate to people, the capacity for calm and reasoned judgment and who demonstrates a commitment to quality patient care.

The program's courses and content are ideal for:

- Recent graduates with a degree in a biological or allied health science, with exposure to anatomy, physiology, chemistry and microbiology. Previous exposure to pathology is recommended.
- Allied health professionals, in particular cytotechnologists, histotechnologists and medical technologists.

Admission requirements

Students will be selected on the basis of adequate educational background and medical experience. A bachelor's degree in a biological or allied health science with a cumulative GPA of at least 3.0 is the minimum requirement for acceptance into the program. Prerequisite course work will include microbiology, human anatomy, physiology, mathematics, English composition, general chemistry, organic and/or biochemistry and biological science.

All candidates will be required to have a formal interview with the Selection Committee prior to final acceptance. Deadline for submission of the application is the second Friday in February of the year in which the students plan to enroll.

Candidates for admission must provide the following credentials:

- Completed application form
- Resume
- Official transcripts from all college or university attended or where coursework was attempted or taken
- Official General Graduate Record Examination (GRE) scores
- Three letters of evaluation
- Self-assessment essays:
 - Discuss personal goals, conditions, or career aspirations that motivate you to pursue graduate study at Drexel University.
 - What are your most important accomplishments?
 - What do you expect to achieve through this program?

Additional Information

For further information, contact:

Tina Rader, MHS, PA (ASCP)

Program Co-Director
Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
245 N. 15th Street, Mail Stop 344
Philadelphia, PA 19102-1192
215-762-4692
tina.rader@drexelmed.edu

Degree Requirements

Required Courses		
MFSP 551S	Human Function	3.0
MLAS 531S	Embryology	3.0
MLAS 545S	Fundamentals of Histology	3.0
MSPA 500S	Gross Anatomy	5.0
MSPA 510S	Laboratory Management	2.0
MSPA 520S	Medical Terminology	3.0
MSPA 530S	Biomedical Photography	4.0
MSPA 540S	Histotechnology I	3.0
MSPA 541S	Histotechnology II	3.0
MSPA 550S	Applied Anatomic Pathology	4.0
MSPA 560S	Medical Ethics	2.0
MSPA 570S	Medical Pathology I	6.0
MSPA 571S	Medical Pathology II	4.0
MSPA 580S	Medical Microbiology I	4.0
MSPA 581S	Medical Microbiology II	3.0
MSPA 590S	Leadership Skills for the Medical Profession	3.0
MSPA 600S	Surgical Pathology I	6.0
MSPA 601S	Surgical Pathology II	6.0
MSPA 602S	Surgical Pathology III	6.0
MSPA 610S	Autopsy Pathology I	6.0
MSPA 611S	Autopsy Pathology II	6.0
MSPA 612S	Autopsy Pathology III	6.0
Total Credits		91.0

Sample Plan of Study

First Year		
Term 1		Credits
MLAS 531S	Embryology	3.0
MLAS 545S	Fundamentals of Histology	3.0
MSPA 500S	Gross Anatomy	5.0
MSPA 510S	Laboratory Management	2.0
MSPA 520S	Medical Terminology	3.0
Term Credits		16.0
Term 2		
MSPA 530S	Biomedical Photography	4.0
MSPA 540S	Histotechnology I	3.0
MSPA 570S	Medical Pathology I	6.0
MSPA 580S	Medical Microbiology I	4.0
MSPA 590S	Leadership Skills for the Medical Profession	3.0
Term Credits		20.0
Term 3		
MFSP 551S	Human Function	3.0
MSPA 541S	Histotechnology II	3.0
MSPA 550S	Applied Anatomic Pathology	4.0
MSPA 571S	Medical Pathology II	4.0
MSPA 581S	Medical Microbiology II	3.0
Term Credits		17.0
Second Year		

Term 4		
MSPA 560S	Medical Ethics	2.0
MSPA 600S	Surgical Pathology I	6.0
MSPA 610S	Autopsy Pathology I	6.0
Term Credits		14.0
Term 5		
MSPA 601S	Surgical Pathology II	6.0
MSPA 611S	Autopsy Pathology II	6.0
Term Credits		12.0
Term 6		
MSPA 602S	Surgical Pathology III	6.0
MSPA 612S	Autopsy Pathology III	6.0
Term Credits		12.0

Total Credit: 91.0

Required Courses

MFSP 551S	Human Function	3.0
MLAS 531S	Embryology	3.0
MLAS 545S	Fundamentals of Histology	3.0
MSPA 500S	Gross Anatomy	5.0
MSPA 510S	Laboratory Management	2.0
MSPA 520S	Medical Terminology	3.0
MSPA 530S	Biomedical Photography	4.0
MSPA 540S	Histotechnology I	3.0
MSPA 541S	Histotechnology II	3.0
MSPA 550S	Applied Anatomic Pathology	4.0
MSPA 560S	Medical Ethics	2.0
MSPA 570S	Medical Pathology I	6.0
MSPA 571S	Medical Pathology II	4.0
MSPA 580S	Medical Microbiology I	4.0
MSPA 581S	Medical Microbiology II	3.0
MSPA 590S	Leadership Skills for the Medical Profession	3.0
MSPA 600S	Surgical Pathology I	6.0
MSPA 601S	Surgical Pathology II	6.0
MSPA 602S	Surgical Pathology III	6.0
MSPA 610S	Autopsy Pathology I	6.0
MSPA 611S	Autopsy Pathology II	6.0
MSPA 612S	Autopsy Pathology III	6.0
Total Credits		91.0

Pharmacology and Physiology

Major: Pharmacology and Physiology

Degree Awarded: Master of Science (MS) and Doctor of Philosophy (PhD)

Calendar Type: Semester

Total Credit Hours: 45.0 (MS, non-thesis); 62.0 (MS, thesis); 128.0 (PhD)

Classification of Instructional Programs (CIP) code: 26.1002

Standard Occupational Classification (SOC) code: 19-1042

About the Programs

The College of Medicine's Graduate School of Biomedical Sciences and Professional Studies offers graduate programs leading to the MS and the PhD degrees in Pharmacology & Physiology. The programs require independent research under the direction of departmental faculty members who are engaged in highly active research programs involving molecular, cellular, and behavioral approaches to experimental pharmacology and physiology in a strongly collaborative environment.

Students in both the PhD and MS programs begin their coursework with a core curriculum in biomedical sciences, and immediately start laboratory rotations. Intensive graduate level pharmacology, physiology and neuropharmacology courses round out the core programmatic courses. Specialization in ion channel physiology, smooth muscle physiology, behavioral pharmacology and signal transduction processes may involve the taking of several elective courses. Each program requires the defense of a thesis based on original research.

About the MS Program

The MS program, requiring two years of full-time study, provides a broad knowledge and technical expertise in pharmacology and physiology, allowing graduates to become partners in research in either an academic or an industrial environment. Students who wish to continue their graduate studies after the MS degree may apply to the PhD program, and their course credits may be applied to the doctoral program.

In addition to the thesis-based MS program, Drexel offers a non-thesis degree program in which students can earn the degree without a research project by taking additional classes and writing a literature review paper.

About the PhD Program

PhD candidates must pass a qualifying examination by November of their third year and they must have one accepted co-author manuscript, and one submitted first-author manuscript in peer-reviewed journals during the course of the program.

Additional Information

For more information about the program, please visit the College of Medicine's Pharmacology & Physiology Program (<http://drexel.edu/medicine/academics/graduate-school/pharmacology-physiology/>) website.

Amanda Mangano
Academic Administrator
Division of Biomedical Science Programs
Drexel University College of Medicine
245 N. 15th St., MS 344
Philadelphia, PA 19102
215.762.8217
amm523@drexel.edu (amanda.mangano@drexelmed.edu)

Admission Requirements

Drexel University College of Medicine has a rolling admissions policy, which means that complete applications are reviewed as they are received. Applicants are therefore advised to apply early, as decisions to accept or deny admission may be made before the official deadlines.

To learn more about applying to Drexel College of Medicine programs visit the Drexel College of Medicine's Graduate School of Biomedical Sciences and Professional Studies (<http://www.drexel.edu/medicine/Academics/Graduate-School/>) website.

Degree Requirements (MS)

About the Curriculum

The core curriculum is a comprehensive interdisciplinary program of study for all first-year research master's students in the Division of Biomedical Science Programs. The goal of the core curriculum is to provide a broad foundation in biomedical sciences and serve as a framework for advanced study in more specialized areas.

Courses Repeatable for Credit

As well as taking all required courses, students will re-enroll in courses having the status “repeatable for credit” (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

Additional Information

For more information about the program, please visit the College of Medicine's Pharmacology and Physiology (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/PharmacologyPhysiology.aspx>) Program (<http://drexel.edu/medicine/academics/graduate-school/pharmacology-physiology/>) web page.

Program Requirements

Non-Thesis Option

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
	or NEUR 500S Statistics for Neuro/Pharm Research	
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
PHRM 502S	Current Topics in Pharmacology & Physiology *	4.0
PHRM 507S	Prin of Neuropharmacology	3.0
PHRM 512S	Graduate Pharmacology	3.0
PHRM 516S	Advanced Topics in Physiology	1.0
PHRM 517S	Advanced Topics in Pharmacology	1.0
PHGY 503S	Graduate Physiology	4.0

Advanced Electives 9.0

Select at least three Advanced Electives for a minimum of nine credits.

BIOC 520S	Macromolecular Structure & Function
CBIO 510S	Cancer Biology
MIIM 508S	Immunology I
MIIM 521S	Biotechniques I: Molecular and Genomic Methods
MLAS 536S	Animal Models for Biomedical Research
NEUR 508S	Graduate Neuroscience I
PHRM 518S	New Frontiers in Therapy
PHRM 519S	Methods in Biomedical Research
PHRM 525S	Drug Discovery and Development I
PHRM 526S	Drug Discovery and Development II

General Electives

IDPT 507S	Teaching Practicum I
IDPT 508S	Teaching Practicum II
IDPT 509S	Teaching Practicum III
IDPT 600S	Thesis Defense
CR 500S	Epidemiology
CR 513S	Business Processes and Contemporary Concerns in Pharmaceutical R & D
CR 514S	World Wide Regulatory Submissions
CR 515S	Intro to Clinical Trials
CR 520S	Applications of Clinical Research Biostatistics
CR 525S	Scientific Writing and Medical Literature
CR 535S	Current Federal Regulatory Issues in Biomedical Research
CR 545S	Pharmaceutical Law
CR 550S	Leadership Skills
CR 555S	Compliance & Monitoring Issues
CR 570S	Principles and Practice of Pharmacovigilance

CR 600S	Designing the Clinical Trial	
CR 609S	Innovative Product Development	
CR 612S	Fundamentals of Compliance	
CR 614S	Introduction to Clinical Pharmacology	
CR 617S	Informatics in Pharm Res & Development	
Total Credits		45.0

* Taken each semester.

Thesis Option

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
	or NEUR 500S Statistics for Neuro/Pharm Research	
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
PHRM 502S	Current Topics in Pharmacology & Physiology *	4.0
PHRM 503S	Pharm & Phys 1st Lab Rotation	4.0
PHRM 504S	Pharm & Phys 2nd Lab Rotation	4.0
PHRM 507S	Prin of Neuropharmacology	3.0
PHRM 512S	Graduate Pharmacology	3.0
PHRM 516S	Advanced Topics in Physiology	1.0
PHRM 517S	Advanced Topics in Pharmacology	1.0
PHRM 600S	Pharmacology Thesis Research **	18.0
PHGY 503S	Graduate Physiology	4.0

Advanced Electives

Select at least two Advanced Electives for a minimum of four credits.	4.0
BIOC 520S	Macromolecular Structure & Function
CBIO 510S	Cancer Biology
MIIM 508S	Immunology I
MIIM 521S	Biotechniques I: Molecular and Genomic Methods
MLAS 536S	Animal Models for Biomedical Research
NEUR 508S	Graduate Neuroscience I
PHRM 518S	New Frontiers in Therapy
PHRM 519S	Methods in Biomedical Research
PHRM 525S	Drug Discovery and Development I
PHRM 526S	Drug Discovery and Development II

General Electives

IDPT 507S	Teaching Practicum I
IDPT 508S	Teaching Practicum II
IDPT 509S	Teaching Practicum III
IDPT 600S	Thesis Defense
CR 500S	Epidemiology
CR 513S	Business Processes and Contemporary Concerns in Pharmaceutical R & D
CR 514S	World Wide Regulatory Submissions
CR 515S	Intro to Clinical Trials
CR 520S	Applications of Clinical Research Biostatistics
CR 525S	Scientific Writing and Medical Literature
CR 535S	Current Federal Regulatory Issues in Biomedical Research
CR 545S	Pharmaceutical Law
CR 550S	Leadership Skills
CR 555S	Compliance & Monitoring Issues
CR 570S	Principles and Practice of Pharmacovigilance
CR 600S	Designing the Clinical Trial
CR 609S	Innovative Product Development
CR 612S	Fundamentals of Compliance
CR 614S	Introduction to Clinical Pharmacology
CR 617S	Informatics in Pharm Res & Development

PHRM 505S	Pharm & Phys 3rd Lab Rotation	
Total Credits		62.0

* Taken each semester.

** Taken each semester starting in the second year.

Degree Requirements (PhD)

About the Curriculum

The core curriculum is a comprehensive interdisciplinary program of study for all PhD students in the Division of Biomedical Science Programs. The goal of the core curriculum is to provide a broad foundation in biomedical sciences and serve as a framework for advanced study in more specialized areas.

Courses Repeatable for Credit

As well as taking all required courses, students will re-enroll in courses having the status "repeatable for credit" (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

Additional Information

For more information about the program, please visit the College of Medicine's Pharmacology and Physiology (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/PharmacologyPhysiology.aspx>) Program (<http://drexel.edu/medicine/academics/graduate-school/pharmacology-physiology/>) web page.

Program Requirements

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
or NEUR 500S Statistics for Neuro/Pharm Research		
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 507S	Teaching Practicum I	1.0-4.0
IDPT 508S	Teaching Practicum II	1.0-4.0
IDPT 509S	Teaching Practicum III	1.0-4.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 600S	Thesis Defense	9.0
PHRM 502S	Current Topics in Pharmacology & Physiology *	9.0
PHRM 503S	Pharm & Phys 1st Lab Rotation	4.0
PHRM 504S	Pharm & Phys 2nd Lab Rotation	4.0
PHRM 505S	Pharm & Phys 3rd Lab Rotation	4.0
PHRM 507S	Prin of Neuropharmacology	3.0
PHRM 512S	Graduate Pharmacology	3.0
PHRM 516S	Advanced Topics in Physiology	1.0
PHRM 517S	Advanced Topics in Pharmacology	1.0
PHRM 600S	Pharmacology Thesis Research **	63.0
PHGY 503S	Graduate Physiology	4.0
Advanced Electives		4.0

Choose at least two Advanced Electives for a minimum of four credits.

BIOC 520S	Macromolecular Structure & Function	
CBIO 510S	Cancer Biology	
MIIM 508S	Immunology I	
MIIM 521S	Biotechniques I: Molecular and Genomic Methods	
PHRM 518S	New Frontiers in Therapy	
PHRM 519S	Methods in Biomedical Research	

PHRM 525S	Drug Discovery and Development I	
PHRM 526S	Drug Discovery and Development II	
MLAS 536S	Animal Models for Biomedical Research	
General Electives		
CR 500S	Epidemiology	
CR 513S	Business Processes and Contemporary Concerns in Pharmaceutical R & D	
CR 514S	World Wide Regulatory Submissions	
CR 515S	Intro to Clinical Trials	
CR 520S	Applications of Clinical Research Biostatistics	
CR 525S	Scientific Writing and Medical Literature	
CR 535S	Current Federal Regulatory Issues in Biomedical Research	
CR 545S	Pharmaceutical Law	
CR 550S	Leadership Skills	
CR 555S	Compliance & Monitoring Issues	
CR 570S	Principles and Practice of Pharmacovigilance	
CR 600S	Designing the Clinical Trial	
CR 609S	Innovative Product Development	
CR 612S	Fundamentals of Compliance	
CR 614S	Introduction to Clinical Pharmacology	
CR 617S	Informatics in Pharm Res & Development	
CR 620S	Regulatory, Scientific and Social Issues Affecting Biotech Research	
CR 625S	Health Policy and Economics	
CR 635S	Strategic Planning	
Total Credits		128.0-137.0

* Taken each semester with the exception of the last when only Thesis Defense is taken.

** Taken each semester starting in year 2, with the exception of the last semester when only Thesis Defense is taken.

Sample Plan of Study (MS)

Thesis Option

First Year

Fall		Credits
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
PHGY 503S	Graduate Physiology	4.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 503S	Pharm & Phys 1st Lab Rotation	4.0
PHRM 516S	Advanced Topics in Physiology	1.0
Term Credits		16.0

Spring

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 504S	Pharm & Phys 2nd Lab Rotation	4.0
PHRM 512S	Graduate Pharmacology	3.0
Term Credits		16.0

Second Year

Fall		Credits
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 507S	Prin of Neuropharmacology	3.0
PHRM 517S	Advanced Topics in Pharmacology	1.0
PHRM 600S	Pharmacology Thesis Research	9.0
Advanced Elective		2.0
Term Credits		16.0

Spring

IDPT 501S or NEUR 500S	Biostatistics I Statistics for Neuro/Pharm Research	2.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 600S	Pharmacology Thesis Research	9.0
Advanced Elective		2.0
Term Credits		14.0

Total Credit: 62.0

Non-Thesis Option

First Year

		Credits
Fall		
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
PHGY 503S	Graduate Physiology	4.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 516S	Advanced Topics in Physiology	1.0
Term Credits		12.0

Spring

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 512S	Graduate Pharmacology	3.0
Advanced Elective		3.0
Term Credits		15.0

Second Year

Fall		
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 507S	Prin of Neuropharmacology	3.0
PHRM 517S	Advanced Topics in Pharmacology	1.0
Advanced Elective		4.0
Term Credits		9.0

Spring

IDPT 501S or NEUR 500S	Biostatistics I Statistics for Neuro/Pharm Research	2.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
Advanced Elective		2.0
Term Credits		9.0

Total Credit: 45.0

Sample Plan of Study (PhD)

First Year

		Credits
Fall		
IDPT 502S	Learn Early As Professionals I (LEAP I)	1.0
IDPT 521S	Molecular Structure and Metabolism	5.0
PHGY 503S	Graduate Physiology	4.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 503S	Pharm & Phys 1st Lab Rotation	4.0
PHRM 516S	Advanced Topics in Physiology	1.0
Term Credits		16.0

Spring

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 504S	Learn Early and Practice (LEAP II)	1.0
IDPT 526S	Cells to Systems	5.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 504S	Pharm & Phys 2nd Lab Rotation	4.0
PHRM 505S	Pharm & Phys 3rd Lab Rotation	4.0
PHRM 512S	Graduate Pharmacology	3.0
Term Credits		20.0

Second Year

Fall

PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 507S	Prin of Neuropharmacology	3.0
PHRM 517S	Advanced Topics in Pharmacology	1.0
PHRM 600S	Pharmacology Thesis Research	9.0
Term Credits		14.0

Spring

IDPT 501S or NEUR 500S	Biostatistics I Statistics for Neuro/Pharm Research	2.0
IDPT 507S	Teaching Practicum I	1.0-4.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 600S	Pharmacology Thesis Research	9.0
Term Credits		13.0-16.0

Third Year

Fall

IDPT 508S	Teaching Practicum II	1.0-4.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 600S	Pharmacology Thesis Research	9.0
Advanced Electives		2.0
Term Credits		13.0-16.0

Spring

IDPT 509S	Teaching Practicum III	1.0-4.0
PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 600S	Pharmacology Thesis Research	9.0
Advanced Electives		2.0
Term Credits		13.0-16.0

Fourth Year

Fall

PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 600S	Pharmacology Thesis Research	9.0
Term Credits		10.0

Spring

PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 600S	Pharmacology Thesis Research	9.0
Term Credits		10.0

Fifth Year

Fall

PHRM 502S	Current Topics in Pharmacology & Physiology	1.0
PHRM 600S	Pharmacology Thesis Research	9.0
Term Credits		10.0

Spring

IDPT 600S	Thesis Defense	9.0
Term Credits		9.0

Total Credit: 128.0-137.0

Certificate in Clinical Research

Certificate Level: Graduate

Admissions Requirements: Bachelor's degree or higher

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Semester

Expected Time to Completion: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.0719

Standard Occupational Classification (SOC) Code: 11-9111

About the Program

This part-time certificate program is a valuable professional resource for today's busy physicians, physician assistants, nurses, clinical fellows, research coordinators, and other individuals working in the clinical arena who want in-depth exposure to the skills and knowledge needed in the evolving clinical research field without having to commit to an entire master's program. All courses are conducted online to accommodate the needs of working professionals.

This program requires the successful completion of five graduate courses. Credits earned in the certificate program are recognized towards the Master of Science in Clinical Research Organization and Management. (<http://online.drexel.edu/online-degrees/biomedical-degrees/ms-crom/>)

Admission Requirements

A bachelor's degree from a regionally accredited institution in the United States or an equivalent international institution.

Cumulative GPA of 3.0 (graduate degree GPA will be considered along with the undergraduate GPA).

Required documents:

- A completed application
- Official transcripts from all universities of colleges and other post-secondary educational institutions (including trade schools) attended
- Two letters of recommendation
- Essay on your past successes, goals and objectives for pursuing this program
- Resume
- Additional requirements for international students

A telephone interview may be requested

Additional Information

Richard Mangano, PhD
Director, Graduate Programs in Clinical Research
rmm379@drexel.edu
215-762-3812

Visit the Drexel University Online web site for additional program information and to apply to the certificate (<http://online.drexel.edu/online-degrees/biomedical-degrees/cert-cr/>) program.

Requirements

CR 515S	Intro to Clinical Trials	3.0
CR 545S	Pharmaceutical Law	3.0
CR 612S	Fundamentals of Compliance	3.0

Electives

Select two of the following: 6.0

New Product Research and Development

CR 525S	Scientific Writing and Medical Literature	
CR 600S	Designing the Clinical Trial	
CR 609S	Innovative Product Development	
CR 614S	Introduction to Clinical Pharmacology	
CR 620S	Regulatory, Scientific and Social Issues Affecting Biotech Research	

Compliance and Safety Surveillance

CR 555S	Compliance & Monitoring Issues	
CR 570S	Principles and Practice of Pharmacovigilance	
CR 633S	Quality Assurance Audits	

Ethics and Law

CR 505S	Ethical Issues in Research	
CR 511S	The History of Misconduct in Biomedical Research	
CR 565S	Contemporary Issues in Human Research Protection	
Regulatory		
CR 501S	Emerging Trends in Medical Device Regulation	
CR 508S	Medical Device Combination Product Regulation	
CR 514S	World Wide Regulatory Submissions	
CR 523S	Current Issues in Review Boards	
CR 535S	Current Federal Regulatory Issues in Biomedical Research	
CR 551S	International Regulatory Affairs	
Biostatistics and Data Management		
CR 500S	Epidemiology	
CR 520S	Applications of Clinical Research Biostatistics	
CR 527S	Clinical Data Management	
CR 631S	Applications of Clinical Research Biostatistics II	
Clinical Research Management		
CR 510S	Sponsored Projects Finance	
CR 512S	Fundamentals of Academic Research Administration	
CR 536S	Clinical Project Management	
CR 541S	Patient Recruitment and Informed consent	
CR 550S	Leadership Skills	
New Therapeutic Product Business and Strategic Planning		
CR 513S	Business Processes and Contemporary Concerns in Pharmaceutical R & D	
CR 518S	Clinical Trial Budgeting	
CR 546S	Clinical Outsourcing	
CR 617S	Informatics in Pharm Res & Development	
CR 625S	Health Policy and Economics	
CR 635S	Strategic Planning	

Total Credits 15.0

* Courses not listed above may be taken as electives only with the approval of the program director.

Sample Plan of Study

Term 1		Credits
CR 515S	Intro to Clinical Trials	3.0
Elective		3.0
Term Credits		6.0
Term 2		
CR 612S	Fundamentals of Compliance	3.0
Elective		3.0
Term Credits		6.0
Term 3		
CR 545S	Pharmaceutical Law	3.0
Term Credits		3.0
Total Credit: 15.0		

Evening Post-Baccalaureate Pre-Medical Certificate Program

Certificate Level: Undergraduate

Admissions Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 32.0

Instructional Delivery: Campus

Calendar Type: Semester

Expected Time to Completion: 2 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.1199

Standard Occupational Classification (SOC) Code: 11-9121

About the Program

The Graduate School of Biomedical Sciences and Professional Studies at Drexel University's College of Medicine offers the part-time Evening Post-Baccalaureate Pre-Medical certificate (PMED). This program gives individuals who hold a non-science baccalaureate degree the opportunity to continue working while they take courses in the evening to prepare themselves for medical, veterinary, dental, podiatric, chiropractic, or other allied health professional schools. This program also affords the individual who took science courses many years ago the opportunity to revisit the sciences. The structured program is the equivalent of five semesters completed in succession.

Articulation agreements have been established for successful students upon completion of the PMED program. These schools include Drexel University College of Medicine, Edward Via College of Osteopathic Medicine, Philadelphia College of Osteopathic Medicine, and the Robert Wood Johnson School of Medicine.

The program consists of 5 semesters parsed out over 2 years. The curriculum offers the prerequisite science courses required by most health professional schools. During the first year, general chemistry and general physics with laboratories are offered. During the second year, students take organic chemistry and general biology in the summer and fall semesters. During the final semester, a formal MCAT review course is offered to students, expense-free. In addition, two elective courses are offered including Molecular Biology & Biochemistry and Sociology & Psychology.

Admission Requirements

Students applying to the program must have a bachelor's degree from an accredited institution in the United States. Admission into the program is competitive because of the limited number of seats. Applicants are accepted on a rolling admissions basis.

An applicant should have a minimum combined SAT score of 1000 or ACT score of 21 and a minimum undergraduate grade point average of 3.00. For those individuals far removed from the college years, additional factors, or other more recent coursework, will be considered.

Applicants to the program should have at least 6.0 semester credits of coursework in English literature and the behavioral sciences (psychology, sociology, or philosophy), as that is a requirement for admission into most health professional schools. The opportunity exists within the program to acquire these courses if a student without these courses is accepted. A strong understanding of algebra and trigonometry is a prerequisite for the program.

The program's application can be found on the College of Medicine's Evening Post-Baccalaureate Pre-Med Certificate Admissions (<http://www.drexelmed.edu/Home/Admissions/ProfessionalStudiesintheHealthSciences/EveningPostBaccalaureatePremedical.aspx>) web page.

Program Requirements

Required Courses

PMED 111S	General Chemistry I	3.0
PMED 112S	General Chemistry I Lab	1.0
PMED 121S	General Physics I	3.0
PMED 122S	General Physics I Lab	1.0
PMED 131S	General Chemistry II	3.0

PMED 132S	General Chemistry II Lab	1.0
PMED 141S	General Physics II	3.0
PMED 142S	General Physics II Lab	1.0
PMED 211S	General Biology I	3.0
PMED 212S	General Biology I Lab	1.0
PMED 221S	Organic Chemistry I	3.0
PMED 222S	Organic Chemistry I Lab	1.0
PMED 231S	General Biology II	3.0
PMED 232S	General Biology II Lab	1.0
PMED 241S	Organic Chemistry II	3.0
PMED 242S	Organic Chemistry II Lab	1.0

Optional

PMED 151S	College Algebra & Trigonometry	
PMED 240S	Conceptual Reviews in General and Organic Chemistry	
PMED 250S	Molecular Biology & Biochemistry	
PMED 800S	Registered for Degree Only	
PMED T180S	Special Topics in Pre-Medical	
PMED T280S	Special Topics in Pre-Medical	

Total Credits 32.0

Additional Information

For more information, visit Drexel's College of Medicine Evening Post-Baccalaureate Pre-Medical Certificate Program (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PremedicalPrograms/EveningPostBaccalaureatePreMedical.aspx>) web page.

Certificate in Quantitative Principles for Clinical Research

Certificate Level: Graduate

Admissions Requirements: Bachelor's degree or higher

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 9.0

Instructional Delivery: Online

Calendar Type: Semester

Expected Time to Completed: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.0000; 51.0719

Standard Occupational Classification (SOC) Code: 11-9111

About the Program

This certificate of study addresses the needs of residents and fellows to attain knowledge in the basic principles of clinical research - analyzing data, understanding medical literature, and communicating results. All coursework is online, providing flexibility for the trainees and training programs.

Students completing this certificate can then apply to either the Clinical Research Organization and Management (<http://online.drexel.edu/online-degrees/biomedical-degrees/ms-crom/>) or the Clinical Research for Health Professionals (<http://online.drexel.edu/online-degrees/biomedical-degrees/ms-crhp/>) program to obtain an MS degree.

Admissions Requirements

A bachelor's degree from a regionally accredited institution in the United States or an equivalent international institution.

Required Documents

- A completed application
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended
- Additional requirements for International Students

Program Requirements

Required Courses

CR 500S	Epidemiology	3.0
CR 520S	Applications of Clinical Research Biostatistics	3.0
CR 525S	Scientific Writing and Medical Literature	3.0
Total Credits		9.0

Additional Information

Richard Mangano, PhD
 Director, Graduate Programs in Clinical Research
 rmm379@drexel.edu
 215-762-3812

Visit the Drexel University Online web site for additional information and to apply to the Quantitative Principles for Clinical Research (<http://online.drexel.edu/online-degrees/biomedical-degrees/qpcr/>) program.

Goodwin College of Professional Studies

The Goodwin College of Professional Studies offers two Masters programs: MS in Professional Studies, which is designed for individuals and practitioners with established career paths who are interested in developing marketable skills to meet evolving workforce demands, seeking professional development, or expanding promotional opportunities; and an MS in Nonprofit Management: Public, Professional & Social Sectors, which prepares students to successfully handle the responsibilities, challenges and opportunities facing today's nonprofit sector.

Majors

- Nonprofit Management: Public, Professional & Social Sectors (MS) (<http://catalog.drexel.edu/graduate/collegeofprofessionalstudies/nonprofitmanagement/>)
- Professional Studies (MS) (p. 100)

Minor

- **New:** Nonprofit Management: Public, Professional & Social Sectors
- Professional Studies (<http://catalog.drexel.edu/graduate/collegeofprofessionalstudies/professionalstudiesgminor/>)

Professional Studies

Major: Professional Studies

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Classification of Instructional Programs (CIP) code: 30.0000

Standard Occupational Classification (SOC) code: 11-9199

About the Program

The MS in Professional Studies degree provides students with the highly valued interpersonal skills needed to collaborate, negotiate, and lead effectively in today's workplace by offering a blend of quantitative and qualitative courses. The interdisciplinary Workplace Competencies concentration allows students to apply their knowledge and learned skills across multiple industries. Our professors are career professionals who bring real-world workplace situations into our virtual classrooms to better prepare students to apply learned skills in the following industries: communications, human resources, finance, insurance, marketing, utilities, pharmaceuticals, among many others. This degree allows students to leverage themselves into various levels of middle and upper management with continued possibilities to climb the corporate ladder.

The MS in Professional Studies Program aims to equip students with the following demonstrable skills:

- **Communication** - enhancing oral, written, and non-verbal communication skills to allow students to easily relate to, collaborate with, and lead others in the work place - both in person and virtually
- **Leadership** - providing students with the necessary tool to lead people and organizations through the acts of negotiation, attracting and sustaining talent, and thinking and acting strategically to achieve results

- **Critical Inquiry** - training students to conduct research and collect data using proven scientific methods and then evaluate and analyze that data to make profitable decisions in the workplace
- **Ethics** - developing a moral and ethical framework from which organizational decisions can be made

This program is designed for the professional who has at least three years of working experience, and who is looking to **launch, change, or advance** his or her career.

Program Delivery

The Masters in Professional Studies is a part-time graduate degree program that is offered entirely online. Drexel University operates on a quarter schedule (four 10-week terms per academic year). Students will take two courses per quarter.

Additional Information

For additional information, please visit the Goodwin College Professional Studies (<http://drexel.edu/goodwin/academics/graduate-programs/ms-professional-studies/>) webpage.

Admission Requirements

Acceptance to the program requires:

- Completed online application (<http://www.drexel.com/online-degrees/business-degrees/ms-prof-studies/apply.aspx>) form
- Bachelor's degree from an accredited institution
- Undergraduate GPA of 3.0 or higher (graduate degree GPAs will be considered along with the undergraduate GPA)
 - Applicants with a cumulative GPA below 3.0 may be considered
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended
 - Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online (customerservice@drexel.com)
 - You must supply transcripts regardless of the number of credits earned or the type of school you attended
 - If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts
 - Please use our Transcript Look-up Tool (<http://www.drexel.com/tools/transcript.aspx>) to assist you in contacting your previous institutions
- Two letters of recommendation (3 preferred)
 - Drexel University Online now accepts electronic letters of recommendation
 - Submission instructions are available at: <http://www.drexel.edu/apply/recommend> (<http://www.drexel.edu/apply/recommend/>)
 - If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender
- Personal Statement — 500-750 words, describing your interest in the program. Specifically, please discuss the following:
 - Your current line of work and career path until this point
 - How the program will help you facilitate your future career goals
 - Your role in building community in an online degree program

- Resume
- Optional: Students may elect to submit any of the following:
 - GRE/GMAT Scores
 - Example of a work project that demonstrates a specific skill or area of expertise
- International students must submit a TOEFL score of 550 or higher, please view additional International students requirements (<http://www.drexel.com/online-degrees/education-degrees/ms-humanresourcedevelopment/international.aspx>)
- Interviews are not required, but may be requested

Students will submit their portfolios as part of their Capstone experience. When students complete the program, they may choose to maintain their portfolios for a small annual fee.

Degree Requirements

Core Courses

PRST 501	Communication for Professionals	3.0
PRST 503	Ethics for Professionals	3.0
PRST 504	Introduction to Research Methods & Design	3.0
PRST 603	Communicating in Virtual Teams	3.0
PRST 612	Data Analysis and Interpretation	3.0
PRST 615	Program Evaluation	3.0
PRST 640	Policy Analysis	3.0
PRST 655	The Art & Science of Influencing Others	3.0
PRST 670	Fostering Diversity and Inclusion in the Workplace	3.0

Electives 12.0

Choose four of the following graduate electives (with advisor approval):

COM 610	Theories of Communication and Persuasion
CRTV 503	Creativity in the Workplace
CRTV 610	Creativity and Change Leadership
CRTV 630	Global Perspectives on Creativity
ENTP 611	Learning from Failure
ENTP 621	Innovation & Ideation
ENTP 631	Building Internal & External Relationships
ENTP 641	Innovation in Established Companies
MGMT 510	Business Problem Solving
ORGB 625	Leadership and Professional Development
ORGB 631	Leading Effective Organizations

Capstone

PRST 700	Capstone I: Project Exploration	1.5
PRST 701	Capstone II: Topical Analysis	4.5

Total Credits	45.0
---------------	------

Portfolio Requirement

All students will be required to maintain a portfolio as they progress through the program. Access to the portfolio platform is provided by the University at no charge to the student.

Over the course of their studies, students will add written assignments, projects, presentations, links to videos, and any other specimens to showcase learned skills, knowledge, or growth in one of 8 areas:

- Communication
- Creative and/or Critical Thinking & Information Literacy
- Ethical Reasoning & Responsible Citizenship
- Global Competence
- Leadership
- Personal Reflections
- Capstone
- Professional Documentation

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 graduate programs. Many offer flexible scheduling, making it possible for students to continue their education through part-time, online, night, or weekend study.

Majors

- Addictions Counseling (MS) (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/addictionscounseling/>)
- Art Therapy and Counseling (MA) (p. 104)
- Complementary and Integrative Health (MS) (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/complementaryandintegrativehealth/>)
- Couple and Family Therapy (PhD) (p. 108)
- Couple and Family Therapy (DCFT) (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/coupleandfamilytherapydcft/>)
- Creative Arts Therapies (PhD) (p. 106)
- Culinary Arts and Science (MS) (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/culinaryartsandscience/>)
- Dance/Movement Therapy and Counseling (MA) (p. 110)
- Doctor of Health Science (DHSc) (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/healthsciencesdhsc/>)
- Family Therapy (MFT) (p. 112)
- Food Science (MS) (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/foodscience/>)
- Health and Rehabilitation Sciences (PhD) (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/healthandrehabilitationssciencephd/>)
- Health Administration (MHA) (p. 114)
- Human Nutrition (MS) (p. 115)
- Music Therapy and Counseling (MA) (p. 119)
- Nurse Anesthesia (MSN) (p. 121)
- Nursing: MSN/PhD Joint Degree (MSN/PhD) (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/nursingmsnphd/>)
- Nursing (PhD) (p. 121)
- Nursing Practice (DNP) (p. 123)
- **Nursing - Advanced Role (MSN)**
 - Clinical Nurse Leader (p. 125)
 - Clinical Research (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/clinicalresearchcon/>)
 - Nursing Education (p. 127)
 - Nursing Innovation (p. 129)
 - Nursing Leadership in Health Systems Management (p. 131)
 - MSN-Bridge Program (p. 133)
 - Quality, Safety, and Risk Management in Healthcare (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/qualitysafetyandriskmanagementinhealthcare/>)

[collegeofnursingandhealthprofessions/qualitysafetyandriskmanagementinhealthcare/](http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/qualitysafetyandriskmanagementinhealthcare/)

- **Nursing - Nurse Practitioner (MSN)**
 - Adult-Gerontology Acute Care Nurse Practitioner
 - Adult-Gerontology Primary Care Nurse Practitioner (p. 135)
 - Family/Individual Across the Lifespan Nurse Practitioner (p. 136)
 - Pediatric Acute Care Nurse Practitioner (p. 137)
 - Pediatric Primary Care Nurse Practitioner (p. 138)
 - Pediatric Primary Care and Pediatric Acute Care Dual Option Nurse Practitioner (p. 139)
 - Psychiatric Mental Health Nurse Practitioner (p. 140)
 - Women's Health/Gender Related Nurse Practitioner (p. 141)
- **NEW:** Nutrition and Dietetics (MS)
- Nutrition Sciences (PhD) (p. 145)
- Physical Therapy (DPT) (p. 142)
- Physician Assistant (MHS) (p. 146)
- Quality, Safety and Risk Management in Healthcare (MS) (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/qualitysafetyandriskmanagementinhealthcare/>)
- Rehabilitation Sciences (DHSc) (p. 149)
- Rehabilitation Sciences (MHS) (p. 151)

Graduate Minors

- Addictions Counseling (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/addictionscounselinggminor/>)
- Advanced Study in Complementary and Integrative Therapies (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/complementaryandintegrativetherapiesgminor/>)
- Advanced Study in Holistic Hospice and Palliative Care (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/holisticheospiceandpalliativecaregminor/>)
- Advanced Study in Integrative Addiction Therapies (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/integrativeaddictiontherapiesgminor/>)
- Advanced Study in Women's Integrative Health (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/womensintegrativehealthgminor/>)
- **NEW:** Forensic Trends and Issues in Contemporary Healthcare
- Health Administration (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/healthadministrationgminor/>)
- Integrated Nursing Care of Autism Spectrum Disorder (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/integratednursingcareofasdgmminor/>)
- Neuroscience, Learning and Instruction (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/neurosciencelearninginstruction/>)
- Nursing Education (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/nursingeducationgminor/>)
- Nursing Leadership in Health Systems Management (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/nursingleadershipinhealthsystemsmanagementgminor/>)
- Quality, Safety and Risk Management in Healthcare (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/qualitysafetyandriskmanagementgminor/>)
- Service to Veterans (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/servicetoveteransgminor/>)

- Sexual Health and Wellness (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/sexualhealthandwellnessgminor/>)

Certificates

- Complementary and Integrative Therapies (p. 152)
- Forensic Trends and Issues in Contemporary Healthcare (p. 153)
- Geriatrics (p. 154)
- Holistic Hospice and Palliative Care (p. 155)
- Integrative Addiction Therapies (p. 156)
- Music Therapy (p. 157)
- Neuroscience, Learning and Instruction (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/neurosciencelearningandinstructionpbc/>)
- Nurse Anesthesia (p. 158)
- **Nursing Certificates - Advanced Role**
 - Clinical Nurse Leader Post-Master's Certificate (p. 158)
 - Leadership in Health Systems Management (p. 162)
 - Nursing Innovation (p. 159)
 - Integrated Nursing Care of Autism Spectrum Disorder (ASD) (p. 160)
 - Nursing Education Post-Bachelor's Certificate (p. 161)
- **Nursing Certificates - Nurse Practitioner**
 - Adult-Gerontology Acute Care Nurse Practitioner Post-Master's Certificate
 - Adult-Gerontology Primary Care Nurse Practitioner Post-Master's Certificate (p. 163)
 - Emergency/Trauma Nurse Practitioner (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/emergencytraumanppmc/>)
 - Family/Individual Across the Lifespan Nurse Practitioner Post-Master's Certificate (p. 164)
 - Pediatric Acute Care Nurse Practitioner Post-Master's Certificate (p. 165)
 - Pediatric Primary Care Nurse Practitioner Post-Master's Certificate (p. 165)
 - Pediatric Primary Care and Pediatric Acute Care Dual Option Nurse Practitioner Post-Master's Certificate (p. 166)
 - Psychiatric Mental Health Nurse Practitioner Post-Master's Certificate (p. 166)
 - Women's Health/Gender Related Nurse Practitioner Post-Master's Certificate (p. 167)
- Service to Veterans (p. 167)
- Sexual Health and Wellness (p. 168)
- Substance Use Disorder Treatment (p. 169)
- Women's Integrative Health (Advanced Study) (p. 170)

About the College

As the practice of medicine has become more complex with the advent of technology and new drug therapies, so has the provision of health services. An increasingly diverse, aging US population experiencing higher rates of chronic illness is demanding more service and culturally competent care. While technology improvements help provide the means to deliver safer, high-quality care, our society is facing shortages in health professionals such as nurses, mental health workers, nurse anesthetists, physician assistants, and rehabilitation science professionals. The

demand for these and other skilled professionals continues to increase and is expected to remain steady well into the 21st century. There is no more vibrant a place to prepare for these kinds of meaningful, rewarding careers than at Drexel University's College of Nursing and Health Professions (<http://www.drexel.edu/cnhp/>). The College offers associate's, bachelor's, master's, and doctoral degrees in more than a dozen health care fields.

Just as the health profession disciplines have come of age, so has the College of Nursing and Health Professions. Founded in 1969 as the College of Allied Health Professions with just three degree programs and a faculty of five, the college has undergone a remarkable evolution. Today it serves over 3,000 students, with a broad array of contemporary program offerings. Along the way, it has earned widespread recognition and accreditation for the education of health professionals.

Mission and Approach

The College believes that the health care needs of today and tomorrow can best be met by professionals who have expertise in their own fields and a concurrent understanding of other health disciplines. In addition to providing a broad-based education that balances academic learning with clinical training, the University promotes collaboration among students in our College of Nursing and Health Professions, our School of Public Health, and the College of Medicine, which draws from the rich traditions of predecessors Hahnemann University and the Medical College of Pennsylvania.

Teamwork is as important in academics as it is in health care. The College of Nursing and Health Professions' dedicated and knowledgeable faculty members work closely with students, providing a supportive and creative learning environment. Graduates from the College possess a wide range of experiences and the knowledge, compassion, and lifelong learning skills needed to become accomplished health care professionals.

The student body, which is diverse in age and culture, reflects Drexel University's commitment to provide qualified students with an opportunity for advanced education. Drexel welcomes nontraditional applicants and especially encourages applications from underrepresented minorities and those interested in practicing in underserved areas.

Many of Drexel's College of Nursing and Health Professions programs offer flexible scheduling, making it possible for students to continue their education through part-time, online, night, or weekend study.

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 CCNE (Commission on Collegiate Nursing Education). 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 Certificates are accredited by COAMFTE (Commission on Accreditation of Marriage and Family Therapy Education).
- The Creative Arts Therapies MA degree programs in Art Therapy and Counseling, Dance/Movement Therapy and Counseling, and Music Therapy and Counseling are approved by AATA (American Art

Therapy Association), ADTA (American Dance Therapy Association), and AMTA (American Music Therapy Association), respectively.

- The Didactic Program in Nutrition is accredited by ACEND (Accreditation Council for Education in Nutrition and Dietetics).
- 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 Doctor of 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).

Art Therapy and Counseling

Major: Art Therapy and Counseling

Degree Awarded: Master of Arts (MA)

Calendar Type: Quarter

Total Credit Hours: 90.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.2301

Standard Occupational Classification (SOC) code: 29-1129

About the Program

The Master of Arts in Art Therapy and Counseling program educates students for creative, responsive and effective therapy practice, in which art making is the essential mode of transformation. Through a balance of classroom education and clinically supervised practicum and internship experiences, students develop a strong foundation for skilled clinical practice. The 90.0 quarter-credit curriculum includes specific art therapy coursework in areas such as assessment and treatment planning for children, adolescents, adults, older adults and families; trauma approaches; creativity, symbol and metaphor; digital media use; mindfulness, and addictions and recovery. Students also take classes in general mental health counseling topics including human development; psychopathology; social and cultural foundations; clinical appraisal and assessment, and group dynamics. Graduates are eligible for the ATR-Provisional, ATR, and ATR-BC credentials, as well as professional counseling licensure in Pennsylvania (upon completion of post-graduation requirements).

Art therapy uses the creative process of making art to help improve a person’s physical, mental, and emotional well-being. Counseling is a professional relationship that empowers diverse individuals, families, and groups to accomplish mental health, wellness, education, and career goals. Art therapy and counseling can help clients explore their behaviors, thoughts and feelings, reconcile conflicts, foster self-awareness, manage coping with addictions, develop social skills, reduce anxiety, and increase self-esteem to build on strengths. Upon graduation, students from Drexel’s MA in Art Therapy and Counseling go on to work in a variety of settings, including but not limited to, medical and psychiatric hospitals, in-patient and out-patient behavioral health and recovery programs, community health and wellness centers, schools and after-school programs, trauma-informed settings, correctional facilities and halfway houses, elder care facilities, and private practices. Students also

pioneer new frontiers in therapy application through their clinical work and research.

For additional information about the program, visit the College of Nursing and Health Professions’ Art Therapy and Counseling (<https://www.drexel.edu/cnhp/academics/graduate/MA-Art-Therapy-Counseling/>) website.

Degree Requirements

Core Courses

CATX 501	Foundations of the Creative Arts Therapies	3.0
CTCN 501	Human Psychological Development	4.5
CTCN 503	DSM and Psychopathology	4.5
CTCN 504	Professional Orientation and Ethics	4.5
CTCN 505	Theories of Counseling and Psychotherapy	4.5
CTCN 506	Social and Cultural Foundations in Counseling and Art Therapy	4.5
CTCN 601	Introduction to Behavioral Research	4.5
CTCN 603	Clinical Appraisal and Assessment	4.5
CTCN 604	Career Counseling	4.5
CTCN 606	Group Dynamics in Counseling and Art Therapy	4.5

Art Therapy Track Courses

CATX 531	Adults & Older Adults Assessment & Treatment Planning	3.0
CATX 532	Trauma Approaches in Art Therapy	3.0
CATX 533	Child & Adolescent Assessment & Treatment Planning	3.0
CATX 534	Family Assessment and Treatment Planning	3.0
CATX 535	Creativity, Symbolism, and Metaphor in Art Therapy and Counseling	3.0
CATX 536	Studio Art for Art Therapists	1.5
CATX 537	Art Therapy Group Supervision I	1.0
CATX 538	Art Therapy Group Supervision II	1.0
CATX 539	Art Therapy Group Supervision III	1.0
CATX 631	Media, Materials and Process in Art Therapy	3.0
CATX 637	Advanced Art Therapy Group Supervision I	1.0
CATX 638	Advanced Art Therapy Group Supervision II	1.0
CATX 639	Advanced Art Therapy Group Supervision III	1.0
CATX 645	Professional Identity & Contemporary Practices	3.0

Art Therapy Electives

Select one of the following:

CATX 540	Addictions and Recovery Art Therapy Approaches	
CATX 541	Digital Media Use in Art Therapy and Counseling	
CATX 542	Mindfulness in Clinical Practice	

Clinical Education Courses

CTCN 510	Clinical Practicum I	2.0
CTCN 520	Clinical Practicum II	2.0
CTCN 530	Clinical Practicum III	2.0
CTCN 610	Clinical Internship I	2.0
CTCN 620	Clinical Internship II	2.0
CTCN 630	Clinical Internship III	2.0

Culminating Project

Complete a total of 3 credits		3.0
CATX 621	Culminating Project in Art Therapy I	
CATX 622	Culminating Project in Art Therapy II	

Additional Electives

CATX 627	For Culminating Project Only	
CATX 1699	Independent Study in Creative Arts Therapy	

Total Credits		90.0
---------------	--	------

Sample Plan of Study

Term 1		Credits
CTCN 501	Human Psychological Development	4.5
CTCN 510	Clinical Practicum I	2.0

CATX 532	Trauma Approaches in Art Therapy	3.0
CATX 533	Child & Adolescent Assessment & Treatment Planning	3.0
CATX 537	Art Therapy Group Supervision I	1.0
Term Credits		13.5
Term 2		
CTCN 506	Social and Cultural Foundations in Counseling and Art Therapy	4.5
CTCN 520	Clinical Practicum II	2.0
CATX 531	Adults & Older Adults Assessment & Treatment Planning	3.0
CATX 534	Family Assessment and Treatment Planning	3.0
CATX 538	Art Therapy Group Supervision II	1.0
Term Credits		13.5
Term 3		
CTCN 503	DSM and Psychopathology	4.5
CTCN 530	Clinical Practicum III	2.0
CATX 535	Creativity, Symbolism, and Metaphor in Art Therapy and Counseling	3.0
CATX 536	Studio Art for Art Therapists	1.5
CATX 539	Art Therapy Group Supervision III	1.0
Term Credits		12.0
Term 4		
CATX 501	Foundations of the Creative Arts Therapies	3.0
CTCN 504	Professional Orientation and Ethics	4.5
CTCN 505	Theories of Counseling and Psychotherapy	4.5
Term Credits		12.0
Term 5		
CTCN 601	Introduction to Behavioral Research	4.5
CTCN 606	Group Dynamics in Counseling and Art Therapy	4.5
CTCN 610	Clinical Internship I	2.0
CATX 631	Media, Materials and Process in Art Therapy	3.0
CATX 637	Advanced Art Therapy Group Supervision I	1.0
Term Credits		15.0
Term 6		
CTCN 603	Clinical Appraisal and Assessment	4.5
CTCN 620	Clinical Internship II	2.0
CATX 621	Culminating Project in Art Therapy I	1.0
CATX 638	Advanced Art Therapy Group Supervision II	1.0
Art Therapy Elective		3.0
Choose one of the following:		
CATX 540	Addictions and Recovery Art Therapy Approaches	
CATX 541	Digital Media Use in Art Therapy and Counseling	
CATX 542	Mindfulness in Clinical Practice	
Term Credits		11.5
Term 7		
CTCN 604	Career Counseling	4.5
CTCN 630	Clinical Internship III	2.0
CATX 639	Advanced Art Therapy Group Supervision III	1.0
CATX 645	Professional Identity & Contemporary Practices	3.0
CATX 622	Culminating Project in Art Therapy II (Variable Credit 1-3 cr)	2.0
Term Credits		12.5

Total Credit: 90.0

Creative Arts Therapies Department Faculty

Yasmine Awais, MAAT, ATR-BC, ATCS, LCAT, LPC (*Art Institute of Chicago*). Associate Clinical Professor. Art therapy with diverse populations, art therapy in non-profit settings, clinical supervision.

Joke Bradt, PhD, MT-BC (*Temple University*) Director, PhD Program in *Creative Arts Therapies*. Professor. Research in music therapy, chronic pain, systematic reviews.

Natalie Rae Carlton, PhD, ATR-BC, LPCC (*Lesley University*) Director, *Art Therapy and Counseling MA Program*. Associate Clinical Professor. New media and art therapy, social justice in art activities, transgender and LGBTQ identity.

Christina Devereaux, PhD, LCAT, LMHC, BC-DMT, NCC (*UCLA*) Program Director for *Dance/Movement Therapy and Counseling*. Associate Clinical Professor. Dance movement therapy, children, attachment, autism spectrum disorder, trauma, group work, clinical supervision

Abby Dougherty, PhD, NCC, LPC (*Walden University*) Core Counseling Curriculum Coordinator. Clinical Assistant Professor. Virtual reality in mental health, mindfulness and contemplative practices in counselor education, creativity in college counseling, learning disabilities, relational-cultural theory in counseling and adult education.

Sharon Goodill, PhD, BC-DMT, NCC, LPC (*Union Institute and University*) Chair, *Department of Creative Arts Therapies*. Clinical Professor. Medical dance/movement, mind/body studies, movement assessment for DMT, CAT research and leadership.

Scott Horowitz, MA, MT-BC, LPC (*Drexel University*) Director of Field Education. Clinical Instructor. Interdisciplinary practice and education, developmental models of clinical and practicum supervision, music therapy and neurodevelopmental populations.

Florence Ierardi, MM, MT-BC, LPC (*Temple University*) Director, *Music Therapy and Counseling MA Program*. Associate Clinical Professor. Clinical improvisation, trauma-informed music therapy, multicultural music therapy perspectives.

Girija Kaimal, EdD, MA (*Harvard University*). Associate Professor. Art therapy, educational research, program evaluation, art therapy.

Dawn Morningstar, MCAT, VC-DMT, LP (*Hahnemann University*) Coordinator of *CAT Clinical Services*. Assistant Clinical Professor. Specialty in working with children and adolescents, Dance/movement therapist at Drexel's Parkway Health and Wellness faculty practice outpatient clinic.

Michele Rattigan, MA, ATR-BC, NCC, LPC (*MCP Hahnemann University*) Coordinator of *CAT Clinical Services*. Associate Clinical Professor. Unresolved trauma; post-partum depression and anxiety; disordered eating and body image concerns; self-harming behaviors; dissociative disorders

Ellen Schelly-Hill, MMT, BC-DMT, NCC, LPC (*Antioch NE Graduate School*) Director of *Dance/Movement Therapy and Counseling MA Program*. Associate Clinical Professor. Adults diagnosed with mood disorders, anxiety, chronic pain and with histories of trauma; clinical supervision; ethics.

Minjung Shim, PhD, BC-DMT (*Drexel University*). Assistant Research Professor. Medical dance/movement therapy, chronic pain management, mindfulness-based interventions, clinical trials, theory/model-building, qualitative inquiries, scoping reviews.

Emeritus Faculty

Nancy Gerber, PhD, ATR-BC (*Union Institute and University*). Associate Clinical Professor Emerita. Art therapy assessment and treatment of adolescents and adults; modern psychoanalysis and art therapy; arts

therapy education and doctoral education; arts based research and mixed methods research.

Creative Arts Therapies PhD

Major: Creative Arts Therapies

Degree Awarded: Doctor of Philosophy

Calendar Type: Quarter

Total Credit Hours: 48.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.2399

Standard Occupational Classification (SOC) code: 29-1129

About the Program

The PhD in Creative Arts Therapies is a research degree program for art therapists, dance/movement therapists, and music therapists who are interested in pursuing advanced scholarship and assuming academic leadership in their discipline. The primary mission of the program is the cultivation of scholars and academic leaders in the creative arts therapies who can:

- 1) Generate and disseminate relevant, robust rigorous research
- 2) Contribute to theory evaluation and building
- 3) Develop evidence-based best clinical practices
- 4) Cultivate academic proficiency in educating the next generation of art therapists, dance/movement therapists and music therapists.

The PhD program consists of four interactive learning modules, plus a dissertation:

- **Interdisciplinary-** Delivered as seminars, these modules challenge students to study, explore, critically evaluate and synthesize areas of interdisciplinary knowledge relative to creative arts therapies origins, philosophy, and theory.
- **Research-** Includes intensive study of multiple approaches to research. The purpose of the research module is to cultivate students' philosophical perspectives and develop research skills along a spectrum of traditional and innovative approaches. The research curriculum contributes to the generation and dissemination of robust and relevant research in the students' respective fields.
- **Self/Other Artistic Knowledge-** Introduces a laboratory-based pedagogical model in which students explore the intrinsic arts therapies intersubjective processes and transformative mechanisms that emerge through artistic inquiry and which parallels the actual arts therapies experience.
- **Practicum-** Emphasizes the transformation of theoretical knowledge to practical application and specialization. All students are required to complete a teaching practicum for one term. Beyond that, students select and complete two terms of a practicum of their choice in: 1) academia/teaching; 2) research; or 3) applied clinical practice. The practicum helps students position themselves as they prepare for graduation.
- **Dissertation-** An original robust research project that directly relates to the development of and contribution to the theory and practice of the student's creative arts therapy specialization. The dissertation is the culmination and representation of the students' doctoral work that not only advances knowledge in their field, but also positions them for career opportunities in academia and research.

Research

The professions of art therapy, dance/movement therapy, and music therapy have grown and become increasingly integrated as interventions in healthcare, education, and human services. Implicit in the emergent growth and integration of these professions is our responsibility to evaluate existing and develop new evidence-based theories and clinical practices. The mission of the PhD Program in Creative Arts Therapies is to generate, critically evaluate, and disseminate research to address this need and ultimately to advance the knowledge and evidence bases for these professions. Consequently, we have identified the following core values central to our research agenda.

Stewardship and scholarship in the Creative Arts Therapies includes:

1. Critical evaluation of the philosophical assumptions inherent in and essential to the understanding, preservation and advancement of theory and practice of the CATs.
2. Critical evaluation of the research approaches and methods best suited for the investigation of theories, processes, and mechanisms in the creative arts therapies.
3. Generation of knowledge that contributes to the construction, evaluation, and credibility of best evidence-based theory and clinical practices.
4. Translation, dissemination and application of rigorous research that contributes to the preservation and advancement of our fields and the health of society.

For additional information about the program, visit the College of Nursing and Health Professions' PhD in Creative Arts Therapies (<https://drexel.edu/cnhp/academics/doctoral/PHD-Creative-Arts-Therapies/>) website.

Degree Requirements

The mission of the PhD in Creative Arts Therapies program is to cultivate stewards of the professions who can preserve the traditions of the disciplines, promote scholarly and clinical advancement, and contribute to the evidence base of the fields. In pursuit of the program mission, the curriculum includes four interactive learning modules and a dissertation research project that comprise a full-time degree program:

- Interdisciplinary module
- Research module
- Self/other artistic module
- Practicum module

Located within these four learning modules and within the dissertation research are the following educational constructs and objectives:

1. **Learning Culture:** To create an innovative learning culture in which students can become advanced, critical, and creative thinkers, scholars and leaders in their field.
2. **Epistemological Integrity:** To cultivate a learning culture respectful of the epistemology of the creative arts therapies disciplines and resulting in the generation of an indigenous to the Creative Arts Therapies disciplines.
3. **Philosophy and Theory:** To identify and articulate the interdisciplinary philosophical assumptions which contribute to the worldview, indigenous epistemology, theory, and practice in the arts therapies.

4. Theory and Practice: To systematically examine and assess existing theory, propose revisions as necessary, and develop new theoretical constructs that contribute to the evidence base for the creative arts therapies disciplines.

5. Research: To expand the quality and quantity of original research while systematically and critically evaluating the traditional or innovative research paradigms most compatible with the epistemology, knowledge gaps, and research questions in the Creative Arts Therapies.

6. Research and Evidence Base: To generate and disseminate research contributing to theory building and critical evaluation of epistemologically relevant evidence based practice in the fields of art therapy, dance/movement therapy, and music therapy.

7. Dissemination and Translation: To expand the dissemination of knowledge and arts therapies services to both professional and public communities.

8. Leadership and Advocacy: To prepare scholarly leaders, researchers and advocates in the professions of art therapy, dance/movement therapy and music therapy.

For additional information about the program, visit the College of Nursing and Health Professions' PhD in Creative Arts Therapies web site.

General Requirements

The following general requirements must be satisfied in order to complete the PhD in Creative Arts Therapies:

- 48.0 quarter credits of required and elective courses as designated
- Passage of the Candidacy/Qualifying exam (administered after the completion of one year)
- Approval of dissertation proposal
- Completion of one quarter of a Teaching Practicum and two quarters of additional Practicum of the student's choice in one of the following areas: teaching, research, or advanced clinical practice
- Completion and passage of the dissertation
- Passage of final oral exam/oral defense of dissertation

The required courses in the curriculum are organized into four essential learning modules: 1) interdisciplinary; 2) research; 3) self/other and artistic knowledge; and 4) practical application. These courses comprise the key components of the doctoral program, along with the dissertation.

Interdisciplinary Seminars

ARTS 703	Interdisciplinary Seminar I	3.0
ARTS 704	Interdisciplinary Seminar II	3.0
ARTS 706	Interdisciplinary Seminar IV	3.0

Research Courses

ARTS 712	Research I: Philosophy & Theory	3.0
ARTS 715	Innovative and Emergent Research Methods	3.0
RSCH 714	Qualitative Research Methods I	3.0
RSCH 759	Foundations of Biostatistics	3.0
RSCH 770	Foundations in Research Methods	3.0

Research Specialization

Select one of the following: 3.0

ARTS 732	Advanced Quantitative Research Seminar	
ARTS 734	Innovative and Emergent Research Methods II	
RSCH 733	Qualitative Research Methods II	
RSCH 816	Intermediate Mixed Methods Research	

Self/Other Artistic Knowledge Studio Labs

ARTS 716	Studio Based Artistic Inquiry I	3.0
----------	---------------------------------	-----

ARTS 717	Studio Based Artistic Inquiry II	3.0
----------	----------------------------------	-----

Practical Application Courses

Practica in either research, teaching, clinical supervision, or advanced clinical practice.

ARTS 812	Teaching Practicum	1.0
ARTS 809	Practicum II	2.0-9.0
ARTS 810	Practicum III	2.0-9.0

Dissertation Research - Minimum of 4 credits

ARTS 804	Dissertation Research I	
ARTS 805	Dissertation Research II	
ARTS 806	Dissertation Research III	
ARTS 807	Dissertation Research IV	

Elective 3.0

Students, with advisement and in accordance with their educational plan, may choose a course in their content area.

Total Credits		45.0-59.0
---------------	--	-----------

* The dissertation is an original research project, the content of which directly relates to the epistemology, theory, and/or practice of the student's creative arts therapy specialization.

All electives must be graduate courses and can be selected from those courses offered at Drexel University. In particular, doctoral level courses in the College of Nursing and Health Professions, School of Public Health, College of Arts and Sciences, and/or the School of Education may be the most relevant to students in this program. (The Creative Arts Therapies PhD program director will obtain permission for the student to take the elective from the relevant Dean of the College or School, and the relevant program director and course instructor.)

Content areas that are acceptable for electives include the following: anthropology, biology, creativity, culture and communication, ethics, health psychology, literature, neuroanatomy, neuropsychology, philosophy, psychology, psychoanalysis, sociology, advanced statistics. Additional content areas may be added by special request as approved by the supervising faculty advisor and program director.

Sample Plan of Study

Term 1		Credits
ARTS 703	Interdisciplinary Seminar I	3.0
ARTS 712	Research I: Philosophy & Theory	3.0
ARTS 716	Studio Based Artistic Inquiry I	3.0
Term Credits		9.0

Term 2		Credits
ARTS 704	Interdisciplinary Seminar II	3.0
ARTS 717	Studio Based Artistic Inquiry II	3.0
RSCH 770	Foundations in Research Methods	3.0
Term Credits		9.0

Term 3		Credits
ARTS 706	Interdisciplinary Seminar IV	3.0
ARTS 715	Innovative and Emergent Research Methods	3.0
RSCH 714	Qualitative Research Methods I	3.0
Term Credits		9.0

Term 4		Credits
RSCH 759	Foundations of Biostatistics	3.0
Term Credits		3.0

Term 5		Credits
Research Specialization - Choose one of the following:		3.0

ARTS 732	Advanced Quantitative Research Seminar
ARTS 734	Innovative and Emergent Research Methods II
RSCH 733	Qualitative Research Methods II
RSCH 816	Intermediate Mixed Methods Research

ARTS 804 [*]	Dissertation Research I	1.0-9.0
	Term Credits	4.0-12.0
Term 6		
ARTS 805 [*]	Dissertation Research II	1.0-9.0
	Term Credits	1.0-9.0
Term 7		
ARTS 812	Teaching Practicum	1.0
ARTS 806 [*]	Dissertation Research III	1.0-9.0
Elective		3.0
	Term Credits	5.0-13.0
Term 8		
ARTS 809	Practicum II	2.0-9.0
	Term Credits	2.0-9.0
Term 9		
ARTS 810	Practicum III	2.0-9.0
ARTS 807 [*]	Dissertation Research IV	1.0-9.0
	Term Credits	3.0-18.0
Total Credit: 45.0-91.0		

* The dissertation is an original research project, the content of which directly relates to the epistemology, theory, and/or practice of the student's creative arts therapy specialization.

Couple and Family Therapy PhD

Major: Couple and Family Therapy

Degree Awarded: Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 120.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.1505

Standard Occupational Classification (SOC) code: 21-1013

About the Program

The PhD program in Couple and Family Therapy (CFT) develops the next generation of couple and family therapy scholars interested in research related to family based psychotherapy, families and health, and health disparities. Students are trained to advance the knowledge base of couple and family therapy through education, research, and clinical service with a particular emphasis on evidenced informed treatment modalities.

The program is rooted in relational and systems theories and therapies including Attachment-based Family Therapy, Emotionally Focused Family Therapy, and Medical Family Therapy approaches. Students are expected to demonstrate critical and analytical thinking with respect to the broad areas of systems theory and therapy, and have a primary interest in research and scholarship. The Counseling and Family Therapy Department is committed to attracting minority scholars as well as training students to be aware and sensitive to contextual issues such as race, class, gender, spirituality and sexual orientation, as well as power and privilege.

Graduates of the Couple and Family Therapy PhD program serve as researchers in public and private institutions, faculty in graduate programs of couple and family therapy, psychology, social work, or medical schools, and as clinicians in mental health agencies or private practice.

For additional information about the PhD in Couple and Family Therapy, visit the Counseling and Family Therapy Department (<https://drexel.edu/cnhp/academics/departments/Counseling-and-Family-Therapy/>) web site.

Degree Requirements

Students are required to complete the standard curriculum in couple and family therapy before pursuing the doctoral curriculum. The standard curriculum is offered in the COAMFTE- accredited Master of Family Therapy (p. 112) and Post-Master's Certificate programs at the University.

The curriculum includes study in the following areas:

- Theory and research in couple and family therapy
- Research methodology, including statistics, research design, and computer applications
- Evidenced informed and specialized instruction in couple and family therapy
- Diverse family structures,
- Supervised clinical experience

Required Courses

CFTP 713	Introduction to CFT Clinical Research	3.0
CFTP 720	Couple Therapy Theory & Practice	3.0
CFTP 721	Critical Theory in Couple and Family Therapy	3.0
CFTP 724	Multicultural Approach to Couple and Family Therapy	4.0
CFTP 725	Trauma and Families	4.0
CFTP 729	Diverse Families and Communities: Intervention Strategies	3.0
CFTP 735	Family Healthcare Policy	3.0
CFTP 757	Attachment, Emotions and Psychotherapy	3.0
CFTP 759	Psychotherapy Outcome and Process Research	3.0
CFTP 760	Teaching Practicum	2.0
CFTP T780	Special Topics in Couple and Family Therapy	1.0-6.0
NHP 762	Health Professional Education	3.0
RSCH 714	Qualitative Research Methods I	3.0
RSCH 759	Foundations of Biostatistics	3.0
RSCH 770	Foundations in Research Methods	3.0
RSCH 811	Intermediate Biostatistics	3.0
RSCH 814	Intermediate Biostatistics II	3.0
RSCH 815	Scientific Inquiry and Writing	3.0
Elective		3.0-4.0
Internship - Minimum of 27 credits *		27.0
CFTP 801	Couple and Family Therapy Internship	
Dissertation *		37.0
CFTP 802	Couple and Family Therapy Dissertation	
CFTP 803	Couple and Family Therapy Dissertation Defense	
Total Credits		120.0-126.0

* Internship (CFTP 801): Students are required to complete at least three terms of internship during the third or fourth year of the program. They must register for 9.0 credits per quarter to cover this activity. Most internships will be done in 3 quarters (27.0 credits), but the expectation has been set that the internship will be completed after 4 quarters (36.0 credits) to give the student some flexibility. Dissertation (CFTP 802): Students should begin their dissertation in year three or four of the program. This project is expected to take four quarters (36.0 credits). For each of those quarters the student must register for 9.0 credits of CFTP 802. If the project takes longer than four quarters, the student may continue to sign up for 9.0 credits of CFTP 802 each quarter. It is anticipated, however, that all students will complete their dissertations after 8 quarters (2 years, 72.0 credits). Dissertation Defense (CFTP 803): Students are required to defend their dissertations when they are complete. To defend, a student must register and pay for one credit of CFTP 803.

Students must be actively engaged in clinical practice throughout the program. Before graduating from the PhD program, all students are encouraged to complete at least 1,000 hours of direct client contact hours.

Internship

All students are required to do an internship. Internship supervisors must be clearly senior in experience to the student intern. The purpose of the internship is to provide students with a supervised full-time clinical, research, academic or administrative experience of at least nine months duration. Clinical and alternate internships must emphasize relationally focused practice and research. For the clinical internship, it is to ensure that students meet the 1,000 direct client contact hour standard.

Students should contact the Counseling and Family Therapy Department (<https://drexel.edu/cnhp/academics/departments/Counseling-and-Family-Therapy/>) for additional information about the qualifying exam and the dissertation.

Sample Plan of Study

Term	Credits
Term 1	
CFTP 713 Introduction to CFT Clinical Research	3.0
CFTP 729 Diverse Families and Communities: Intervention Strategies	3.0
RSCH 759 Foundations of Biostatistics	3.0
Term Credits	9.0
Term 2	
CFTP 725 Trauma and Families	4.0
RSCH 770 Foundations in Research Methods	3.0
RSCH 811 Intermediate Biostatistics	3.0
Term Credits	10.0
Term 3	
CFTP 724 Multicultural Approach to Couple and Family Therapy	4.0
NHP 762 Health Professional Education	3.0
RSCH 714 Qualitative Research Methods I	3.0
Term Credits	10.0
Term 4	
CFTP 721 Critical Theory in Couple and Family Therapy	3.0
CFTP 757 Attachment, Emotions and Psychotherapy	3.0
CFTP T780 Special Topics in Couple and Family Therapy	3.0
Term Credits	9.0
Term 5	
CFTP 735 Family Healthcare Policy	3.0
RSCH 815 Scientific Inquiry and Writing	3.0

RSCH 814 Intermediate Biostatistics II	3.0
Term Credits	9.0
Term 6	
CFTP 759 Psychotherapy Outcome and Process Research	3.0
CFTP 760 Teaching Practicum	2.0
CFTP T780 Special Topics in Couple and Family Therapy	4.0
Term Credits	9.0
Term 7	
CFTP 801 Couple and Family Therapy Internship	9.0
Term Credits	9.0
Term 8	
CFTP 801 Couple and Family Therapy Internship	9.0
Term Credits	9.0
Term 9	
CFTP 801 Couple and Family Therapy Internship	9.0
Term Credits	9.0
Term 10	
CFTP 802 Couple and Family Therapy Dissertation	9.0
Term Credits	9.0
Term 11	
CFTP 802 Couple and Family Therapy Dissertation	9.0
Term Credits	9.0
Term 12	
CFTP 802 Couple and Family Therapy Dissertation	9.0
Term Credits	9.0
Term 13	
CFTP 802 Couple and Family Therapy Dissertation	9.0
Term Credits	9.0
Term 14	
CFTP 803 Couple and Family Therapy Dissertation Defense	1.0
Term Credits	1.0
Total Credit: 120.0	

Couple and Family Therapy Faculty

Stephanie Brooks, PhD, LCSW, LMFT (*Drexel University*) Associate Dean, Health Professions. Associate Clinical Professor. Outcome-based education; supervision and training; African American families; cultural diversity specifically African American families and adolescents; Person of the Therapist training; ADHD and couple therapy; families impacted by addiction; behavioral health and family violence.

Guy Diamond, PhD, MA (*California School of Professional Psychology*) Director, Center for Family Intervention Science. Associate Professor. Prevention and treatment of adolescent depression and suicide; screening and education in schools, primary care, emergency rooms and health care centers; Attachment-based family therapy; empirically supported treatment for youth depression and suicide.

Stephanie Krauthamer Ewing, PhD, MPH (*University of Delaware*). Assistant Professor. Promoting healthy emotional development and resilience in children and adolescents, attachment and caregiving relationships, impact of trauma on parenting and attachment, developmental and contextual risk factors for depression and suicide risk in youth, evidence based treatments for depression and suicide risk, research methodology.

Kenneth Hardy, PhD (*Florida State University*). Professor. Challenging society to think critically about the hidden but significant connections that often exist between trauma and issues of oppression.

Christian Jordal, PhD, LMFT, CST (*Virginia Polytechnic Institute and State University*) Program Director, Master of Family Therapy Program

(MFT). Associate Clinical Professor. Behavioral health outcomes, mixed methodology; LGBT and mixed orientation relationships, marital commitment, medical family therapy, sex therapy, transgender healthcare and relationships.

Marlene F. Watson, PhD, LMFT (*Virginia Polytechnic and State University*). Associate Professor. Forensic family therapy, siblings, race, class, gender and health policy issues.

Erica Wilkins, PhD, LMFT (*Texas Tech University*) Program Director, Doctor of Couple and Family Therapy (DCFT). Assistant Clinical Professor. Residual effects of slavery on African Americans, HIV/AIDS, treatment of post-traumatic stress, grief counseling, substance abuse and the family, culturally competent services, and contextual therapy.

Dance/Movement Therapy and Counseling

Major: Dance/Movement Therapy and Counseling

Degree Awarded: Master of Arts (MA)

Calendar Type: Quarter

Total Credit Hours: 90.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.2302

Standard Occupational Classification (SOC) code: 29-1129

About the Program

The Master of Arts program in Dance/Movement Therapy and Counseling educates students for creative, responsive and effective therapy practice, in which dance and movement are the essential modes of transformation. Through a balance of experiential and reflective learning, theory and skill-based education, and supervised practicum and internship experiences, students develop a strong base for effective clinical practice. The 90.0 quarter-credit curriculum includes specific dance/movement therapy coursework in areas such as Laban Movement Analysis (LMA); movement observation and assessment; child and adult theories and skills, and developmental movement, as well as general mental health counseling coursework in human development; psychopathology; social and cultural foundations; clinical appraisal and assessment, and group dynamics. Program graduates are eligible for the Registered Dance/Movement Therapist (R-DMT) credential, as well as professional counseling licensure in Pennsylvania (upon completion of post-graduation requirements).

The American Dance Therapy Association (ADTA) defines dance/movement therapy as the psychotherapeutic use of movement in a process that furthers the emotional, cognitive, social, and physical integration of the individual. The profession is positioned to meet an increasing interest in mind-body approaches to mental and physical health that have emerged in health profession circles and in the general public. Upon graduation, students go on to work in a variety of settings, including but not limited to, medical and psychiatric hospitals; inpatient and outpatient behavioral health programs; community health and wellness centers; schools and afterschool programs; trauma-informed settings; correctional facilities and halfway houses; elder care facilities, and private practices. Students also pioneer new frontiers in therapy application through clinical work and research.

For additional information about the program, visit the College of Nursing and Health Professions' Dance/Movement Therapy and Counseling

(<https://www.drexel.edu/cnhp/academics/graduate/MA-Dance-Movement-Therapy-Counseling/>) web site.

Degree Requirements

Core Courses

CATX 501	Foundations of the Creative Arts Therapies	3.0
CTCN 501	Human Psychological Development	4.5
CTCN 503	DSM and Psychopathology	4.5
CTCN 504	Professional Orientation and Ethics	4.5
CTCN 505	Theories of Counseling and Psychotherapy	4.5
CTCN 507	Social and Cultural Foundations in Counseling and Dance/Movement Therapy	4.5
CTCN 601	Introduction to Behavioral Research	4.5
CTCN 603	Clinical Appraisal and Assessment	4.5
CTCN 604	Career Counseling	4.5
CTCN 607	Group Dynamics in Counseling and Dance/Movement Therapy	4.5

Dance/Movement Therapy Track Courses

CTCN 552	Therapy Relationship Skills I	3.0
CTCN 553	Therapy Relationship Skills II	3.0
CTCN 554	Movement Observation I	2.0
CTCN 556	Movement Observation II	2.0
CTCN 557	Theory and Practice I- Children	3.0
CTCN 558	Theory and Practice II: Adults	3.0
CTCN 559	Orientation to Dance/Movement Therapy	1.0
CTCN 563	Movement Perspectives in Human Development	3.0
CTCN 564	Mental Health Applications of Movement Analysis	3.0
CTCN 655	Laban Movement Analysis Workshop	1.5
CTCN 657	Dance/Movement Therapy Assessment	2.0
CTCN 658	Advanced Practice Topics and Skills I	2.5
CTCN 659	Advanced Practice Topics and Skills II	2.5

Clinical Education Courses

CTCN 511	Clinical Practicum & Practicum Seminar I	2.0
CTCN 521	Clinical Practicum & Practicum Seminar II	2.0
CTCN 531	Clinical Practicum & Practicum Seminar III	2.0
CTCN 611	Clinical Internship & Internship Seminar I	2.0
CTCN 621	Clinical Internship & Internship Seminar II	2.0
CTCN 631	Clinical Internship & Internship Seminar III	2.0

Culminating Project

Complete at least 3 credits		3.0
CATX 623	Culminating Project in Dance/Movement Therapy I	
CATX 624	Culminating Project in Dance/Movement Therapy II	

Electives

CTCN 551	Introduction to Anatomy and Kinesiology for Dance/Movement Therapy	
----------	--	--

Additional Electives

As needed, in consultation with the program director students can select the following electives:

CATX 627	For Culminating Project Only	
CATX 1699	Independent Study in Creative Arts Therapy	

Total Credits 90.0

Sample Plan of Study

Term 1		Credits
CTCN 501	Human Psychological Development	4.5
CTCN 511	Clinical Practicum & Practicum Seminar I	2.0
CTCN 554	Movement Observation I	2.0
CTCN 559	Orientation to Dance/Movement Therapy	1.0
CTCN 563	Movement Perspectives in Human Development	3.0
CTCN 552	Therapy Relationship Skills I	3.0
Elective		

CTCN 551	Introduction to Anatomy and Kinesiology for Dance/Movement Therapy	
	Term Credits	15.5
Term 2		
CTCN 507	Social and Cultural Foundations in Counseling and Dance/Movement Therapy	4.5
CTCN 521	Clinical Practicum & Practicum Seminar II	2.0
CTCN 553	Therapy Relationship Skills II	3.0
CTCN 556	Movement Observation II	2.0
CTCN 557	Theory and Practice I- Children	3.0
	Term Credits	14.5
Term 3		
CTCN 503	DSM and Psychopathology	4.5
CTCN 531	Clinical Practicum & Practicum Seminar III	2.0
CTCN 558	Theory and Practice II: Adults	3.0
CTCN 564	Mental Health Applications of Movement Analysis	3.0
	Term Credits	12.5
Term 4		
CATX 501	Foundations of the Creative Arts Therapies	3.0
CTCN 504	Professional Orientation and Ethics	4.5
CTCN 505	Theories of Counseling and Psychotherapy	4.5
	Term Credits	12.0
Term 5		
CTCN 601	Introduction to Behavioral Research	4.5
CTCN 607	Group Dynamics in Counseling and Dance/Movement Therapy	4.5
CTCN 611	Clinical Internship & Internship Seminar I	2.0
CTCN 655	Laban Movement Analysis Workshop	1.5
	Term Credits	12.5
Term 6		
CTCN 603	Clinical Appraisal and Assessment	4.5
CTCN 621	Clinical Internship & Internship Seminar II	2.0
CATX 623	Culminating Project in Dance/Movement Therapy I	1.0
CTCN 657	Dance/Movement Therapy Assessment	2.0
CTCN 658	Advanced Practice Topics and Skills I	2.5
	Term Credits	12.0
Term 7		
CTCN 604	Career Counseling	4.5
CTCN 631	Clinical Internship & Internship Seminar III	2.0
CTCN 659	Advanced Practice Topics and Skills II	2.5
CATX 624	Culminating Project in Dance/Movement Therapy II	2.0
	Term Credits	11.0

Total Credit: 90.0

* Please note that the electives are in addition to the 90 credits required for the degree. Please consult with you advisor before registering for an elective.

Dance/Movement Therapy and Counseling Faculty

Yasmine Awais, MAAT, ATR-BC, ATCS, LCAT, LPC (*Art Institute of Chicago*). Associate Clinical Professor. Art therapy with diverse populations, art therapy in non-profit settings, clinical supervision.

Joke Bradt, PhD, MT-BC (*Temple University*) Director, PhD Program in *Creative Arts Therapies*. Professor. Research in music therapy, chronic pain, systematic reviews.

Natalie Rae Carlton, PhD, ATR-BC, LPCC (*Lesley University*) Director, *Art Therapy and Counseling MA Program*. Associate Clinical Professor. New media and art therapy, social justice in art activities, transgender and LGBTQ identity.

Susan Deutsch Laban Movement Analysis

Christina Devereaux, PhD, LCAT, LMHC, BC-DMT, NCC (*UCLA*) Program Director for *Dance/Movement Therapy and Counseling*. Associate Clinical Professor. Dance movement therapy, children, attachment, autism spectrum disorder, trauma, group work, clinical supervision

Abby Dougherty, PhD, NCC, LPC (*Walden University*) Core Counseling Curriculum Coordinator. Clinical Assistant Professor. Virtual reality in mental health, mindfulness and contemplative practices in counselor education, creativity in college counseling, learning disabilities, relational-cultural theory in counseling and adult education.

Sharon Goodill, PhD, BC-DMT, NCC, LPC (*Union Institute and University*) Chair, *Department of Creative Arts Therapies*. Clinical Professor. Medical dance/movement, mind/body studies, movement assessment for DMT, CAT research and leadership.

Scott Horowitz, MA, MT-BC, LPC (*Drexel University*) Director of *Field Education*. Clinical Instructor. Interdisciplinary practice and education, developmental models of clinical and practicum supervision, music therapy and neurodevelopmental populations.

Florence Ierardi, MM, MT-BC, LPC (*Temple University*) Director, *Music Therapy and Counseling MA Program*. Associate Clinical Professor. Clinical improvisation, trauma-informed music therapy, multicultural music therapy perspectives.

Girija Kaimal, EdD, MA (*Harvard University*). Associate Professor. Art therapy, educational research, program evaluation, art therapy.

Dawn Morningstar, MCAT, VC-DMT, LP (*Hahnemann University*) Coordinator of *CAT Clinical Services*. Assistant Clinical Professor. Specialty in working with children and adolescents, Dance/movement therapist at Drexel's Parkway Health and Wellness faculty practice outpatient clinic.

Michele Rattigan, MA, ATR-BC, NCC, LPC (*MCP Hahnemann University*) Coordinator of *CAT Clinical Services*. Associate Clinical Professor. Unresolved trauma; post-partum depression and anxiety; disordered eating and body image concerns; self-harming behaviors; dissociative disorders

Ellen Schelly-Hill, MMT, BC-DMT, NCC, LPC (*Antioch NE Graduate School*) Director of *Dance/Movement Therapy and Counseling MA Program*. Associate Clinical Professor. Adults diagnosed with mood disorders, anxiety, chronic pain and with histories of trauma; clinical supervision; ethics.

Minjung Shim, PhD, BC-DMT (*Drexel University*). Assistant Research Professor. Medical dance/movement therapy, chronic pain management, mindfulness-based interventions, clinical trials, theory/model-building, qualitative inquiries, scoping reviews.

Emeritus Faculty

Nancy Gerber, PhD, ATR-BC (*Union Institute and University*). Associate Clinical Professor Emerita. Art therapy assessment and treatment of adolescents and adults; modern psychoanalysis and art therapy; arts therapy education and doctoral education; arts based research and mixed methods research.

Master of Family Therapy

Major: Family Therapy
Degree Awarded: Master of Family Therapy (MFT)
Calendar Type: Quarter
Total Credit Hours: 90.0
Co-op Option: None
Classification of Instructional Programs (CIP) code: 51.1505
Standard Occupational Classification (SOC) code: 21.1013

About the Program

The Master of Family Therapy (MFT) Program prepares couple and family therapy practitioners and meets the educational requirements for license eligibility in the state of Pennsylvania. It is a two-year, full-time or four-year, part-time program accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE).

This clinically rigorous program exposes students to broad areas of theory and practice with an emphasis on the interdependence of the individual and the context of their relationships extending from family of origin to the global community. The curriculum is centered on the principles of social justice, cultural competence, and the Person of the Therapist model. Students also participate in culturally diverse, clinical practicum experiences, working with individuals, couples, and families under the supervision of experienced clinicians.

For more information, visit Drexel's College of Nursing and Health Professions Counseling and Family Therapy Department (<https://drexel.edu/cnhp/academics/departments/Counseling-and-Family-Therapy/>) web page.

Degree Requirements

The MFT curriculum assists students in integrating theory and practice. Issues of cultural diversity such as race, class, gender, sexual orientation, and ethnicity and power and privilege are addressed throughout the program. Students are fully trained to assume clinical practice in couple and family therapy and meet the educational requirements for Clinical Fellow membership in the AAMFT.

Required Courses

Foundations of Relational/Systemic Practice, Theories & Models		
CFTP 500	Introduction to Systems Theory	4.0
CFTP 501	Introduction to Family Therapy	4.0
CFTP 502	Introduction to Family Therapy II	3.0
Clinical Treatment with Individuals, Couples & Families		
CFTP 509	Couples Therapy	4.0
CFTP 540	Child Therapy in Couple and Family Therapy	3.0
CFTP 606	Contextual Family Therapy	3.0
CFTP 610	Sex Therapy	3.0
Diverse, Multicultural/International &/or Underserved Communities		
CFTP 503	Historical and Sociocultural Influences	4.0
CFTP 504	Sociocultural Influences II	3.0
Research & Evaluation		
CFTP 524	Research I: Family Evaluation	3.0
CFTP 525	Research in Couple and Family Therapy	4.0
Professional Identity, Law, Ethics and Social Responsibility		
CFTP 522	Legal and Ethical Implications in Couple and Family Therapy Practice	4.0
CFTP 526	Person of the Therapist Experience I	2.0
CFTP 527	Person of the Therapist Experience II	2.0
CFTP 528	Person of the Therapist Experience III	2.0

CFTP 542	Professional Development Seminar	1.0
Biopsychosocial Health & Development across the Life Span		
CFTP 520	Family Life Cycle	4.0
CFTP 521	Human Development	4.0
Systemic/Relational Assessment & Mental Health Diagnosis and Treatment		
CFTP 513	DSM I: Adult Psychopathology	3.0
CFTP 514	DSM II: Child Psychopathology	3.0
Contemporary Issues		
CFTP 725	Trauma and Families	4.0
Community Intersections & Collaboration		
CFTP 518	Medical Family Therapy	4.0
Clinical Practice & Supervision		
CFTP 530	Clinical Practicum/Supervision I	1.0
CFTP 531	Clinical Practicum/Supervision II	1.0
CFTP 532	Clinical Practicum/Supervision III	1.0
CFTP 533	Clinical Practicum/Supervision IV	1.0
CFTP 534	Clinical Practicum/Supervision V	1.0
CFTP 535	Clinical Practicum/Supervision VI	1.0
CFTP 536	Clinical Practicum/Supervision VII	1.0
CFTP 539	Clinical Readiness Seminar	3.0
CFTP 561	Group Supervision / Practicum I	2.0
CFTP 562	Group Supervision / Practicum II	2.0
CFTP 563	Group Supervision / Practicum III	2.0
CFTP 564	Group Supervision / Practicum IV	2.0
Capstone Project		
CFTP 543	Capstone Project	1.0
Total Credits		90.0

Clinical Practicum Experience

All interns must complete two practicum experiences continuously prior to graduation: 9 month and 12 month. Interns will be expected to spend 16-20 hours per week working at the approved program practicum site. The intern, site supervisor, and CFT Director of Clinical Training negotiate practicum schedules. The practicum schedule cannot conflict with program class schedule.

Clinical practicum sites are located primarily in Philadelphia, Delaware, and New Jersey. Settings include addictions facilities, schools, family based and forensic family therapy treatment programs, hospitals, community health centers, juvenile justice treatment systems, and inpatient and outpatient behavioral health agencies. Students should expect to travel up to 30 miles to their practicum site or for related supervision. Transportation, therein is the responsibility of the student.

For additional information, students should contact the Couple and Family Therapy Department (<https://www.drexel.edu/cnhp/academics/departments/Couple-and-Family-Therapy/>).

Sample Plan of Study

Full-time:

Term 1		Credits
CFTP 500	Introduction to Systems Theory	4.0
CFTP 520	Family Life Cycle	4.0
CFTP 522	Legal and Ethical Implications in Couple and Family Therapy Practice	4.0
CFTP 526	Person of the Therapist Experience I	2.0
CFTP 530	Clinical Practicum/Supervision I	1.0
CFTP 539	Clinical Readiness Seminar	3.0
Term Credits		18.0
Term 2		
CFTP 501	Introduction to Family Therapy	4.0

CFTP 503	Historical and Sociocultural Influences	4.0
CFTP 513	DSM I: Adult Psychopathology	3.0
CFTP 527	Person of the Therapist Experience II	2.0
CFTP 531	Clinical Practicum/Supervision II	1.0
Term Credits		14.0
Term 3		
CFTP 502	Introduction to Family Therapy II	3.0
CFTP 514	DSM II: Child Psychopathology	3.0
CFTP 521	Human Development	4.0
CFTP 528	Person of the Therapist Experience III	2.0
CFTP 532	Clinical Practicum/Supervision III	1.0
Term Credits		13.0
Term 4		
CFTP 524	Research I: Family Evaluation	3.0
CFTP 525	Research in Couple and Family Therapy	4.0
CFTP 533	Clinical Practicum/Supervision IV	1.0
CFTP 561	Group Supervision / Practicum I	2.0
Term Credits		10.0
Term 5		
CFTP 534	Clinical Practicum/Supervision V	1.0
CFTP 540	Child Therapy in Couple and Family Therapy	3.0
CFTP 562	Group Supervision / Practicum II	2.0
CFTP 606	Contextual Family Therapy	3.0
Term Credits		9.0
Term 6		
CFTP 504	Sociocultural Influences II	3.0
CFTP 509	Couples Therapy	4.0
CFTP 535	Clinical Practicum/Supervision VI	1.0
CFTP 542	Professional Development Seminar	1.0
CFTP 563	Group Supervision / Practicum III	2.0
CFTP 725	Trauma and Families	4.0
Term Credits		15.0
Term 7		
CFTP 518	Medical Family Therapy	4.0
CFTP 536	Clinical Practicum/Supervision VII	1.0
CFTP 543	Capstone Project	1.0
CFTP 564	Group Supervision / Practicum IV	2.0
CFTP 610	Sex Therapy	3.0
Term Credits		11.0

Total Credit: 90.0

Part-time:

		Credits
Term 1		
CFTP 500	Introduction to Systems Theory	4.0
CFTP 522	Legal and Ethical Implications in Couple and Family Therapy Practice	4.0
Term Credits		8.0
Term 2		
CFTP 501	Introduction to Family Therapy	4.0
CFTP 503	Historical and Sociocultural Influences	4.0
Term Credits		8.0
Term 3		
CFTP 502	Introduction to Family Therapy II	3.0
CFTP 521	Human Development	4.0
Term Credits		7.0
Term 4		
CFTP 520	Family Life Cycle	4.0
CFTP 606	Contextual Family Therapy	3.0
Term Credits		7.0
Term 5		
CFTP 513	DSM I: Adult Psychopathology	3.0

CFTP 725	Trauma and Families	4.0
Term Credits		7.0
Term 6		
CFTP 514	DSM II: Child Psychopathology	3.0
CFTP 518	Medical Family Therapy	4.0
Term Credits		7.0
Term 7		
CFTP 530	Clinical Practicum/Supervision I	1.0
CFTP 539	Clinical Readiness Seminar	3.0
CFTP 526	Person of the Therapist Experience I	2.0
Term Credits		6.0
Term 8		
CFTP 504	Sociocultural Influences II	3.0
CFTP 527	Person of the Therapist Experience II	2.0
CFTP 531	Clinical Practicum/Supervision II	1.0
Term Credits		6.0
Term 9		
CFTP 525	Research in Couple and Family Therapy	4.0
CFTP 528	Person of the Therapist Experience III	2.0
CFTP 532	Clinical Practicum/Supervision III	1.0
Term Credits		7.0
Term 10		
CFTP 524	Research I: Family Evaluation	3.0
CFTP 533	Clinical Practicum/Supervision IV	1.0
CFTP 561	Group Supervision / Practicum I	2.0
Term Credits		6.0
Term 11		
CFTP 534	Clinical Practicum/Supervision V	1.0
CFTP 540	Child Therapy in Couple and Family Therapy	3.0
CFTP 562	Group Supervision / Practicum II	2.0
Term Credits		6.0
Term 12		
CFTP 509	Couples Therapy	4.0
CFTP 535	Clinical Practicum/Supervision VI	1.0
CFTP 542	Professional Development Seminar	1.0
CFTP 563	Group Supervision / Practicum III	2.0
Term Credits		8.0
Term 13		
CFTP 536	Clinical Practicum/Supervision VII	1.0
CFTP 543	Capstone Project	1.0
CFTP 564	Group Supervision / Practicum IV	2.0
CFTP 610	Sex Therapy	3.0
Term Credits		7.0

Total Credit: 90.0

Couple and Family Therapy Faculty

Stephanie Brooks, PhD, LCSW, LMFT (*Drexel University*) Associate Dean, *Health Professions*. Associate Clinical Professor. Outcome-based education; supervision and training; African American families; cultural diversity specifically African American families and adolescents; Person of the Therapist training; ADHD and couple therapy; families impacted by addiction; behavioral health and family violence.

Guy Diamond, PhD, MA (*California School of Professional Psychology*) Director, *Center for Family Intervention Science*. Associate Professor. Prevention and treatment of adolescent depression and suicide; screening and education in schools, primary care, emergency rooms and health care centers; Attachment-based family therapy; empirically supported treatment for youth depression and suicide.

Stephanie Krauthamer Ewing, PhD, MPH (*University of Delaware*). Assistant Professor. Promoting healthy emotional development and resilience in children and adolescents, attachment and care-giving relationships, impact of trauma on parenting and attachment, developmental and contextual risk factors for depression and suicide risk in youth, evidence based treatments for depression and suicide risk, research methodology.

Kenneth Hardy, PhD (*Florida State University*). Professor. Challenging society to think critically about the hidden but significant connections that often exist between trauma and issues of oppression.

Christian Jordal, PhD, LMFT, CST (*Virginia Polytechnic Institute and State University*) Program Director, Master of Family Therapy Program (MFT). Associate Clinical Professor. Behavioral health outcomes, mixed methodology; LGBT and mixed orientation relationships, marital commitment, medical family therapy, sex therapy, transgender healthcare and relationships.

Marlene F. Watson, PhD, LMFT (*Virginia Polytechnic and State University*). Associate Professor. Forensic family therapy, siblings, race, class, gender and health policy issues.

Erica Wilkins, PhD, LMFT (*Texas Tech University*) Program Director, Doctor of Couple and Family Therapy (DCFT). Assistant Clinical Professor. Residual effects of slavery on African Americans, HIV/AIDS, treatment of post-traumatic stress, grief counseling, substance abuse and the family, culturally competent services, and contextual therapy.

Health Administration

Major: Health Administration

Degree Awarded: Master of Health Administration (MHA)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.0701

Standard Occupational Classification (SOC) code: 11-9111

About the Program

The Master of Health Administration program consists of 10 core courses, one on-site residency, and one elective course, for a total of 45.0 credits. All courses, except for the residency, will be conducted online through Drexel University Online (<http://online.drexel.edu/online-degrees/nursing-degrees/mha/>). The residency, based at Drexel University's Center City campus, is designed to provide students with a full master's level collaborative experience with on-campus and/or community activities, and the experience of working directly with health care or public health service organizations to improve the planning, delivery and evaluation of these services.

Students will learn the extent of health disparities in urban areas based on current health indices, such as infant mortality rates, life expectancy and violence, and the policy, systems management, and epidemiological tools for addressing these.

The curriculum includes community orientation, financial skills, analytical thinking, and strategic orientation. The community orientation is expressed in the public health approach in courses such as the Introduction to Descriptive Epidemiology and Biostatistics, which is based in the tradition of social epidemiology.

Students collaborate to produce an Applied Management Project which will be assigned in groups as a culminating project for the program. In this project, students will apply management tools and/or research tools to address particular administrative challenges, assuring that students think at an organizational level and use particular strategies to respond to change.

In addition to the content of the workforce course, self-confidence and self-development are integrated in the management courses and the on-campus portion of the program, which encourages self-reflection, application of theoretical perspectives, and synthesis of data and management tools. In the online portion of the course, students engage in threaded discussions with classmates about their completed projects.

This curriculum is designed to help you to achieve your goals on a timeline that fits your lifestyle and allows a student to graduate in two or three academic years. Students also have the option to enter during the Fall or Spring term.

Additional Information

The contact for this program is:

Melissa Giorgio, BS
Administrative Coordinator
Health Administration Department
267-359-5859
maa46@drexel.edu

Degree Requirements

The Master of Health Administration program consists of 11 core courses (41.0 credits), including one 4.0 credit on-site residency (HSAD 522), and one elective course (4.0 credits), for a total of 45.0 credits.

REQUIRED COURSES

EPI 570	Introduction to Epidemiology	3.0
HMP 512	The Business of Healthcare: Advanced Healthcare Financial Management	3.0
or IPS 564	The Business of Healthcare	
HSAD 500	Historical Influences on the US Healthcare System	4.0
HSAD 505	Ethical and Legal Issues in Healthcare Management and Policy	4.0
HSAD 515	Practice issues in Healthcare Management	4.0
HSAD 522	Applied Management Project	4.0
HSAD 525	National Health Expenditures	4.0
HSAD 530	Politics and Policy of Healthcare Resources	4.0
HSAD 540	Resources, Recruitment and Retention in Healthcare	4.0
HSAD 550	Planning in the Era of the Affordable Care Act	4.0
RSCH 519	Introduction to Biostatistics	3.0

ELECTIVE COURSES (4 credits from the following list)

HSAD 560	Advanced Healthcare Marketing	4.0
HSAD 561	Risk Management	
HSAD 562	Group Dynamics & Leadership in Health Care Management	
HSAD 565	Global Health and Management Issues	
IPS 562	Comparative Health Systems	
Total Credits		45.0

* HSAD 522 is taken during the first week of Summer term.

Sample Plan of Study

Two Year Sample Plan of Study

Term 1		Credits
HSAD 500	Historical Influences on the US Healthcare System	4.0
RSCH 519	Introduction to Biostatistics	3.0
Term Credits		7.0
Term 2		
HSAD 505	Ethical and Legal Issues in Healthcare Management and Policy	4.0
EPI 570	Introduction to Epidemiology	3.0
Term Credits		7.0
Term 3		
HSAD 515	Practice issues in Healthcare Management	4.0
HSAD 540	Resources, Recruitment and Retention in Healthcare	4.0
Term Credits		8.0
Term 4		
HSAD 522	Applied Management Project	4.0
Elective*		
Term Credits		4.0
Term 5		
HSAD 530	Politics and Policy of Healthcare Resources	4.0
HSAD 525	National Health Expenditures	4.0
Term Credits		8.0
Term 6		
Elective*		4.0-6.0
Term Credits		4.0-6.0
Term 7		
HMP 512 or IPS 564	The Business of Healthcare: Advanced Healthcare Financial Management The Business of Healthcare	3.0
HSAD 550	Planning in the Era of the Affordable Care Act	4.0
Term Credits		7.0
Total Credit: 45.0-47.0		

* Students may choose to take the elective in Term 4. If taken in Term 4, no course would be taken in Term 6.

Three Year Sample Plan of Study

Term 1		Credits
HSAD 500	Historical Influences on the US Healthcare System	4.0
Term Credits		4.0
Term 2		
HSAD 505	Ethical and Legal Issues in Healthcare Management and Policy	4.0
Term Credits		4.0
Term 3		
HSAD 540	Resources, Recruitment and Retention in Healthcare	4.0
Term Credits		4.0
Term 4		
Elective		4.0
Term Credits		4.0
Term 5		
RSCH 519	Introduction to Biostatistics	3.0
Term Credits		3.0
Term 6		
EPI 570	Introduction to Epidemiology	3.0
Term Credits		3.0
Term 7		
HSAD 515	Practice issues in Healthcare Management	4.0
Term Credits		4.0
Term 8		

HSAD 522	Applied Management Project	4.0
HSAD 550	Planning in the Era of the Affordable Care Act	4.0
Term Credits		8.0
Term 9		
HSAD 530	Politics and Policy of Healthcare Resources	4.0
Term Credits		4.0
Term 10		
HSAD 525	National Health Expenditures	4.0
Term Credits		4.0
Term 11		
HMP 512 or IPS 564	The Business of Healthcare: Advanced Healthcare Financial Management The Business of Healthcare	3.0
Term Credits		3.0
Total Credit: 45.0		

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.

Merritt Brockman, DHA, FACHE (*Medical University of South Carolina*). Assistant Teaching Professor. Patient centered medical home; improvements in health care delivery.

Fred DiCostanzo, EdD (*Rutgers University*). Assistant Professor. Organizational leadership, Healthcare Management, Human resources and team effectiveness

Stephen F. Gambescia, PhD, MEd, MBA (*Temple University*). Professor. Health care policy, nonprofits and health care, and health care management and leadership.

Kevin Mitchell, PhD, MBA (*Walden University*). Assistant Teaching Professor. Health Services Administration; continuous quality improvement, strategic health care management. Research interests include health disparities in vulnerable population, evidenced based medicine and clinical pharmacology and therapeutics.

Marina Moses, MS, DrPH (*Columbia University*). Assistant Professor. Health administration; healthcare policy; nonprofit association management; sustainability.

Kristine A. Mulhorn, PhD (*University of Delaware*) *Chair, Department of Health Administration*. Professor. Disability and aging; cross-national methods of functioning.

Sharrona Pearl, PhD (*Harvard University*). Associate Professor. Medical ethics; science studies; history of science and medicine; critical race, gender, and disability studies; media studies.

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.

Human Nutrition

Major: Human Nutrition
Degree Awarded: Master's of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Co-op Option: None

Classification of Instructional Programs (CIP) code: 30.1901
Standard Occupational Classification (SOC) code: 29-1031

About the Program

The Human Nutrition major is designed to provide the didactic coursework necessary to prepare students to address the nutrition needs of individuals or groups, through prevention or management of illness or chronic disease. This major also encompasses nutrition science, the application of the principles of biochemistry, physiology, and biology to human nutritional needs. The major includes two tracks; the Didactic Program in Dietetics (DPD) track leading to becoming a Registered Dietitian/Nutritionist (RDN), and the Nutrition Sciences track leading to application in research or industry. Applicants to the program should indicate to which track they are applying.

Current research in human nutrition includes: the prevention of obesity and diabetes across the lifespan; community engagement to improve healthful food access, availability, and exposure in school and clinic-based settings; nutrition misinformation in the areas of diabetes, oncology and weight control; and effectiveness of nutrition education (particularly by the use of multimedia) on health and eating habits.

Current research in nutrition science includes: 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; the relationship between human exposure to pesticides and oxidative stress by measuring biomarkers of oxidative stress in biological fluids and DNA damage in human cells; identifying potential unique food safety risks for minority racial/ethnic and low income populations; and, understanding whether novel dietary interventions can influence bone-regulating hormones, bone mineral density, pro-inflammatory cytokines and energy metabolism.

Graduate study in human nutrition is offered on both a full-time and part-time basis. Students are admitted only in the Fall or Winter terms. Students in the DPD track are required to complete a comprehensive exam at the end of the first year of study, and have the option to complete a research thesis. Students in the Nutrition Sciences track are required to complete a research thesis. In addition to the core curriculum, students select specialty courses relating to their major, as well as electives.

Mission, Goals, and Outcome Measures

Drexel University's Department of Nutrition Sciences, Nutrition and Dietetics Program integrates a foundation in the nutrition sciences with courses in the social sciences to provide the knowledge, skills, and professional values needed for successful entry into dietetic internships, graduate school, or dietetics employment. The learning environment is structured to allow students and interns to use current technology, to participate in conducting research, and to engage in experiential learning, including co-operative education for undergraduates.

Goal 1

To provide quality didactic instruction and learning experiences to prepare graduates to be accepted into dietetic internships and graduate schools, or work in the field of dietetics.

Objective #1: Eighty percent of graduating BS students and 90% of graduating MS students will apply to an accredited dietetic internship.

Objective #2: Eighty percent of students who apply to dietetic internships or Individualized Supervised Practice Pathways (ISPPs) are accepted.

Objective #3: Seventy-five percent of students who apply to graduate school are accepted.

Objective #4: Eighty percent of graduates of the Drexel University ISPP who seek employment will be employed within six months of program completion.

Objective #5: Graduates of the didactic program in dietetics (DPD) will rate 10 aspects of their didactic and learning experiences and average of "4" or better, on a scale of 1=poor to 5=excellent.

Objective #6: At least 90% of students will complete the program within 150% of the expected time frame for the program (BS-DPD full-time = 4 years; BS-DPD part-time = 5 to 7 years; Masters of Science [MS]-DPD full-time = 2 years; MS-DPD part-time = 4 years; ISPP full-time = 3 quarters or 1 year; ISPP part-time = 6 quarters or 2 years).

Goal 2

To prepare graduates to become competent entry-level dietitians.

Objective #1: The program's first time pass rate on the entry exam for all tracks (BS-DPD, MS-DPD, and ISPP) will be 80% or higher.

Objective #2: Internship directors of graduates of the DPD will rate 10 aspects of the students' preparation for internship an average "4" or better, on a scale of 1=poor to 5=excellent.

Objective #3: Employers of alumni of the ISPP will rate 10 aspects of the employees' preparation for entry-level practice an average of "4" or better, on a scale of 1=poor to 5=excellent.

Goal 3

To increase diversity in the profession by recruiting and retaining students from under-represented groups and facilitating their success in the program.

Objective #1: At least 10% of students in all tracks (BS-DPD, MS-DPD and ISPP cumulatively) will be from under-represented groups.

Visit the College's MS in Human Nutrition web page (<https://www.drexel.edu/cnhp/academics/graduate/MS-Human-Nutrition/>) for more information.

Program Prerequisites

The Human Nutrition program builds on a fundamental background in human behavior, written communication, and the sciences of biology, chemistry, physiology and nutrition.

Applicants may apply to the program at any point in time while completing prerequisites. However, if they are accepted, all prerequisite courses must be completed with a grade of B or better before students may enroll in the program.

- 1 year of English composition and/or literature
- 1 semester of general biology with lab to include cells and genetics
- 2 semesters of general chemistry with lab, OR, 1 semester of general chemistry with lab AND 1 semester of organic chemistry with lab
- 1 semester biochemistry

- 1 semester of human physiology, OR, 2 semesters of anatomy & physiology with lab
- 1 semester of general psychology
- 1 semester of statistics
- 1 semester of nutrition

In addition, students completing the DPD track will be required to complete the following two courses either before entry to the program or while completing the degree program to receive a DPD Verification Statement.

- 1 semester of basic and quantity food preparation (DPD track only), OR 1 semester of basic food preparation and 1 semester quantity food (DPD track only)

Degree Requirements - Nutrition Sciences Track

Students are required to complete 18.0 credits of CORE courses and then select 27.0 credits of electives chosen from courses currently offered in Biology, Nutrition, Food Science, Environmental Science or Public Health after consulting with their advisor.

Required Courses		18.0
NFS 525	Nutritional Assessment Through the Life Cycle	
NFS 601	Research Methods	
NFS 602	Methods of Nutrition Research	
NFS T680	Special Topics in NFS	
NFS 997	Research	
Electives (27 credits chosen from the following; must be approved by thesis advisor or committee)		27.0
BIO 500	Biochemistry I	
BIO 501	Biochemistry Laboratory I	
BIO 566	Endocrinology	
BIO 610	Biochemistry of Metabolism	
BIO 611	Biochemistry Laboratory II	
BIO 613	Genomics	
BIO 614	Behavioral Genetics	
BIO 615	Proteins	
BIO 616	Biochemistry of Major Diseases	
BIO 626	Immunology	
BIO 662	Biology of Neuron Function	
BIO 664	Neurobiology of Disease	
FDSC 506	Food Composition & Behavior	
FDSC 550	Food Microbiology	
FDSC 551	Food Microbiology Laboratory	
FDSC 554	Microbiology & Chemistry of Food Safety I	
FDSC 558	Nutritional Impact of Food Processing Methods	
FDSC 560	Food Chemistry	
FDSC 561	Food Analysis	
FDSC 568	Functional Foods	
FDSC 654	Microbiology & Chemistry of Food Safety II	
FDSC 662	Sensory Evaluation of Food	
NFS 530	Macronutrient Metabolism	
NFS 531	Micronutrient Metabolism	
NFS 546	World Nutrition	
NFS 625	Nutrition and Exercise Physiology	
NFS 650	Advanced Nutritional Chemistry I	
NFS 651	Advanced Nutritional Chemistry II	
NFS 690	Community Nutrition	
NFS 810	Topics in Metabolic Nutrition	
NFS 811	Topics in Community Nutrition	

PSY 828	Weight and Eating Disorders	
RSCH 759	Foundations of Biostatistics	
RSCH 770	Foundations in Research Methods	
RSCH 811	Intermediate Biostatistics	
RSCH 812	Interpretation of Data	
RSCH 813	Measurement Theory in Healthcare	
Total Credits		45.0

Sample Plan of Study - Nutrition Sciences Track

Term	Credits
Term 1	
NFS 602	3.0
NFS Elective	3.0
FDSC Elective	3.0
Term Credits	
	9.0
Term 2	
NFS 525	3.0
2 NFS Electives	6.0
Term Credits	
	9.0
Term 3	
NFS 601	3.0
NFS T680	3.0
Term Credits	
	6.0
Term 4	
NFS 997	2.0
2 NFS Electives	6.0
Term Credits	
	8.0
Term 5	
NFS 997	2.0
2 NFS Electives	6.0
Term Credits	
	8.0
Term 6	
NFS 997	2.0
NFS Elective	3.0
Term Credits	
	5.0
Total Credit: 45.0	

Degree Requirements - Didactic Program in Dietetics (DPD) Track

The Didactic Program in Dietetics (DPD) (<https://www.drexel.edu/cnhp/academics/graduate/MS-Human-Nutrition/>) provides the coursework that is required to become a Registered Dietitian/Nutritionist (RD/RDN). *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 Drexel University Didactic Program in Dietetics (DPD) 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 South Riverside Plaza
Suite 2000
Chicago, IL 60606
800-877-1600 x5400
www.eatright.org (<http://www.eatright.org>)

The Academy of Nutrition and Dietetics (<https://www.cdrnet.org/>) is the nation's largest organization of food and nutrition professionals, most of whom are Registered Dietitians (RD) or Registered Dietitians/Nutritionists (RDN). Note that the "RD" and "RDN" credential are the same credential. The Academy of Nutrition and Dietetics included the "RDN" to reflect that "all registered dietitians are nutritionists, but not all nutritionists are registered dietitians." In addition, the Academy of Nutrition and Dietetics states that adding the word to "nutritionist" to the RD credential allows for a broader notion of wellness.

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.
 - NOTE: As of January 1, 2024, the minimum of a Master's degree will be required to be able to take the RDN exam.
- 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.

Students who already have a bachelor's degree and want to become an RD/RDN, may complete coursework approved by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) at the master's degree level. Drexel University was one of the first universities in the country to offer the DPD program on the graduate level.

The MS in Human Nutrition with the DPD option is a full- or part-time program with courses offered in the evening. The program is 45.0 credits with a written comprehensive exam and may be completed in 18 months to two years with full-time study. Students who enroll part-time typically complete the program in three to four years. After completing the MS in Human Nutrition, students participating in this program will also receive a Verification Statement that shows successful completion of the DPD and allows them to apply for an accredited supervised practice experience (dietetic internship).

Required Courses

FDSC 506	Food Composition & Behavior	3.0
NFS 510	Profession of Dietetics	3.0
NFS 525	Nutritional Assessment Through the Life Cycle	3.0
NFS 526	Lifecycle Nutrition	3.0
NFS 530	Macronutrient Metabolism	3.0
NFS 531	Micronutrient Metabolism	3.0
NFS 543	Medical Nutrition Therapy I	3.0
NFS 544	Medical Nutrition Therapy II	3.0
NFS 545	Nutrition in Critical Care	3.0
NFS 546	World Nutrition	3.0
NFS 601	Research Methods	3.0
NFS 630	Nutrition Counseling	3.0
NFS 550	Foodservice Systems Management	3.0
NFS 690	Community Nutrition	3.0
Elective		3.0
Total Credits		45.0

Human Nutrition 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.

Charlene Compher, PhD, RD, CNSC, LDN, FADA, FASPEN (*Drexel University*) *Courtesy Appointment*. Visiting Research Professor.

Nyree Dardarian, MS, RD, LDN, CSSD, FAND (*Drexel University*) *Director, Center for Nutrition & 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.

RoseAnn 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.

Susan Fuchs, MS, IBCLC (*Drexel University*) *Director, Human Lactation Certificate Program*. Clinical Instructor. Human lactation

Beth L. Leonberg, MS, MA, RDN, CSP, FAND, LDN (*Colorado State University, Rowan University*) *Director, Didactic Program in Dietetics*. Associate Clinical Professor. Pediatric nutrition.

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.

Brandy-Joe Milliron, PhD (*Arizona State University*). Associate 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*). Visiting 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.

Kavitha Penugonda, PhD (*Kansas State University*) *Manager, Nutritional Biochemistry Laboratory*. Assistant Clinical Professor. Nutrient bioavailability in foods; nutritional supplements on health

Jennifer Quinlan, PhD (*North Carolina State University*). Professor. Food microbiology; microbiological quality and safety of produce, dairy and

meat products in markets in high vs. low socioeconomic 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.

Vicki Schwartz, DCN, RD, LDN, CNSC, FAND (*Rutgers University*). Assistant Clinical Professor. Clinical nutrition; using standardized patients in nutrition counseling

Sinclair A. Smith, MS, DSc (*Boston University*) *Chair, Health Sciences*. Professor. Effects of aging, dehydration, and oral creatine supplementation on skeletal muscle metabolism using phosphorus magnetic resonance spectroscopy. Anatomy, physiology, and exercise science.

Deeptha Sukumar, PhD (*Rutgers University*). Associate Professor. Vitamin D and magnesium and bone mineral density; obesity and bone mineral density.

Stella Lucia Volpe, PhD, RD, ACSM-CEP, 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*). 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.

Music Therapy and Counseling

Major: Music Therapy and Counseling

Degree Awarded: Master of Arts (MA)

Calendar Type: Quarter

Total Credit Hours: 90.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.2305

Standard Occupational Classification (SOC) code: 29-1129

About the Program

The Master of Arts program in Music Therapy and Counseling educates students for creative, responsive and effective therapy practice, in which music is the essential mode of transformation. Through a balance of classroom education and clinically supervised practicum and internship experiences, students develop a strong foundation for skilled clinical practice. The 90 quarter-credit curriculum includes specific music therapy coursework in areas such as clinical musicianship; clinical improvisation; theories and methods for children, adolescents, adults and older adults, and technological applications, as well as general mental health counseling coursework in human development; social and cultural foundations; clinical appraisal and assessment, and group dynamics. All courses are taught at the graduate level. Graduates are eligible for Board Certification through the Certification Board for Music Therapists, as well as professional counseling licensure in Pennsylvania (upon completion of post-graduation requirements).

Music therapists use music within a therapeutic relationship to address physical, emotional, cognitive and social needs of individuals. Research shows that music therapy is an effective treatment for children, adolescents, adults, and older adults with mental health needs, developmental and learning disabilities, Alzheimer’s disease and other aging-related conditions, substance abuse problems, acute and chronic pain, and brain injuries. Graduates of the MA in Music Therapy & Counseling program go on to work in a variety of clinical environments, including but not limited to: medical and behavioral health in-patient and out-patient settings; community health and wellness centers; schools and afterschool programs; trauma-informed settings; correctional facilities; elder care facilities, and private practices. Students also pioneer new frontiers in therapy application through clinical work and research.

For additional information about program, visit the College of Nursing and Health Professions’ Music Therapy (<https://www.drexel.edu/cnhp/academics/graduate/MA-Music-Therapy-Counseling/>) web site.

Degree Requirements

Core Courses

CATX 501	Foundations of the Creative Arts Therapies	3.0
CTCN 501	Human Psychological Development	4.5
CTCN 503	DSM and Psychopathology	4.5
CTCN 504	Professional Orientation and Ethics	4.5
CTCN 505	Theories of Counseling and Psychotherapy	4.5
CTCN 508	Social and Cultural Foundations in Counseling and Music Therapy	4.5
CTCN 601	Introduction to Behavioral Research	4.5
CTCN 603	Clinical Appraisal and Assessment	4.5
CTCN 604	Career Counseling	4.5
CTCN 608	Group Dynamics in Counseling and Music Therapy	4.5

Music Therapy Track Courses

CATX 570	Clinical Musicianship I	2.5
CATX 571	Clinical Musicianship II	2.5
CATX 572	Clinical Musicianship III	2.5
CATX 573	Clinical Musical Improvisation	4.0
CATX 575	Music Therapy Theories & Methods: Children and Adolescents	4.0
CATX 577	Music Therapy Theories & Methods: Adults and Older Adults	4.0
CATX 579	Technological Applications in Music Therapy	2.0
CATX 673	Advanced Topics in Music Therapy and Counseling I: Music, Imagery and the Therapeutic Relationship	3.0
CATX 674	Advanced Topics in Music Therapy and Counseling II: Integrative and Community Processes	3.0
CATX 678	Advanced Clinical Improvisation & Musical Analysis	4.0

Clinical Education Courses

CTCN 512	Clinical Practicum & Practicum Supervision I	2.0
CTCN 522	Clinical Practicum & Practicum Supervision II	2.0
CTCN 532	Clinical Practicum & Practicum Supervision III	2.0
CTCN 612	Clinical Internship & Internship Supervision I	2.0
CTCN 622	Clinical Internship & Internship Supervision II	2.0
CTCN 632	Clinical Internship & Internship Supervision III	2.0

Culminating Project

Complete at least 3 credits

CATX 625	Culminating Project in Music Therapy I	
CATX 626	Culminating Project in Music Therapy II	

Additional Electives

As needed, in consultation with the program director students can select the following electives:

CATX 627	For Culminating Project Only	
CATX I699	Independent Study in Creative Arts Therapy	

Total Credits

90.0

Sample Plan of Study

Term 1		Credits
CTCN 501	Human Psychological Development	4.5
CTCN 512	Clinical Practicum & Practicum Supervision I	2.0
CATX 570	Clinical Musicianship I	2.5
CATX 575	Music Therapy Theories & Methods: Children and Adolescents	4.0
Term Credits		13.0
Term 2		Credits
CTCN 508	Social and Cultural Foundations in Counseling and Music Therapy	4.5
CTCN 522	Clinical Practicum & Practicum Supervision II	2.0
CATX 571	Clinical Musicianship II	2.5
CATX 577	Music Therapy Theories & Methods: Adults and Older Adults	4.0
Term Credits		13.0
Term 3		Credits
CTCN 503	DSM and Psychopathology	4.5
CTCN 532	Clinical Practicum & Practicum Supervision III	2.0
CATX 572	Clinical Musicianship III	2.5
CATX 573	Clinical Musical Improvisation	4.0
CATX 579	Technological Applications in Music Therapy	2.0
Term Credits		15.0
Term 4		Credits
CATX 501	Foundations of the Creative Arts Therapies	3.0
CTCN 504	Professional Orientation and Ethics	4.5
CTCN 505	Theories of Counseling and Psychotherapy	4.5
Term Credits		12.0
Term 5		Credits
CTCN 601	Introduction to Behavioral Research	4.5
CTCN 608	Group Dynamics in Counseling and Music Therapy	4.5
CTCN 612	Clinical Internship & Internship Supervision I	2.0
CATX 673	Advanced Topics in Music Therapy and Counseling I: Music, Imagery and the Therapeutic Relationship	3.0
Term Credits		14.0
Term 6		Credits
CTCN 603	Clinical Appraisal and Assessment	4.5
CTCN 622	Clinical Internship & Internship Supervision II	2.0
CATX 625	Culminating Project in Music Therapy I	1.0
CATX 674	Advanced Topics in Music Therapy and Counseling II: Integrative and Community Processes	3.0
Term Credits		10.5
Term 7		Credits
CTCN 604	Career Counseling	4.5
CTCN 632	Clinical Internship & Internship Supervision III	2.0
CATX 626	Culminating Project in Music Therapy II	2.0
CATX 678	Advanced Clinical Improvisation & Musical Analysis	4.0
Term Credits		12.5

Total Credit: 90.0

Creative Arts Therapies Department Faculty

Yasmine Awais, MAAT, ATR-BC, ATCS, LCAT, LPC (*Art Institute of Chicago*). Associate Clinical Professor. Art therapy with diverse populations, art therapy in non-profit settings, clinical supervision.

Joke Bradt, PhD, MT-BC (*Temple University*) Director, PhD Program in *Creative Arts Therapies*. Professor. Research in music therapy, chronic pain, systematic reviews.

Natalie Rae Carlton, PhD, ATR-BC, LPCC (*Lesley University*) Director, *Art Therapy and Counseling MA Program*. Associate Clinical Professor.

New media and art therapy, social justice in art activities, transgender and LGBTQ identity.

Christina Devereaux, PhD, LCAT, LMHC, BC-DMT, NCC (*UCLA*) Program Director for *Dance/Movement Therapy and Counseling*. Associate Clinical Professor. Dance movement therapy, children, attachment, autism spectrum disorder, trauma, group work, clinical supervision

Abby Dougherty, PhD, NCC, LPC (*Walden University*) Core Counseling Curriculum Coordinator. Clinical Assistant Professor. Virtual reality in mental health, mindfulness and contemplative practices in counselor education, creativity in college counseling, learning disabilities, relational-cultural theory in counseling and adult education.

Sharon Goodill, PhD, BC-DMT, NCC, LPC (*Union Institute and University*) Chair, *Department of Creative Arts Therapies*. Clinical Professor. Medical dance/movement, mind/body studies, movement assessment for DMT, CAT research and leadership.

Scott Horowitz, MA, MT-BC, LPC (*Drexel University*) Director of Field Education. Clinical Instructor. Interdisciplinary practice and education, developmental models of clinical and practicum supervision, music therapy and neurodevelopmental populations.

Florence Ierardi, MM, MT-BC, LPC (*Temple University*) Director, *Music Therapy and Counseling MA Program*. Associate Clinical Professor. Clinical improvisation, trauma-informed music therapy, multicultural music therapy perspectives.

Girija Kaimal, EdD, MA (*Harvard University*). Associate Professor. Art therapy, educational research, program evaluation, art therapy.

Dawn Morningstar, MCAT, VC-DMT, LP (*Hahnemann University*) Coordinator of *CAT Clinical Services*. Assistant Clinical Professor. Specialty in working with children and adolescents, Dance/movement therapist at Drexel's Parkway Health and Wellness faculty practice outpatient clinic.

Michele Rattigan, MA, ATR-BC, NCC, LPC (*MCP Hahnemann University*) Coordinator of *CAT Clinical Services*. Associate Clinical Professor. Unresolved trauma; post-partum depression and anxiety; disordered eating and body image concerns; self-harming behaviors; dissociative disorders

Ellen Schelly-Hill, MMT, BC-DMT, NCC, LPC (*Antioch NE Graduate School*) Director of *Dance/Movement Therapy and Counseling MA Program*. Associate Clinical Professor. Adults diagnosed with mood disorders, anxiety, chronic pain and with histories of trauma; clinical supervision; ethics.

Minjung Shim, PhD, BC-DMT (*Drexel University*). Assistant Research Professor. Medical dance/movement therapy, chronic pain management, mindfulness-based interventions, clinical trials, theory/model-building, qualitative inquiries, scoping reviews.

Emeritus Faculty

Nancy Gerber, PhD, ATR-BC (*Union Institute and University*). Associate Clinical Professor Emerita. Art therapy assessment and treatment of adolescents and adults; modern psychoanalysis and art therapy; arts therapy education and doctoral education; arts based research and mixed methods research.

MSN in Nurse Anesthesia

Major: Nurse Anesthesia

Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 89.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.3804

Standard Occupational Classification (SOC) code: 29.1151

About the Program

The Master of Science in Nursing in nurse anesthesia is a 28-month, 89.0 quarter credit, full-time program. The program offers 19.0 theoretical nursing and research credits, a 15.0 quarter credit basic science component, a 30.0 quarter credits didactic anesthesia component and a 25.0 credit clinical component. Upon successful completion of the program's outcomes the student is awarded an MSN in nurse anesthesia and is eligible to take the national certification examination offered by the National Board of Certification and Recertification of Nurse Anesthetists (NBCRNA).

The Nurse Anesthesia Program is accredited by the:
Council on Accreditation of Nurse Anesthesia Educational Programs
222 South Prospect Avenue, Suite 304
Park Ridge, IL 60068
847.692.7050

PMC in Nurse Anesthesia

The College of Nursing and Health Professions also offers a post-master's certificate in nurse anesthesia (p. 158) option. Upon successful completion of the program's outcomes the student is awarded a certificate in nurse anesthesia and is eligible to take the national certification examination offered by the NBCRNA.

Additional Information

For more information, contact the Academic Advisor of the Nurse Anesthesia Program:
MSN Programs Academic Advisor
1601 Cherry Street
267.359.5786

Additional information is also available on Drexel's College of Nursing and Health Professions Nurse Anesthesia Program (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nursing-Nurse-Anesthesia/>) web page.

Admission Requirements

The nurse anesthesia program begins annually in January. Applications are reviewed continually. Applications should be made 12-18 months in advance of the anticipated January start date. Interviews are conducted throughout the year.

Prospective applicants must demonstrate their ability to pursue graduate work, as exemplified by high scholastic achievement, high aptitude-test scores, and letters of recommendation. Applicants for the nurse anesthesia programs may submit scores from the Miller Analogies Test (MAT) in lieu of the GRE.

For detailed admission requirements, visit the College's MSN in Nurse Anesthesia Admission Requirements (<http://www.drexel.edu/gradnursing/msn/nurseAnesthesia/admissions/>) web page.

An application form and additional requirements and deadline information is available on the the Nurse Anesthesia (<http://www.drexel.edu/grad/programs/cnhp/nurse-anesthesia/>) page of Drexel Admissions website.

Degree Requirements

MSN Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Nurse Anesthesia Core

NURS 503	Basic Principles of Nurse Anesthesia	3.0
NURS 504	Overview of Nurse Anesthesia	3.0
NURS 505	Chemistry and Physics	2.0
NURS 507	Nurse Anesthesia Pharmacology I	3.0
NURS 510	Advanced Principles of Nurse Anesthesia I	3.0
NURS 511	Nurse Anesthesia Pharmacology II	3.0
NURS 515	Advanced Principles of Nurse Anesthesia II	3.0
NURS 518	Advanced Principles of Nurse Anesthesia III	3.0
NURS 530	Anesthesia Seminar	1.0
NURS 659	Advanced Principles of Nurse Anesthesia IV	3.0
NURS 688	Clinical Correlative Seminars	3.0
NURS 508	Nurse Anesthesia Clinical Practicum I	1.0
NURS 512	Nurse Anesthesia Clinical Practicum II	1.0
NURS 516	Nurse Anesthesia Clinical Practicum III	2.0
NURS 517	Nurse Anesthesia Clinical Practicum IV	3.0
NURS 683	Nurse Anesthesia Clinical Practicum V	3.0
NURS 684	Nurse Anesthesia Clinical Practicum VI	3.0
NURS 687	Clinical Residency I	6.0
NURS 689	Clinical Residency II	6.0

Physiological Science Courses

NURS 520	Advanced Physiology	3.0
NURS 521	Advanced Pathophysiology I	3.0
NURS 522	Advanced Pathophysiology II	3.0
NURS 523	Advanced Pathophysiology III	3.0

Total Credits		89.0
---------------	--	------

Nurse Anesthesia Faculty

Suzanne Ariza, MSN, CRNA (*Drexel University*). Assistant Clinical Professor.

Lew Bennett, DNP, CRNA (*Chatham University*) *Chair, Nurse Anesthesia Department*. Assistant Clinical Professor. Clinical and didactic education of nurse anesthesia students.

Ferne Cohen, EdD, CRNA (*Drexel University*) *Associate Chair & Director of Clinical Education, Nurse Anesthesia Department*. Assistant Clinical Professor. Clinical and didactic education of nurse anesthesia students.

PhD in Nursing

Major: Nursing

Degree Awarded: Doctor of Philosophy

Calendar Type: Quarter

Total Credit Hours: 49.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.3801

Standard Occupational Classification (SOC) code: 29-1141

About the Program

The College of Nursing and Health Professions (CNHP) offers a Doctor of Philosophy in Nursing Science, a research-based program embedded in social justice, which aims to prepare nurse researchers to design, conduct and lead research studies as emerging nurse scientists. The objective of the PhD in Nursing is to prepare professional nurses as scholars and researchers who will make a substantive contribution to the body of knowledge for the discipline of nursing and thereby improve health services for those who receive nursing care. Graduates are expected to plan and launch an independent program of research, seek needed support for initial phases of the research program, and begin to involve others (i.e., students, clinicians, and other researchers) in their activities.

The program of study builds on advanced preparation in nursing at the master's level (MSN to PhD). In addition to structured coursework, the program builds upon a research mentorship model which recognizes that research skills are learned most effectively by working with a faculty mentor, who provides opportunities to use the tools to conduct research and design, and execute an original research within a focused program of study.

Innovation, leadership, civic engagement, and interdisciplinary collaboration are strong educational values which are reflected in the Drexel University emerging strategic plan. The PhD in nursing program represents leadership in the fields, with interdisciplinary collaboration and critical consciousness as core administrative and curricular values basic to its philosophy and epistemology. Innovation is also central to this doctoral program as evidenced in its curriculum and research philosophy.

The College of Nursing and Health Professions (CNHP), Graduate Nursing Division in which the Doctoral Nursing Program is housed, is regarded as a forward thinking, progressive, and interdisciplinary healthcare school within the university as well as in the larger context of advanced healthcare education.

Admission Requirements

Applicants must possess a master's degree in nursing for admission consideration. Criteria for admission include:

- GPA of 3.5
- GRE scores
- OREs (and TOEFLs, if international)
- Letters of recommendation (3)
- Articulation of research interests, career goals and insight into important issues in the profession in essays
- Professional accomplishments
- Fit with faculty research interests and expertise

Degree Requirements

The PhD curriculum requires 49.0 quarter credits of course work plus comprehensive examination and dissertation completion. Of the 49.0 credits, 15.0 credits are required interdisciplinary courses, and 21.0 credits in nursing science. In addition, there are three elective courses that form the student's field of concentration related to their dissertation research. These elective courses can be taken anywhere within the university but must be approved by the student's advisor and the Doctoral Curriculum Committee in advance of taking these courses. The student

files a plan of Study outlining these courses in the winter of the first year which is approved by the Curriculum Committee.

Required Courses		
NURS 800	Theoretical Foundations of Nursing Inquiry 1	3.0
NURS 801	Theoretical Foundations of Nursing Inquiry II	3.0
NURS 803	Doctoral Seminar: Scientific Integrity	1.0
NURS 804	Doctoral Seminar: Creating Intellectual Community	1.0
NURS 805	Doctoral Seminar: Grantsmanship	1.0
NURS 806	Scientific Appraisal and Knowledge Development	3.0
NURS 819	Qualitative Research Methods in Nursing Inquiry	3.0
NURS 820	The Science of Therapeutics	3.0
RSCH 759	Foundations of Biostatistics	3.0
RSCH 770	Foundations in Research Methods	3.0
RSCH 811	Intermediate Biostatistics	3.0
RSCH 812	Interpretation of Data	3.0
RSCH 813	Measurement Theory in Healthcare	3.0
Required Research Apprenticeship (total of 3 credits)		3.0
NURS 850	Research Apprenticeship (Must be repeated 2 times)	
Dissertation Research (minimum of 4 credits)		4.0
NURS 989	Dissertation (May be repeated up to 7 times)	
Electives		9.0
NURS 860	Integration of Genetics/Genomics in a Research Agenda	
NURS 861	Interdisciplinary Approaches in Aging Research	
NURS 862	Reproductive Epidemiology	
NURS 863	Mixed-Methods Research	
NURS I899	Independent Study in Nursing	
Total Credits		49.0

Sample Plan of Study

Term 1		Credits
NURS 800	Theoretical Foundations of Nursing Inquiry 1	3.0
NURS 819	Qualitative Research Methods in Nursing Inquiry	3.0
RSCH 759	Foundations of Biostatistics	3.0
Term Credits		9.0
Term 2		
NURS 801	Theoretical Foundations of Nursing Inquiry II	3.0
RSCH 770	Foundations in Research Methods	3.0
RSCH 811	Intermediate Biostatistics	3.0
Term Credits		9.0
Term 3		
NURS 803	Doctoral Seminar: Scientific Integrity	1.0
NURS 806	Scientific Appraisal and Knowledge Development	3.0
RSCH 812	Interpretation of Data	3.0
Term Credits		7.0
Term 4		
NURS 804	Doctoral Seminar: Creating Intellectual Community	1.0
NURS 850	Research Apprenticeship	1.0
RSCH 813	Measurement Theory in Healthcare	3.0
Elective		3.0
Term Credits		8.0
Term 5		
NURS 805	Doctoral Seminar: Grantsmanship	1.0
NURS 820	The Science of Therapeutics	3.0
NURS 850	Research Apprenticeship	1.0
Elective		3.0
Term Credits		8.0
Term 6		
NURS 850	Research Apprenticeship	1.0
Elective		3.0
Term Credits		4.0

Term 7		
NURS 989	Dissertation	1.0
Term Credits		1.0
Term 8		
NURS 989	Dissertation	1.0
Term Credits		1.0
Term 9		
NURS 989	Dissertation	1.0
Term Credits		1.0
Term 10		
NURS 989	Dissertation	1.0
Term Credits		1.0
Total Credit: 49.0		

Doctor of Nursing Practice

Major: Nursing Practice

Degree Awarded: Doctor of Nursing Practice (DNP)

Calendar Type: Quarter

Total Credit Hours: 46.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.3818

Standard Occupational Classification (SOC) code: 11-9111

About the Program

Drexel's accredited online Doctor of Nursing Practice (DNP) program is designed for nurses seeking a terminal degree in nursing practice and offers an alternative to research-focused doctoral programs. The mission of the DNP program is to prepare advanced nursing practice leaders for application of evidence-based knowledge in practice, quality improvement, and systems leadership to improve health outcomes. DNP-prepared nurses are well-equipped to fully implement the science developed by nurse researchers prepared in PhD, DNS, and other research-focused nursing doctorates.

Upon graduation, students will be able to:

- Evaluate patient care delivery approaches to meet the current and anticipated needs of patient populations based on outcomes and scientific findings
- Translate research into clinical practice and policy to improve care and outcomes
- Use advanced communication skills to lead quality improvement and patient safety
- Use principles of business, finance, economics, and health policy to develop and implement plans to improve the quality of healthcare delivery
- Demonstrate sensitivity to diversity in patients and providers
- Evaluate effective strategies for the management of ethical dilemmas that can occur in the course of healthcare delivery

Clinical Requirements

A total of 500 clinical hours are required which are built into the following courses and project:

- NURS 830 - 125 hours
- NURS 835 - 125 hours
- NURS 838 - 125 hours

- NURS 842 - 75 hours
- NURS 843 - 125 hours

In-Person Experiential Elements

- **Orientation** (Required) – *September of Student's First Term*
 - Designed as a two-day introduction to the program and an opportunity to engage in discussion about the DNP project topic, meet peers, advisors, staff, and the faculty.
- **Global Immersion** (Optional) – *Spring Quarter of Student's Second Year*
 - The DNP program prepares future advanced nursing practice leaders to respond to current and future global healthcare needs in diverse settings. Global opportunities are transformational, strengthening the leadership role for which DNP scholars are prepared. At Drexel University, the option of global engagement experiences are available to students.

An exciting opportunity in Drexel's DNP program encompasses a one-week global experience at the birthplace of evidence-based practice. Conducted at a host university in another country, the scholar may elect to participate in a unique educational and cultural experience designed to gain global perspectives on health care. Upon completion, students are awarded practice hours towards the required number of clinical practicum hours in the program. For a global immersion trip, the student must satisfy requirements for U.S. citizenship (i.e. valid U.S. passport, NEXUS card) to enter a host country.

Admission Requirements

Admissions Criteria

- Master's of Science in Nursing (MSN)
- Master's degree in health-related field
- Master's of Business Administration (MBA)
- If Master's degree is not in Nursing, a Bachelor's of Science in Nursing (BSN) is required
- Graduate-level Research Methods course (grade B or higher)

Masters and Bachelors degrees from a regionally accredited institution in the United States or an equivalent international institution are accepted.

Submission of the following documents include:

- A completed application
- Copies of current RN license, advanced practice nursing licensure and advanced certification documents
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended
- Two letters of recommendation from individuals who hold a graduate degree (doctoral prepared highly preferred). Sources may be from academic, employer, or professional colleagues and attest to academic ability and professional competency.
- Personal statement/essay integrating responses to the following questions in 2-3 pages, double-spaced:
 - What is your area of interest (e.g. clinical practice, education, administration/nurse executive) and how will you apply the DNP to your practice area?
 - Identify a clinical problem or nursing process of interest you would like to develop for your practice-focused DNP project in a health care practice or system. Discuss why it is a problem and

how it is related to the DNP project in which you are interested. Explain how you aim to use the evidence-based practice project to improve processes or health outcomes.

- Curriculum Vitae (CV) or Resume
- Licensure/Certification
 - Current U.S. licensure as a registered nurse (RN)
 - Advanced Practice Registered Nurse (APRN) Candidates
 - Submit U.S. licensure and certification documentation for one of the following certification(s):
 - Certified Nurse Practitioner
 - Certified Nurse Midwife (CNM)
 - Certified Registered Nurse Anesthetist (CRNA)
 - Certified Clinical Nurse Specialist (CNS)
 - Nurse Managers/Executives Candidates
 - Submit certification documentation for one of the following certification(s) or verification that you are scheduled to take one of these exams:
 - American Credentialing Center (ANCC) Nurse Executive-Advanced certification (NEA)
 - American Nurse Credentialing Center (ANCC) Nurse Executive (NE)
 - American Organization of Nurse Executives (AONE) Certified in Executive Nursing Practice (CENP)
 - American Organization of Nurse Executives (AONE) Certified Nurse Manager and Leader (CNML)
 - If utilizing your master's preparation in an area of advanced nursing practice and do not hold or are eligible to attain one of the required certifications listed, contact the DNP Program (<https://drexel.edu/cnhp/academics/doctoral/DNP-Doctor-Nursing-Practice/>).

Degree Requirements

Curriculum

The Doctor of Nursing Practice (DNP) program of study integrates core courses along with clinical/role practicum and DNP Project courses. The DNP degree requires completion of a scholarly doctoral project that demonstrates clinical scholarship. The focused study combination of courses provides the student learner with an opportunity for acquisition of advanced knowledge, new skills, clinical scholarship, practice immersion experiences, and leadership for DNP role preparation to influence health care outcomes. The curriculum is based on nationally recognized standards by the American Association of Colleges of Nursing (AACN) and consistent with the DNP program accrediting by the Commission on Collegiate Nursing Education (CCNE).

The DNP Project process is designed to progress concurrent with the DNP Plan of Study coursework. A DNP Project Team for the scholarly doctoral project is required. During the DNP program, the student is paired with a DNP Project Chair (doctorate prepared Drexel faculty member) who guides and oversees the project team process related to the student's required DNP Final Project. A doctorate-prepared Practicum Mentor is required (for courses with Practicum/Practice Hours) who may be internal or external to the student's practice setting. Additional formal or informal experts, mentors, partners, and/or facilitators may provide intermittent or limited support throughout the project stages as needed (optional).

The intended project completion date is by the end of spring quarter, Year 2. Some students will require an additional quarter (summer quarter,

Year 2), depending on project complexities, practice site conflicts, and institutional review board processes. The DNP final project must be completed within the timelines for graduation established by College and University Policies. The project culminates with a final DNP scholarly paper.

Required Courses

NURS 703	Health Policy and Economics	3.0
NURS 706	Applied Epidemiology	3.0
NURS 714	Introduction to Qualitative Methods in Nursing Inquiry	3.0
NURS 716	Scientific Foundation of Nursing Knowledge Development	3.0
NURS 718	Quantitative Methods for Practice-based Nursing Inquiry	3.0
NURS 720	Health Information Technology and Information Systems	3.0
NURS 722	Organizations and Systems Leadership: Innovative Strategies	3.0
NURS 830	Doctoral Nursing Practice Clinical Practicum	3.0
NURS 835	Doctoral Nursing Practice Role Practicum	3.0
NURS 836	Clinical and Applied Nursing Ethics	3.0
NURS 837	Translating Evidence into Clinical Practice	3.0
NURS 838	Global Leadership Perspectives	3.0
NURS 842	DNP Project Seminar I	3.0
NURS 843	DNP Project Seminar II	3.0
RSCH 519	Introduction to Biostatistics	3.0
Total Credits		45.0

Program Delivery

The DNP program is an online distance-learning program with an information technology requirement for accessing courses. The DNP program is delivered over 10-week quarters per year with four academic quarters offered per year (1-semester credit is equivalent to 1.5-quarter credits). Students in the DNP Program are required to attend a mandatory, two-day DNP orientation. The orientation is an on-campus program held at Drexel University. DNP Orientation transpires at the start of the program corresponding to the beginning of the first Fall academic term.

Sample Plan of Study

First Year		Credits
Fall		
NURS 716	Scientific Foundation of Nursing Knowledge Development	3.0
RSCH 519	Introduction to Biostatistics	3.0
Term Credits		6.0
Winter		
NURS 706	Applied Epidemiology	3.0
NURS 837	Translating Evidence into Clinical Practice	3.0
Term Credits		6.0
Spring		
NURS 714	Introduction to Qualitative Methods in Nursing Inquiry	3.0
NURS 842	DNP Project Seminar I	3.0
Term Credits		6.0
Summer		
NURS 718	Quantitative Methods for Practice-based Nursing Inquiry	3.0
NURS 720	Health Information Technology and Information Systems	3.0
Term Credits		6.0
Second Year		
Fall		
NURS 830	Doctoral Nursing Practice Clinical Practicum	3.0
NURS 836	Clinical and Applied Nursing Ethics	3.0
Term Credits		6.0
Winter		
NURS 703	Health Policy and Economics	3.0

NURS 835	Doctoral Nursing Practice Role Practicum	3.0
Term Credits		6.0
Spring		
NURS 838	Global Leadership Perspectives	3.0
NURS 843	DNP Project Seminar II	3.0
Term Credits		6.0
Summer		
NURS 722	Organizations and Systems Leadership: Innovative Strategies	3.0
Term Credits		3.0

Total Credit: 45.0

* NURS 810 is an optional course to be taken under the direction of the academic advisor and the DNP program chair or director.

Doctor of Nursing Practice (DNP) Faculty

Anthony Angelow, MSN, CRNP, BC, CEN (*Thomas Jefferson University*). Assistant Clinical Professor. Developing diagnostic reasoning in nurse practitioners, curriculum design and implementation, and nurse practitioner educational methods.

Katherine Kaby Anselmi, PhD, JD, FNP-BC, WHNP-BC (*University of Pennsylvania*) *Assistant Dean of Accreditation/Regulatory Affairs & Online Innovation*. Associate Clinical Professor. Nursing, law, family nurse practitioner, women's health nurse practitioner.

Brenda Douglass, DNP, CRNP-BC, CDE, CTTS. Associate Clinical Professor. Endocrine, cardiology, pulmonology, sleep disorders, and chronic health conditions

Mary Gallagher-Gordon, PhD, MSN, RN, CNE (*Drexel University*) *Senior Director of Contracts, Compliance and Academic Community Initiatives*. Assistant Clinical Professor. Informatics, patient safety and nursing education, NCLEX review.

William Lorman, PhD, JD, PMHNP-BC, CARN-AP, FIAAN (*American Institute*). Assistant Clinical Professor. Addiction and mental health.

Bobbie Posmontier, PhD, CNM, PMHNP-BC (*University of Pennsylvania*). Associate Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Al Rundio, PhD, DNP, RN, APRN, CARN-AP, NEA-BC, FNAP, FIAAN, FAAN (*Chatham College*). Clinical Professor. Transference of dependencies from bariatric surgical procedures, relapse prevention in chemically addicted clients.

Albert Rundio, Jr., PhD, DNP, RN, APRN, NEA, BC, FAAN (*University of Pennsylvania*) *Associate Dean for Post Licensure and Graduate Nursing Programs*. Clinical Professor. Nursing graduate leadership and management track.

Susan Solecki, MSN, FNP-BC, PPCNP-BC (*Hahnemann University*). Associate Clinical Professor. Nursing women's health, adult health, and occupational health.

Linda Wilson, PhD, RN, CPAN, CAPA, BC, CNE, CHSE (*Rutgers University*) *Assistant Dean for Special Projects, Simulation & CNE Accreditation*. Associate Clinical Professor. Simulation informatics and technology, perianesthesia, pain management, critical care, trauma, emergency preparedness.

Patti Rager Zuzelo, EdD, RN, ACNS-BC, ANP-BC, CRNP, FAAN (*Widener University*). Clinical Professor. Advanced practice nursing,

leadership and management, nursing education, clinical nurse specialist (adult health) and adult nurse practitioner.

MSN: Clinical Nurse Leader Concentration

Major: Nursing: Clinical Nurse Leader Concentration

Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 48.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.3801

Standard Occupational Classification (SOC) code: 29-1141

About the Program

The MSN Clinical Nurse Leader (CNL) track is designed to prepare nurses for an evolving advanced generalist role which incorporates advanced knowledge, skill, and clinical expertise in an evidence-and-quality-driven context. The CNL oversees care coordination of a distinct group of patients, is a resource for clinical decision making, and serves as lateral integrator of care. This clinical leader puts evidence-based practice into action to ensure that patients benefit from the latest innovations in care delivery. The CNL collects and evaluates patient outcomes, assess cohort risk, and has the decision-making authority to change care plans when necessary. This clinician functions as part of an interdisciplinary team by communicating, planning, and implementing care directly with other health care professionals including physicians, pharmacists, social workers, therapists, clinical nurse specialists, and nurse practitioners. The CNL is a leader in the health care delivery system across all settings in which health care is delivered. The program emphasizes the development of competencies related to the use of technology, evidence-based practice, customization of care, health team and interdisciplinary leadership, and outcome and risk assessment.

This online masters program prepares nurses to function effectively in a quickly changing, increasingly complex clinical care environment. Students have the opportunity to develop advanced competencies and depth of knowledge as clinical nurse leaders. The program emphasizes evidence-based approaches to solve clinical problems, assessment and evaluation of nursing and health care outcomes, clinical decision-making, lateral care integration, clinically-based leadership and the design of nursing care for clinical populations at the clinical unit or similar small system level.

Clinical practicum experiences include development and management of a data driven project which provides opportunities for students to deepen evidenced base practice competencies in the management of clients' health care needs at the point-of-care. Precepted clinical experiences will include activities such as modeling of care, assessment and evaluation of aggregate patient outcomes, case management and service integration, unit and interdisciplinary team leadership, as well as teaching and mentoring of staff.

The program is accredited by the Commission on Collegiate Nursing Education.

Additional Information

For more information about this program, contact:

Ms. Jillian Randall
Senior Academic Advisor

jnr56@drexel.edu
267.359.5692

Additional information is also available on Drexel's College of Nursing and Health Professions MSN in Clinical Nurse Leader (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Clinical-Nurse-Leader/>) (<http://www.drexel.edu/gradnursing/msn/advancedRoleMSN/clinNurseLeader/>) web page and on the Drexel University Online MSN Clinical Nurse Leader (<http://online.drexel.edu/online-degrees/nursing-degrees/msn-clinical/>) web page.

Admission Requirements

- BSN from a program fully accredited by NLN and/or CCNE.
- 3.0 or above on all previous coursework or the last 60 credits completed. Applications from RN's with GPA < 3.0 may be considered on an individual basis.
- Official transcripts from all previous educational institutions are required.
- Two professional references required from colleagues or supervisors who can attest to the applicant's knowledge, skill, and potential aptitude for graduate study.
 - Letters of Recommendations are waived for students with a 3.5 GPA or higher
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- Curriculum Vitae or Resume.
- Copy of Current US RN license required.
- Copies of any Advanced Practice Nursing Licensure and Certification Documents.
- While specific experience is not required for applicants to the track, previous related work experience may make an applicant more competitive.

International applicants must possess a BSN (or its equivalent) and current US RN license.

TOEFL Requirement

International Applicants, as well as Immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor's degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and must show proficiency in English speaking as well as listening, writing and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

If you take the TOEFLiBT exam, you are required to have a minimum combined score for the listening, writing and reading sections of 79 Plus a speaking section score of 26 or higher.

If you take the TOEFL, you are required to have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Additional Information

For more information about this program, contact:

Mr. Redian Furxhiu
Senior Academic Advisor
rf53@drexel.edu
267-359-5691

Additional information is also available on Drexel University's College of Nursing and Health Professions MSN in Clinical Nurse Leader web page (<http://drexel.edu/cnhp/academics/graduate/MSN-Clinical-Nurse-Leader/>) and on Drexel University Online's MSN Clinical Nurse Leader web page (<https://online.drexel.edu/online-degrees/nursing-degrees/msn-clinical/>).

Degree Requirements

MSN Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 564	The Business of Healthcare	3.0

Track Courses

NURS 531	Epidemiology in Action: Tracking Health & Disease	3.0
NURS 532	Evaluation of Health Outcomes	3.0
NURS 602	Foundations for Clinical Nurse Leader	4.0
NURS 603	Clinical Nurse Leader Capstone Immersion I	5.0
NURS 604	Clinical Nurse Leader Capstone Immersion II	5.0

Total Credits		48.0
---------------	--	------

Additional Information

For more information about this program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu (fr53@drexel.edu)
267.359.5691

Additional information is also available on Drexel's College of Nursing and Health Professions MSN in Clinical Nurse Leader (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Clinical-Nurse-Leader/>) web page and on Drexel University Online MSN Clinical Nurse Leader (<http://online.drexel.edu/online-degrees/nursing-degrees/msn-clinical/>) web page.

Sample Plan of Study

Term 1		Credits
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
Term Credits		6.0
Term 2		
RSCH 503	Research Methods and Biostatistics	3.0
NURS 544	Quality and Safety in Healthcare	3.0
Term Credits		6.0
Term 3		
RSCH 504	Evaluation and Translation of Health Research	3.0

NURS 531	Epidemiology in Action: Tracking Health & Disease	3.0
	Term Credits	6.0
Term 4		
NURS 548	Advanced Pathophysiology	3.0
NURS 532	Evaluation of Health Outcomes	3.0
	Term Credits	6.0
Term 5		
NURS 564	The Business of Healthcare	3.0
NURS 549	Advanced Pharmacology	3.0
	Term Credits	6.0
Term 6		
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
	Term Credits	4.0
Term 7		
Off		
	Term Credits	0.0
Term 8		
Off		
	Term Credits	0.0
Term 9		
NURS 602	Foundations for Clinical Nurse Leader	4.0
	Term Credits	4.0
Term 10		
NURS 603	Clinical Nurse Leader Capstone Immersion I	5.0
	Term Credits	5.0
Term 11		
NURS 604	Clinical Nurse Leader Capstone Immersion II	5.0
	Term Credits	5.0

Total Credit: 48.0

Advanced Role MSN Faculty

Susan M. Burke, PhD, RN, CPNP-BC (*The Catholic University of America*) Track Director, *Pediatric Primary Care*. Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Jennifer Coates, MSN, MBA, ACNPC, ACNP-BC (*The University of Pennsylvania*). Assistant Clinical Professor. Critical care nurse practitioner.

Frances H. Cornelius, PhD, MSN (*Drexel University; Wayne State University*) Chair, *MSN Department*. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Brenda Douglass, DNP, CRNP-BC, CDE, CTTS. Associate Clinical Professor. Endocrine, cardiology, pulmonology, sleep disorders, and chronic health conditions

Alecia Schneider Fox, PhD (Candidate) (*Widener University*) Senior Director *Nursing Faculty Affairs and Clinical Education*. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

MSN: Nursing Education Concentration

Major: Nursing Education

Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 46.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.3817

Standard Occupational Classification (SOC) code: 25-1072

About the Program

The MSN: Nursing Education program prepares students to work as nursing educators, nursing faculty, or nursing professors in all types of programs, at all levels, in a variety of settings. This program has a special focus on preparing students with the required competencies to be successful on the nurse educator certification exam.

Currently, there is a severe and critical nursing faculty shortage in the United States. This program will prepare graduates to fill these faculty and educator positions in healthcare organizations through cutting-edge content and learning experiences that build the skills and competencies essential for today's nurse educators.

The program integrates theories specific to adult learning, curriculum design, evaluation of courses and programs, critical thinking, both clinical and classroom techniques, and the preparation for the role of the nursing professor. The program also includes opportunities to explore contemporary and leading-edge educational modalities. Knowledge and skills gained through this program are applicable in a variety of settings.

This unique program even instructs students on how to teach online and use technology to teach nursing in innovative ways. The culminating practicum, which runs over two terms, provides students with opportunities to put what has been learned into practice. Participants complete a role practicum experience in teaching, providing ample opportunity to apply theory to practice. In addition, students are required to attend an immersive on-campus intensive (OCI) simulation residency when taking practicum. The OCI hours will count as part of the required 160 total practicum hours (24 practicum hours earned). The OCI is offered biannually.

The program is accredited by the Commission on Collegiate Nursing Education (CCNE).

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
j_rf53@drexel.edu)nr56@drexel.edu (jnr56@drexel.edu)
267.359.5692

Additional information is also available on the Drexel's College of Nursing and Health Professions MSN in Nursing Education (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nursing-Education-Faculty-Role/>) web page and on the Drexel University Online MSN in Nursing Education (<http://online.drexel.edu/online-degrees/nursing-degrees/msn-ed/>) web page.

Admission Requirements

- BSN from a program fully accredited by NLN and or CCNE.
- 3.0 or above on all previous coursework or the last 60 credits completed. Applications from RN's with GPA less than a 3.0 may be considered on an individual basis.

- Official transcripts from all previous educational institutions are required.
- Two professional references required from colleagues or supervisors who can attest to the applicant's knowledge, skill, and potential aptitude for graduate study.
 - Letters of Recommendations are waived for students with a 3.5 GPA or higher
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- Curriculum Vitae or Resume.
- Copy of Current United States RN license required.
- Copies of any Advanced Practice Nursing Licensure and Certification Documents.
- While specific experience is not required for applicants to the track, previous related work experience may make an applicant more competitive.

International applicants must possess a BSN (or its equivalent) and current United States RN license.

TOEFL Requirement

International Applicants, as well as Immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor's degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and must show proficiency in English speaking as well as listening, writing and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

If you take the TOEFLiBT exam, you are required to have a minimum combined score for the listening, writing and reading sections of 79 Plus a speaking section score of 26 or higher.

If you take the TOEFL, you are required to have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Additional Information

For more information about this program, contact:

Ms. Jillian Randall
Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is available on the Drexel University College of Nursing and Health Professions MSN in Nursing Education (<http://drexel.edu/cnhp/academics/graduate/MSN-Nursing-Education-Faculty-Role/>) web page and on the Drexel University Online MSN Nursing Education (<https://online.drexel.edu/online-degrees/nursing-degrees/msn-ed/>) web page.

Degree Requirements

About the Curriculum

The program integrates theories specific to adult learning, curriculum design, evaluation of courses and programs, both clinical and classroom techniques, and the preparation for the role of the nursing professor. It combines theory, research and practice from the disciplines of education, management and leadership. Knowledge and skills gained through this program are applicable in both the academic and clinical arenas. Please note: NURS 632 runs over two quarters.

Required Courses

Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Required Track Courses

NURS 591	Foundations of Nursing Education	3.0
NURS 606	Curriculum Design for Higher Level Cognition	3.0
NURS 613	The Role and Responsibility of the Nursing Professor	3.0
NURS 615	Assessment, Measurement and Evaluation	3.0
NURS 616	Teaching Methods in Nursing Education	3.0

Practicum

NURS 632	Nurse Educator and Faculty Role Practicum	6.0
----------	---	-----

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0

Total Credits		46.0
---------------	--	------

Additional Information

For more information about this program, contact:

Ms. Jillian Randall
Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on Drexel's College of Nursing and Health Professions MSN in Nursing Education (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nursing-Education-Faculty-Role/>) web page and on Drexel University Online's MSN in Nursing Education (<http://www.drexel.com/online-degrees/nursing-degrees/msn-ed/>) web page.

Sample Plan of Study

Term 1		Credits
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 591	Foundations of Nursing Education	3.0
Term Credits		6.0
Term 2		
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 606	Curriculum Design for Higher Level Cognition	3.0
Term Credits		6.0
Term 3		
RSCH 503	Research Methods and Biostatistics	3.0
NURS 613	The Role and Responsibility of the Nursing Professor	3.0
Term Credits		6.0
Term 4		
NURS 615	Assessment, Measurement and Evaluation	3.0

NURS 548	Advanced Pathophysiology	3.0
Term Credits		6.0
Term 5		
NURS 549	Advanced Pharmacology	3.0
NURS 544	Quality and Safety in Healthcare	3.0
Term Credits		6.0
Term 6		
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
Term Credits		4.0
Term 7		
RSCH 504	Evaluation and Translation of Health Research	3.0
NURS 616	Teaching Methods in Nursing Education	3.0
Term Credits		6.0
Term 8		
NURS 632*	Nurse Educator and Faculty Role Practicum	6.0
Term Credits		6.0

Total Credit: 46.0

* Two-term course (runs over 20 weeks)

Advanced Role MSN Faculty

Susan M. Burke, PhD, RN, CPNP-BC (*The Catholic University of America*) Track Director, *Pediatric Primary Care*. Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Jennifer Coates, MSN, MBA, ACNPC, ACNP-BC (*The University of Pennsylvania*). Assistant Clinical Professor. Critical care nurse practitioner.

Frances H. Cornelius, PhD, MSN (*Drexel University; Wayne State University*) Chair, *MSN Department*. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Brenda Douglass, DNP, CRNP-BC, CDE, CTTS. Associate Clinical Professor. Endocrine, cardiology, pulmonology, sleep disorders, and chronic health conditions

Alecia Schneider Fox, PhD (Candidate) (*Widener University*) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

MSN: Nursing Innovation Concentration

Major: Nursing Innovation

Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 45.0 minimum

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.3818

Standard Occupational Classification (SOC) code: 29-1141

NOTE: This program is currently undergoing revision and therefore no applications will be accepted for the 2019-2020 academic year. Please check back in summer 2020 for an update.

About the Program

The online MSN in Nursing Innovation is designed for the graduate nursing student who seeks to re-invent and transform nursing practice in today's tumultuous health care system. Graduates of this accredited program fill innovative and problem-solving roles as clinicians, educators, administrators and clinical scientists; some students choose to move toward and succeed in the business environment of healthcare.

This pioneering masters degree emphasizes problem-solving and creative approaches to advance nursing practice, improve and change healthcare delivery and focuses on models, methods, environments and processes that will give students the tools to transform ideas into reality. It offers a flexible, but rigorous, curriculum including a substantial capstone project that demonstrates innovation and pushing the creative boundaries to promote real and substantive change.

This program:

- Gives students the ability to make ideas a reality.
- Teaches students new skills to support changing ideas into reality.
- Develops students as creative and inventive nurses who can make meaningful and unique contributions to the healthcare industry.
- Is a good fit for students whose career objectives may not be met by a traditional graduate nursing curriculum or career paths.

With approval, students may design an individualized plan of study to meet the program requirements or use the 4-5 electives to obtain a post-baccalaureate certificate in a specialty area of interest including but not limited to the list below.

- Leadership in Health Systems Management
- Nursing Education
- Substance Use Disorders Counseling
- Project Management
- Healthcare Informatics
- Complementary & Integrative Therapies

The program is accredited by the Commission on Collegiate Nursing Education (CCNE).

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel University College of Nursing and Health Professions Nursing Innovation (<http://drexel.edu/cnhp/academics/graduate/MSN-Nursing-Innovation-Concentration/>) (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Innovation-and-Intra-Entrepreneurship-Nursing-Practice/>) web page and the Drexel University Online Nursing Innovation (<http://online.drexel.edu/online-degrees/nursing-degrees/msn-innov/>) web page.

Admission Requirements

- BSN from a program fully accredited by NLN and or CCNE.
- 3.0 or above on all previous coursework or the last 60 credits completed. Applications from RN's with GPA < 3.0 may be considered on an individual basis.
- Official transcripts from all previous educational institutions are required.
- Two professional references required from colleagues or supervisors who can attest to the applicant's knowledge, skill, and potential aptitude for graduate study.
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Describe your proposed capstone project.
 - Would your capstone project be intrapreneurial or entrepreneurial?
 - Is your capstone a project, program, or product?
 - Who is your target audience?
- Curriculum Vitae or Resume.
- Copy of Current United States RN license required.
- Copies of any Advanced Practice Nursing Licensure and Certification Documents.
- While specific experience is not required for applicants to the track, previous related work experience may make an applicant more competitive.

International applicants must possess a BSN (or its equivalent) and current US RN license.

TOEFL Requirement

International Applicants, as well as Immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor's degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and must show proficiency in English speaking as well as listening, writing and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

If you take the TOEFLiBT exam, you are required to have a minimum combined score for the listening, writing and reading sections of 79 Plus a speaking section score of 26 or higher.

If you take the TOEFL, you are required to have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Additional Information

For more information about this program, contact:

Ms. Jillian Randall
Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel University College of Nursing and Health Professions Nursing Innovation (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Innovation-and-Intra-Entrepreneurship-Nursing-Practice/>) web page and the Drexel University

Online Nursing Innovation (<http://online.drexel.edu/online-degrees/nursing-degrees/msn-innov/>) web page.

Degree Requirements

Core MSN Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Required Track Courses

NURS 586	Innovation in Advanced Nursing Practice: Theory and Application	3.0
NURS 587	Case Studies in Intra/Entrepreneurship and Innovation in Nursing	3.0

Support Courses

NURS 564	The Business of Healthcare	3.0
PROJ 501	Introduction to Project Management	3.0

Practicum/Capstone Projects

NURS 652	Innovation Capstone Project	6.0
----------	-----------------------------	-----

Electives (by advisement with track coordinator or selected from concentrations listed below) **12.0-18.0**

Total Credits	45.0-51.0
---------------	-----------

Healthcare Informatics Concentration

PROJ 502	Project Planning & Scheduling	3.0
INFO 648	Healthcare Informatics	3.0
INFO 731	Managing Health Informatics Projects	3.0
INFO 732	Healthcare Informatics: Planning & Evaluation	3.0

Total Credits	12.0
---------------	------

Service to Veterans Concentration

IPS 549	The Military and Veteran Culture	3.0
IPS 550	The Unique Health Care Needs of our Military and Veterans	3.0
IPS 551	Veteran Advocacy	3.0
IPS 552	Veteran Healthcare Policy	3.0

Total Credits	12.0
---------------	------

Complementary & Integrative Therapies Concentration

CIT 501	Foundations of Phytotherapy	3.0
CIT 502	Foundations of Complementary and Integrative Therapies	3.0
CIT 503	Holistic Living For The Caregiver	3.0
CIT Elective *		3.0

Total Credits	12.0
---------------	------

* One CIT 500 or 600 level course

Holistic Hospice & Palliative Care Concentration

CIT 503	Holistic Living For The Caregiver	3.0
CIT 621	Spirituality in Hospice and Palliative Care	3.0
CIT 622	Holistic Therapies in Hospice and Palliative Care	3.0
CIT 623	Cultural Perspectives in Hospice and Palliative Care	3.0

Total Credits	12.0
---------------	------

Leadership in Health Systems Management Concentration

NURS 557	Leadership and Stewardship in the Health Professions	3.0
NURS 558	Economics of Healthcare Management & Policy	3.0
NURS 559	Operations Management in Contemporary Healthcare Organizations	3.0
NURS 562	Workforce Management in Healthcare Organizations	3.0
or NURS 564	The Business of Healthcare	3.0

or NURS 567	Strategic Management: Power, Politics and Influence in Healthcare Systems	
Total Credits		12.0

Forensic Trends & Issues in Contemporary Healthcare Concentration

PROJ 502	Project Planning & Scheduling	3.0
NURS 519	Forensic Science Foundations	3.0
NURS 528	Victimology – Contemporary Trend	3.0
NURS 533	Forensic Mental Health	3.0
Total Credits		12.0

Integrative Addiction Therapies

CIT 503	Holistic Living For The Caregiver	3.0
CIT 624	Foundations of Integrative Addiction Therapy	3.0
CIT 625	Spirituality, Empowerment, and Transformation	3.0
CIT 631	Introduction to Nutritional Neuroscience	3.0
Total Credits		12.0

Substance Use Disorder Concentration

BACS 534	Approaches to Substance Use Disorders	3.0
BACS 535	Motivational Enhancement Skills	3.0
BACS 540	Treatment Planning and Relapse Prevention	3.0
BACS 560	Preventing Substance Use Disorders	3.0
BACS 568	Substance Use Counseling with Special Populations	3.0
BACS 570	Clinical Supervision Skills	3.0
Total Credits		18.0

Health Care Compliance Concentration

IPS 501	Legal Compliance: Structure and Implementation	4.5
IPS 504	Regulations in Health Care	4.5
IPS 505	Health Care Quality and the Legal Context	4.5
IPS 506	HIPAA: A Patient's Legal Right to Privacy	4.5
Total Credits		18.0

Additional Information

For more information about this program, contact:

Ms. Jillian Randall
Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel University College of Nursing and Health Professions Nursing Innovation (<http://drexel.edu/cnhp/academics/graduate/MSN-Nursing-Innovation-Concentration/>) (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Innovation-and-Intra-Entrepreneurship-Nursing-Practice/>) web page and the Drexel University Online Nursing Innovation (<http://online.drexel.edu/online-degrees/nursing-degrees/msn-innov/>) web page.

Sample Plan of Study

First Year		
Term 1		Credits
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 586	Innovation in Advanced Nursing Practice: Theory and Application	3.0
	Term Credits	6.0
Term 2		
RSCH 503	Research Methods and Biostatistics	3.0
NURS 587	Case Studies in Intra/Entrepreneurship and Innovation in Nursing	3.0
	Term Credits	6.0
Term 3		
RSCH 504	Evaluation and Translation of Health Research	3.0

NURS 564	The Business of Healthcare	3.0
	Term Credits	6.0

Term 4

NURS 544	Quality and Safety in Healthcare	3.0
INFO 648	Healthcare Informatics	3.0
	Term Credits	6.0

Term 5

PROJ 501	Introduction to Project Management	3.0
INFO 731	Managing Health Informatics Projects	3.0
	Term Credits	6.0

Term 6

PROJ 502	Project Planning & Scheduling	3.0
NURS 652*	Innovation Capstone Project	6.0
	Term Credits	9.0

Term 7

INFO 732	Healthcare Informatics: Planning & Evaluation	3.0
	Term Credits	3.0

Term 8

NURS 502	Advanced Ethical Decision Making in Health Care	3.0
	Term Credits	3.0

Total Credit: 45.0

* Two-term course

Advanced Role MSN Faculty

Susan M. Burke, PhD, RN, CPNP-BC (*The Catholic University of America*) Track Director, *Pediatric Primary Care*. Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Jennifer Coates, MSN, MBA, ACNPC, ACNP-BC (*The University of Pennsylvania*). Assistant Clinical Professor. Critical care nurse practitioner.

Frances H. Cornelius, PhD, MSN (*Drexel University; Wayne State University*) Chair, *MSN Department*. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Brenda Douglass, DNP, CRNP-BC, CDE, CTTS. Associate Clinical Professor. Endocrine, cardiology, pulmonology, sleep disorders, and chronic health conditions

Alecia Schneider Fox, PhD (Candidate) (*Widener University*) Senior Director *Nursing Faculty Affairs and Clinical Education*. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

MSN: Nursing Leadership in Health Systems Management Concentration

Major: Nursing: Nursing Leadership in Health Systems Management Concentration

Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 48.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.3802

Standard Occupational Classification (SOC) code: 29-1141

About the Program

The MSN in Nursing Leadership in Health Systems Management program, designed for part-time attendance by working nurses, prepares students to become nursing leaders in today's rapidly changing health care environment. This online master's degree program will prepare students for a senior role in a dynamic and increasingly demanding healthcare environment.

The MSN program focuses on the development of a leadership style and the skill set essential for individuals in or seeking administrative roles, including:

- fiscal and organizational management,
- strategic planning,
- integrated quality outcomes measurement,
- organizational structures,
- marketing, and
- management of human resources within organizations.

The program also provides the student with information and strategies to problem solve, make decisions, resolve conflict, address legal/ethical issues and operationalize the mission and goals of the health care delivery organization.

Coursework for the MSN program is completed online. The MSN also requires one practicum experience that provides opportunities for students to further develop leadership skills for complex healthcare organizations.

The program is accredited by the Commission on Collegiate Nursing Education (CCNE).

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel's College of Nursing and Health Professions Nursing Leadership in Health Systems Management (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nursing-Leadership-in-Health-Systems-Management/>) web page and the Drexel University Online Nursing Leadership in Health Systems Management (<http://online.drexel.edu/online-degrees/nursing-degrees/msn-lead/>) web page.

Admission Requirements

- BSN from a program fully accredited by NLN and or CCNE.
- 3.0 or above on all previous coursework or the last 60.0 credits completed. Applications from RN's with a GPA of less than 3.0 may be considered on an individual basis.
- Official transcripts from all previous educational institutions are required.
- Two professional references required from colleagues or supervisors who can attest to the applicant's knowledge, skill, and potential aptitude for graduate study.

- Letters of recommendation are waived for students who have an undergraduate GPA of 3.5 or higher
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the degree
 - How your current work experience will enhance your experience in this program
- Curriculum Vitae or Resume.
- Copy of Current US RN license required.
- Copies of any Advanced Practice Nursing Licensure and Certification Documents.
- While specific experience is not required for applicants to the track, previous related work experience may make an applicant more competitive.

International applicants must possess a BSN (or its equivalent) and current US RN license.

TOEFL Requirement

International Applicants, as well as Immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor's degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and must show proficiency in English speaking as well as listening, writing and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

If you take the TOEFLiBT exam, you are required to have a minimum combined score for the listening, writing and reading sections of 79 Plus a speaking section score of 26 or higher.

If you take the TOEFL, you are required to have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Additional Information

For more information about this program, contact:

Ms. Jillian Randall
Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel College of Nursing and Health Professions' Nursing Leadership in Health Systems Management web page (<http://drexel.edu/cnhp/academics/graduate/MSN-Nursing-Leadership-in-Health-Systems-Management/>) and the Drexel University Online Nursing Leadership in Health Systems Management web page (<https://online.drexel.edu/online-degrees/nursing-degrees/msn-lead/>).

Degree Requirements

The program content addresses the four key areas of organizations: leading the human side of the enterprise, managing resources, managing operations, and managing information. Two threads are incorporated throughout all courses: the importance of professional image in written and live presentations and the use of technology to support and enhance management and care delivery outcomes.

MSN Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Course**Major Courses**

INFO 526	Information, Innovation & Technology in Advanced Nursing Practice	3.0
or NURS 553	Data Analysis for Decision-Making in HC Management	
NURS 557	Leadership and Stewardship in the Health Professions	3.0
NURS 558	Economics of Healthcare Management & Policy	3.0
NURS 547	Communication and Self-Awareness for Leading and Managing in Healthcare	3.0
NURS 564	The Business of Healthcare	3.0
NURS 562	Workforce Management in Healthcare Organizations	3.0
NURS 559	Operations Management in Contemporary Healthcare Organizations	3.0
NURS 567	Strategic Management: Power, Politics and Influence in Healthcare Systems	3.0

Elective		3.0
----------	--	-----

Practicum Courses

NURS 568	Practicum and Symposium in Healthcare Operations Management	3.0
NURS 569	Practicum and Symposium in Technology and Management of Information in Healthcare Organizations	3.0

Total Credits		48.0
---------------	--	------

Additional Information

For more information about this program, contact:

Ms. Jillian Randall
Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel's College of Nursing and Health Professions Nursing Leadership in Health Systems Management (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nursing-Leadership-in-Health-Systems-Management/>) web page and the Drexel University Online Nursing Leadership in Health Systems Management (<http://online.drexel.edu/online-degrees/nursing-degrees/msn-lead/>) web page.

Sample Plan of Study**Advanced Role MSN Faculty**

Susan M. Burke, PhD, RN, CPNP-BC (*The Catholic University of America*) Track Director, *Pediatric Primary Care*. Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Jennifer Coates, MSN, MBA, ACNPC, ACNP-BC (*The University of Pennsylvania*). Assistant Clinical Professor. Critical care nurse practitioner.

Frances H. Cornelius, PhD, MSN (*Drexel University; Wayne State University*) Chair, *MSN Department*. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Brenda Douglass, DNP, CRNP-BC, CDE, CTTS. Associate Clinical Professor. Endocrine, cardiology, pulmonology, sleep disorders, and chronic health conditions

Alecia Schneider Fox, PhD (Candidate) (*Widener University*) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

MSN "Bridge" Program

MSN for Nurses with a Non-Nursing BA or BS

About the Program

Drexel University's RN-MSN "bridge" program is available for nurses who have a bachelor's degree in a field other than nursing and now wish to pursue an MSN degree. Applicants to this program must complete the admission process to the MSN program and seek initial advisement from the MSN program academic advisors. The bridge program is available only to students applying for the MSN Advanced Role programs. It is not available for students wishing to pursue an MSN Nurse Practitioner degree. However, to learn more about alternative pathways to becoming a nurse practitioner, contact Jillian Randall (see contact information below).

The graduate program department chair reviews the applicant's file for program eligibility and prerequisites are established on an individual basis.

The "bridge" consists of one undergraduate course. Individuals with extensive professional experience may request to waive the bridge course. Contact Jillian Randall (jnr56@drexel.edu) for more information. The required "bridge course" in the MSN Advanced Role Track is NURS 335 *Genetics and Genomics: Application to Nursing Practice* (4.5 quarter credits). This class is available entirely online and is delivered in a 10-week quarter term session. This course is offered in every term, and includes mandatory synchronous class meetings.

After successfully completing all requirements and admission to the MSN program, students progress directly into graduate-level courses. (Note: The BSN is not awarded in this program.)

Bridge to MSN Requirements

NURS 335	Genetics and Genomics: Application to Nursing Practice	4.5
----------	--	-----

Eligible MSN Programs

- MSN Clinical Nurse Leader (p. 125)
- MSN in Leadership in Health Systems Management (p. 131)
- MSN in Nursing Education (p. 127)
- MSN in Quality, Safety, and Risk Management (<http://catalog.drexel.edu/graduate/collegeofnursingandhealthprofessions/qualitysafetyriskmanagementmsn/>)
- **Nurse Practitioner programs are not eligible**

See the College's Nursing: MSN-Bridge Program (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Bridge/>) web page for more details about the program, and visit the Drexel University Online MSN Bridge Program (<http://www.drexel.com/online-degrees/nursing-degrees/rn-msn-bridge/>) web page for information about the online delivery format. If you are interested in earning both a BSN and MSN, consider enrollment in the

Accelerated RN/BSN/MSN (<http://catalog.drexel.edu/undergraduate/collegeofnursingandhealthprofessions/nursingrnbsnmsn/>) program.

Additional Information

For more information about MSN Advanced Roles Track program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu (jnr56@drexel.edu)
267.359.5692

Advanced Role MSN Faculty

Susan M. Burke, PhD, RN, CPNP-BC (*The Catholic University of America*) Track Director, Pediatric Primary Care. Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Jennifer Coates, MSN, MBA, ACNPC, ACNP-BC (*The University of Pennsylvania*). Assistant Clinical Professor. Critical care nurse practitioner.

Frances H. Cornelius, PhD, MSN (*Drexel University; Wayne State University*) Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Brenda Douglass, DNP, CRNP-BC, CDE, CTTS. Associate Clinical Professor. Endocrine, cardiology, pulmonology, sleep disorders, and chronic health conditions

Alecia Schneider Fox, PhD (Candidate) (*Widener University*) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

MSN: Adult-Gerontology Acute Care Nurse Practitioner

Major: Nurse Practitioner, Adult-Gerontology Acute Care

Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 57.0 quarter credits; 800 clinical hours

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.3801

Standard Occupational Classification (SOC) code: 29-1171

About the Program

The online Adult-Gerontology Acute Care Nurse Practitioner (AGACNP) program is designed to prepare practitioners for professional practice in the management of medical, surgical, and critical-care adult patient populations. Concurrent theory and clinical courses provide a knowledge base for the management of adults and older-adult acute, critical, and complex chronic health care conditions. Clinical practicum rotations allow students to put the principles they have learned into practice in medical, surgical, and critical care settings. Upon completing the program, graduates pursue practice roles across the continuum of acute care services ranging from high-acuity hospital based specialty services and intensive care settings. Graduates are eligible to sit for the AACN and/

or ANCC's Adult Gerontology Acute Care Nurse Practitioner Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-4 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nurse-Practitioner-Adult-Gerontology-Acute-Care/>) web page.

Degree Requirements

Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 554	Pharmacology for Adult-Gerontology Acute Care Nurse Practitioners	3.0
NURS 664	Professional Issues for Nurse Practitioners	1.0

Clinical Courses

NURS 570	Adult Gerontology Acute Care NP I: Introduction to Adult Gerontology Acute Care Medicine	5.0
NURS 571	Adult Gerontology Acute Care Nurse Practitioner II: Mgmt/Care of Patients in Acute/Crit Care Med Set	5.0
NURS 572	Adult Gerontology Acute Care Nurse Practitioner III: Mgmt/Care of Patients in Acute Surgical Setting	5.0
NURS 573	Adult Gerontology Acute Care NP IV: Management of Care of Patients in Critical Care Settings	5.0
NURS 580	Adult Gero Acute Care NP V: Mgmt/Care of Clients in Acute, Critical Care, Med or Surg Settings	5.0

Elective		3.0
Total Credits		57.0

Sample Plan of Study

First Year

Term 1		Credits
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
Term Credits		6.0

Term 2

RSCH 503	Research Methods and Biostatistics	3.0
NURS 544	Quality and Safety in Healthcare	3.0
Term Credits		6.0

Term 3

RSCH 504	Evaluation and Translation of Health Research	3.0
NURS 548	Advanced Pathophysiology	3.0
Term Credits		6.0

Term 4		
NURS 549	Advanced Pharmacology	3.0
	Term Credits	3.0
Second Year		
Term 1		
Elective		3.0
	Term Credits	3.0
Term 2		
NURS 554	Pharmacology for Adult-Gerontology Acute Care Nurse Practitioners	3.0
	Term Credits	3.0
Term 3		
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
	Term Credits	5.0
Term 4		
NURS 570	Adult Gerontology Acute Care NP I: Introduction to Adult Gerontology Acute Care Medicine	5.0
	Term Credits	5.0
Third Year		
Term 1		
NURS 571	Adult Gerontology Acute Care Nurse Practitioner II: Mgmt/Care of Patients in Acute/Crit Care Med Set	5.0
	Term Credits	5.0
Term 2		
NURS 572	Adult Gerontology Acute Care Nurse Practitioner III: Mgmt/Care of Patients in Acute Surgical Setting	5.0
	Term Credits	5.0
Term 3		
NURS 573	Adult Gerontology Acute Care NP IV: Management of Care of Patients in Critical Care Settings	5.0
	Term Credits	5.0
Term 4		
NURS 580	Adult Gero Acute Care NP V: Mgmt/Care of Clients in Acute, Critical Care, Med or Surg Settings	5.0
	Term Credits	5.0
Total Credit: 57.0		

MSN: Adult-Gerontology Primary Care Nurse Practitioner

Major: Nurse Practitioner, Adult-Gerontology Primary Care

Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 52.0 quarter credits; 640 clinical hours

Co-op Option: None

Classification of Instructional Program (CIP) code: 51.3822

Standard Occupational Classification (SOC) code: 29-1171

About the Program

One of the major healthcare challenges of the 21st century will include the delivery of quality, comprehensive, cost effective care for a rapidly increasing number of older adults. With the elderly population in the U.S. expected to double, if not triple, by 2030 it is imperative that there is an educated workforce of health professionals able to deliver high-quality and appropriate care to the adult and older-adult population. In response to this need, Drexel University has developed an Adult-Gerontology Primary Care Nurse Practitioner (AGPC) program. The AGPC cares for individuals (aged 13 years and above) across the lifespan to promote maximal health, reduce risks and manage acute, chronic and complex health conditions. The AGPC is specifically trained to focus on health and wellness, disease prevention, and quality of life in the aging population.

The purpose of our AGPC program is to educate and prepare competent and compassionate AGPC graduates to provide comprehensive, quality and cost effective care founded in evidence-based practice to adults across the lifespan on the continuum of health and illnesses.

All graduates will be eligible to sit for the certification exam as an Adult-Gerontology Primary Care Nurse Practitioner through the American Academy of Nurse Practitioners (AANP) and/or American Nurses Credentialing Center (ANCC).

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-4 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nurse-Practitioner-Adult-Gerontology-Primary-Care/>) web page.

Degree Requirements

Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 641	Advanced Pharmacology for Adult-Gerontology Primary Care Nurse Practitioners	3.0
NURS 664	Professional Issues for Nurse Practitioners	1.0

Clinical Courses

NURS 660	Adult-Gero Primary Care I: Introduction to Adult-Gero Primary Care and Care of the Young-Adult	5.0
NURS 661	Adult-Gerontology Primary Care II: Management and Care of Adult Patients in Primary Care	5.0
NURS 662	Adult-Gerontology Primary Care III: Management of the Older-Adult Patient in Primary Care	5.0
NURS 663	Adult-Gerontology Primary Care IV: Gerontology Management and Care	5.0

Elective

Total Credits		52.0
---------------	--	------

Sample Plan of Study

First Year

Term 1		Credits
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
	Term Credits	6.0

Term 2

RSCH 503	Research Methods and Biostatistics	3.0
----------	------------------------------------	-----

NURS 544	Quality and Safety in Healthcare	3.0
	Term Credits	6.0
Term 3		
RSCH 504	Evaluation and Translation of Health Research	3.0
NURS 548	Advanced Pathophysiology	3.0
	Term Credits	6.0
Term 4		
NURS 549	Advanced Pharmacology	3.0
	Term Credits	3.0
Second Year		
Term 1		
Elective		3.0
	Term Credits	3.0
Term 2		
NURS 641	Advanced Pharmacology for Adult-Gerontology Primary Care Nurse Practitioners	3.0
	Term Credits	3.0
Term 3		
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
	Term Credits	5.0
Term 4		
NURS 660	Adult-Gero Primary Care I: Introduction to Adult-Gero Primary Care and Care of the Young-Adult	5.0
	Term Credits	5.0
Third Year		
Term 1		
NURS 661	Adult-Gerontology Primary Care II: Management and Care of Adult Patients in Primary Care	5.0
	Term Credits	5.0
Term 2		
NURS 662	Adult-Gerontology Primary Care III: Management of the Older-Adult Patient in Primary Care	5.0
	Term Credits	5.0
Term 3		
NURS 663	Adult-Gerontology Primary Care IV: Gerontology Management and Care	5.0
	Term Credits	5.0

Total Credit: 52.0

MSN: Family/Individual Across the Lifespan Nurse Practitioner

Major: Nurse Practitioner, Family/Individual Across the Lifespan

Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 56.0 quarter credits; 720 clinical hours

Co-op Option: None

Classification of Instructional (CIP) code: 51.3801

Standard Occupational Classification (SOC) code: 29-1171

About the Program

The Family/Individual Across the Lifespan Nurse Practitioner (FNP) online program focuses on the application of advanced-practice nursing knowledge—including physical, psychosocial, and environmental assessment skills—to manage common health and illness problems of clients of all ages and their families. It emphasizes health promotion and disease prevention. Family nurse practitioners primarily practice in ambulatory-care settings, such as primary care clinics, physician offices, HMOs, outpatient clinics, schools, nursing centers, emergency

departments, long-term care facilities, industry, the armed services, public health departments, correctional institutions, and home health agencies. Graduates of the program are eligible to sit for the ANCC's Family Nurse Practitioner Examination and/or the AANP's Family Nurse Practitioner Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-4 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (<http://drexel.edu/cnhp/academics/graduate/MSN-Nurse-Practitioner-Family-Individual-Across-Lifespan/>) web page.

Degree Requirements

Master of Science in Nursing (MSN): 56.0 quarter credits; 720 clinical hours

Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 556	Pharmacology for Family Nurse Practitioners	3.0
NURS 664	Professional Issues for Nurse Practitioners	1.0

Clinical Courses

NURS 534	FNP I: Primary Care of the Emerging Family	5.0
NURS 535	FNP II: Primary and Episodic Care of Infants, Children and Adolescents	5.0
NURS 536	FNP III: Primary Care of Adults and Older Adults Across the Adult Age Spectrum I	5.0
NURS 537	FNP IV: Primary Care of Adults and Older Adults Across the Adult Age Spectrum II	5.0
NURS 538	FNP V: Integrative Practicum in Family Practice Across the Lifespan	4.0

Elective		3.0
Total Credits		56.0

Sample Plan of Study

		Credits
Summer		
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
RSCH 503	Research Methods and Biostatistics	3.0
Term 2		
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0
Term 3		
NURS 544	Quality and Safety in Healthcare	3.0
Term 4		

NURS 549	Advanced Pharmacology	3.0
Elective		3.0
Term 5		
NURS 548	Advanced Pathophysiology	3.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
Term 6		
NURS 556	Pharmacology for Family Nurse Practitioners	3.0
Term 7		
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
Term 8		
NURS 534	FNP I: Primary Care of the Emerging Family	5.0
Term 9		
NURS 535	FNP II: Primary and Episodic Care of Infants, Children and Adolescents	5.0
Term 10		
NURS 536	FNP III: Primary Care of Adults and Older Adults Across the Adult Age Spectrum I	5.0
Term 11		
NURS 537	FNP IV: Primary Care of Adults and Older Adults Across the Adult Age Spectrum II	5.0
Term 12		
NURS 538	FNP V: Integrative Practicum in Family Practice Across the Lifespan	4.0
Term Credits		56.0
Total Credit: 56.0		

MSN: Pediatric Acute Care Nurse Practitioner

Major: Nurse Practitioner, Pediatric Acute Care
Degree Awarded: Master of Science in Nursing (MSN)
Calendar Type: Quarter
Total Credit Hours: 57.0; 800 clinical hours
Co-op Option: None
Classification of Instructional Programs (CIP) code: 51.3809
Standard Occupational Classification (SOC) code: 29-1171

About the Program

The online Pediatric Acute Nurse Practitioner (PNP-AC) program is designed to prepare practitioners for professional practice in the management of medical, surgical, and critical-care pediatric patient populations. Concurrent theory and clinical courses provide a knowledge base for the management of pediatric complex acute, critical, and chronic health care conditions. Clinical practicum rotations allow students to put the principles they have learned into practice in medical, surgical, and critical care settings. Upon completing the program, graduates pursue practice roles across the continuum of acute care services ranging from high-acuity hospital based emergency or intensive care settings to specialty based practices. Graduates are eligible to sit for the PNCB's Pediatric Acute Care Nurse Practitioner Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. Students are required to attend On-Campus visits during the clinical course work within the curriculum. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab.

These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (<http://drexel.edu/cnhp/academics/graduate/MSN-Nurse-Practitioner-Pediatric-Acute-Care/>) web page.

Degree Requirements

Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 646	Pharmacology for the Pediatric Nurse Practitioner	3.0
NURS 664	Professional Issues for Nurse Practitioners	1.0

Clinical Courses

NURS 642	PNP I: Primary Care of Infants, Children and Adolescents	5.0
NURS 643	PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care	5.0
NURS 649	Ped Nurse Pract AC I: Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
NURS 650	Ped Nurse Pract AC II: Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
NURS 651	PNP Management of the Medically Fragile and Technology Dependent Child in the Community	5.0

Elective		3.0
Total Credits		57.0

Sample Plan of Study

First Year

Term 1		Credits
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
Term Credits		6.0

Term 2		Credits
RSCH 503	Research Methods and Biostatistics	3.0
NURS 544	Quality and Safety in Healthcare	3.0
Term Credits		6.0

Term 3		Credits
RSCH 504	Evaluation and Translation of Health Research	3.0
NURS 548	Advanced Pathophysiology	3.0
Elective		3.0
Term Credits		9.0

Second Year

Term 1		Credits
NURS 549	Advanced Pharmacology	3.0
Term Credits		3.0

Term 2		Credits
NURS 646	Pharmacology for the Pediatric Nurse Practitioner	3.0
Term Credits		3.0

Term 3		Credits
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
Term Credits		5.0

Term 4

NURS 642	PNP I: Primary Care of Infants, Children and Adolescents	5.0
Term Credits		5.0
Third Year		
Term 1		
NURS 643	PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care	5.0
Term Credits		5.0
Term 2		
NURS 649	Ped Nurse Pract AC I: Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
Term Credits		5.0
Term 3		
NURS 650	Ped Nurse Pract AC II: Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
Term Credits		5.0
Term 4		
NURS 651	PNP Management of the Medically Fragile and Technology Dependent Child in the Community	5.0
Term Credits		5.0

Total Credit: 57.0

Pediatric Primary Care Nurse Practitioner

Major: Nurse Practitioner, Pediatric Primary Care

Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 52.0 quarter credits; 640 clinical hours

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.3809

Standard Occupational Classification (SOC) code: 29-1171

About the Program

The online Pediatric Primary Care Nurse Practitioner (PNP) program is directed toward preparing nurse practitioners who will take advanced nursing roles as clinicians, educators, researchers, and leaders in the rapidly changing, evidence-driven health care environment. The program emphasizes evidence-based practice, interdisciplinary collaboration, and critical use of evolving technology in the care of children and their families. While most pediatric nurse practitioners practice in primary care settings, the continuum of child healthcare spans the geographic settings of home care, ambulatory care, specialty care, urgent care, and rehabilitative care.

Pediatric primary care nurse practitioners provide advanced nursing care across the continuum of healthcare services to meet the specialized physiologic and psychological needs of patients from infancy through adolescence, and have competencies to manage well-child care as well as complex, acute, and chronic healthcare conditions within a family-centered healthcare model. Graduates are eligible to sit for the ANCC's Pediatric Primary Care Nurse Practitioner Examination and/or the PNCB's Pediatric Primary Care Nurse Practitioner Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulations and evaluation. OCI visits occur as a part of the clinical portion of the program. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab.

These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nurse-Practitioner-Pediatric-Primary-Care/>) web page.

Degree Requirements

Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 646	Pharmacology for the Pediatric Nurse Practitioner	3.0
NURS 664	Professional Issues for Nurse Practitioners	1.0

Clinical Concentration Courses

NURS 642	PNP I: Primary Care of Infants, Children and Adolescents	5.0
NURS 643	PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care	5.0
NURS 647	PNP III: Management and Care of Adolescents in the Primary Care Setting	5.0
NURS 648	PNP IV: Primary Care of Children with Special Health Care Needs	5.0

Elective		3.0
Total Credits		52.0

Sample Plan of Study

First Year

Term 1		Credits
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
Term Credits		6.0

Term 2		Credits
RSCH 503	Research Methods and Biostatistics	3.0
NURS 544	Quality and Safety in Healthcare	3.0
Term Credits		6.0

Term 3		Credits
RSCH 504	Evaluation and Translation of Health Research (Elective)	3.0
Elective		3.0
Term Credits		6.0

Term 4		Credits
NURS 548	Advanced Pathophysiology	3.0
Term Credits		3.0

Second Year

Term 1		Credits
NURS 549	Advanced Pharmacology	3.0
Term Credits		3.0

Term 2		Credits
NURS 646	Pharmacology for the Pediatric Nurse Practitioner	3.0
Term Credits		3.0

Term 3		Credits
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
Term Credits		5.0

Term 4		Credits

NURS 642	PNP I: Primary Care of Infants, Children and Adolescents	5.0
Term Credits		5.0
Third Year		
Term 1		
NURS 643	PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care	5.0
Term Credits		5.0
Term 2		
NURS 647	PNP III: Management and Care of Adolescents in the Primary Care Setting	5.0
Term Credits		5.0
Term 3		
NURS 648	PNP IV: Primary Care of Children with Special Health Care Needs	5.0
Term Credits		5.0

Total Credit: 52.0

MSN: Pediatric Primary Care and Pediatric Acute Care Dual Option

Major: Nurse Practitioner, Pediatric Primary Care and Pediatric Acute Care

Degree Awarded: Master of Science

Calendar Type: Quarter

Total Credit Hours: 62.0; 1000 clinical hours

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.1601

Standard Occupational Classification (SOC) code: 29-1171

About the Program

The Pediatric Primary Care and Pediatric Acute Care Nurse Practitioner Program at Drexel University will prepare the Pediatric Nurse Practitioner to perform acts of medical diagnosis and treatment through didactic lectures, problem-based learning, clinical practice hours, standardized patient experiences and high-fidelity simulation.

This innovative dual option track coincides with the new models of healthcare delivery and the increasing demand for PNP's to provide care for children and their families across the entire continuum of health and illness, including acute critical conditions. The clinical practice settings for the dual certification track options provides students with a mixed inpatient/outpatient experience ranging from specialty clinics and primary care settings. Diverse clinical settings provide supervised clinical hours to allow the student advance practitioner to perform advance physical assessment, critical thinking, diagnostic reasoning and management of care in collaboration with licensed physician and APN's in accredited institutions. Students graduating from this track will be eligible to sit for both the Pediatric Primary Care and the Pediatric Acute Care Board Certifications through the PNCB.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. Students are required to attend On-Campus visits during the clinical course work within the curriculum. *Mandatory on-campus visits each quarter are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab.

These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (<http://drexel.edu/cnhp/academics/graduate/MSN-Nurse-Practitioner-Pediatric-Dual-Program/>) web page.

Degree Requirements

Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 646	Pharmacology for the Pediatric Nurse Practitioner	3.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
Elective		3.0

Clinical Courses

NURS 642	PNP I: Primary Care of Infants, Children and Adolescents	5.0
NURS 643	PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care	5.0
NURS 647	PNP III: Management and Care of Adolescents in the Primary Care Setting	5.0
NURS 649	Ped Nurse Pract AC I:Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
NURS 650	Ped Nurse Pract AC II:Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
NURS 651	PNP Management of the Medically Fragile and Technology Dependent Child in the Community	5.0

Total Credits 62.0

Sample Plan of Study

First Year

Term 1		Credits
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
Term Credits		6.0

Term 2

RSCH 503	Research Methods and Biostatistics	3.0
NURS 544	Quality and Safety in Healthcare	3.0
Term Credits		6.0

Term 3

RSCH 504	Evaluation and Translation of Health Research	3.0
Term Credits		3.0

Term 4

NURS 548	Advanced Pathophysiology	3.0
Elective		3.0
Term Credits		6.0

Second Year

Term 1		Credits
NURS 549	Advanced Pharmacology	3.0
Term Credits		3.0

Term 2

NURS 646	Pharmacology for the Pediatric Nurse Practitioner	3.0
Term Credits		3.0

Term 3

NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
----------	---	-----

NURS 664	Professional Issues for Nurse Practitioners	1.0
	Term Credits	5.0
Term 4		
NURS 642	PNP I: Primary Care of Infants, Children and Adolescents	5.0
	Term Credits	5.0
Third Year		
Term 1		
NURS 643	PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care	5.0
	Term Credits	5.0
Term 2		
NURS 647	PNP III: Management and Care of Adolescents in the Primary Care Setting	5.0
	Term Credits	5.0
Term 3		
NURS 649	Ped Nurse Pract AC I: Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
	Term Credits	5.0
Term 4		
NURS 650	Ped Nurse Pract AC II: Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
	Term Credits	5.0
Fourth Year		
Term 1		
NURS 651	PNP Management of the Medically Fragile and Technology Dependent Child in the Community	5.0
	Term Credits	5.0

Total Credit: 62.0

Psychiatric Mental Health Nurse Practitioner

Major: Nurse Practitioner, Psychiatric Mental Health Degree Awarded: Master of Science in Nursing (MSN)

Calendar Type: Quarter

Total Credit Hours: 52.0 quarter credits; 640 clinical hours

Co-op Option: None

Classification of Instructional Programs (CIP) code: 58.3810

Standard Occupational Classification (SOC) code: 29-1123

About the Program

The online Psychiatric Mental Health Nurse Practitioner (PMHNP) program prepares practitioners to provide a wide range of services to patients across the lifespan and their families. The program of study is based on a biopsychosocial model of care and includes the study and application of diagnostic and treatment modalities, and theories and approaches to practice. Graduates of this program practice in a wide variety of settings as this program enables them to provide direct (assessment, intervention) and indirect (consultation, case management, and supervision) advanced practice services to individuals who are at risk and those who need mental health services. Graduates are eligible to sit for the ANCC's Psychiatric Mental Health Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On-Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-3 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits each quarter are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (<http://drexel.edu/cnhp/academics/departments/Nursing-Graduate/>) web page.

Degree Requirements

Master of Science in Nursing (MSN): 52.0 quarter credits; 640 clinical hours

Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 555	Psychopharmacology Across the Lifespan	3.0
NURS 664	Professional Issues for Nurse Practitioners	1.0

Clinical Courses

NURS 592	PMHNP I: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology I	5.0
NURS 593	PMHNP II: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology II	5.0
NURS 594	PMHNP III: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology III	5.0
NURS 595	PMHNP IV: Adv Mental Hlth NP Management and Care of Clients in Diverse Pop Across the Lifespan	5.0

Elective		3.0
Total Credits		52.0

Sample Plan of Study

First Year		Credits
Term 1		
NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 549	Advanced Pharmacology	3.0
	Term Credits	6.0
Term 2		
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 548	Advanced Pathophysiology	3.0
	Term Credits	6.0
Term 3		
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
	Term Credits	6.0
Term 4		
Elective		3.0
	Term Credits	3.0
Second Year		
Term 1		
RSCH 504	Evaluation and Translation of Health Research	3.0
	Term Credits	3.0
Term 2		

NURS 555	Psychopharmacology Across the Lifespan	3.0
Term Credits		3.0
Term 3		
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
Term Credits		5.0
Term 4		
NURS 592	PMHNP I: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology I	5.0
Term Credits		5.0
Third Year		
Term 1		
NURS 593	PMHNP II: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology II	5.0
Term Credits		5.0
Term 2		
NURS 594	PMHNP III: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology III	5.0
Term Credits		5.0
Term 3		
NURS 595	PMHNP IV: Adv Mental Hlth NP Management and Care of Clients in Diverse Pop Across the Lifespan	5.0
Term Credits		5.0

Total Credit: 52.0

Women's Health/Gender Related Nurse Practitioner

Major: Nurse Practitioner, Women's Health/Gender Related
 Degree Awarded: Master of Science in Nursing (MSN)
 Calendar Type: Quarter
 Total Credit Hours: 55.0 quarter credits; 640 clinical hours
 Co-op Option: None
 Classification of Instructional Programs (CIP) code: 51.3822
 Standard Occupational Classification (SOC) code: 29-1171

About the Program

The online Women's Health/Gender Related Nurse Practitioner track offers didactic and clinical education via distance learning and concurrent clinical preceptorships. The courses offered throughout the track reflect the competencies and skill sets required for today's women's health nurse practitioner as knowledge expands, health care systems evolve, technology advances and practice changes in response to current needs and evidence-based research. Additionally, this track offers the opportunity for students to work in transdisciplinary simulated scenarios to promote a better understanding and respect of discipline-specific roles, improve existing communication and collaboration within disciplines, and initiate teamwork development in order to promote patient safety and high-quality patient care. Graduates are eligible to sit for the NCC's Women's Health/Gender Related Nurse Practitioner Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-4 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab.

These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nurse-Practitioner-Womens-Health-Gender-Related/>) web page.

Degree Requirements

Core Courses

NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
NURS 502	Advanced Ethical Decision Making in Health Care	3.0
NURS 544	Quality and Safety in Healthcare	3.0
RSCH 503	Research Methods and Biostatistics	3.0
RSCH 504	Evaluation and Translation of Health Research	3.0

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
NURS 680	Primary Care for Women's Health	3.0
NURS 682	Pharmacology for the Women's Health Nurse Practitioner	3.0

Clinical Concentration Courses

NURS 690	WHNP I: Mngmnt & Care of the Common Gyn and Gender Related Issues throughout the Lifespan	5.0
NURS 691	WHNP II: Mngmnt & Care of the Complex Gyn and Gender Related Issues of Women throughout the Lifespan	5.0
NURS 692	WHNP III: Management & Care of the Low Risk Obstetrical and Post Partum Needs of Women and Families	5.0
NURS 693	WHNP IV: Mngmnt & Care of the High Risk Obstetrical and Post Partum Needs of Women and Families	5.0

Elective		3.0
Total Credits		55.0

Sample Plan of Study

Term		Credits	
Term 1	NURS 500 [WI]	Confronting Issues in Contemporary Health Care Environments	3.0
	RSCH 503	Research Methods and Biostatistics	3.0
	Term Credits		6.0
Term 2	NURS 502	Advanced Ethical Decision Making in Health Care	3.0
	RSCH 504	Evaluation and Translation of Health Research	3.0
	Term Credits		6.0
Term 3	NURS 544	Quality and Safety in Healthcare	3.0
	Term Credits		3.0
Term 4	NURS 549	Advanced Pharmacology	3.0
	Elective		3.0
	Term Credits		6.0
Term 5	NURS 548	Advanced Pathophysiology	3.0
	NURS 664	Professional Issues for Nurse Practitioners	1.0
	Term Credits		4.0
Term 6	NURS 680	Primary Care for Women's Health	3.0
	NURS 682	Pharmacology for the Women's Health Nurse Practitioner	3.0
	Term Credits		6.0
Term 7	NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
	Term Credits		4.0
Term 8			

NURS 690	WHNP I: Mngmnt & Care of the Common Gyn and Gender Related Issues throughout the Lifespan	5.0
Term Credits		5.0
Term 9		
NURS 691	WHNP II: Mngmnt & Care of the Complex Gyn and Gender Related Issues of Women throughout the Lifespan	5.0
Term Credits		5.0
Term 10		
NURS 692	WHNP III: Management & Care of the Low Risk Obstetrical and Post Partum Needs of Women and Families	5.0
Term Credits		5.0
Term 11		
NURS 693	WHNP IV: Mngmnt & Care of the High Risk Obstetrical and Post Partum Needs of Women and Families	5.0
Term Credits		5.0

Total Credit: 55.0

Doctor of Physical Therapy

Major: Physical Therapy

Degree Awarded: Doctor of Physical Therapy (DPT)

Calendar Type: Quarter

Total Credit Hours: 128.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.2308

Standard Occupational Classification (SOC) code: 29-1123

About the Program

The Doctor of Physical Therapy (DPT) curriculum produces broadly educated physical therapists, while being sensitive to the needs of the health care community and the students' interests. The program strives to foster both intellectual and professional growth in students and is reflective of contemporary practice to prepare graduates for the ongoing changes in health care delivery.

The Doctor of Physical Therapy (DPT) program prepares students for autonomous practice in physical therapy. As a science, physical therapy examines human motion at the tissue, organ, and systems levels. In the clinical environment, physical therapists (PTs) examine and evaluate patients/clients and implement procedural interventions that restore physical function for all people across the life span. As essential practitioners in the health care delivery system, PTs assume roles in rehabilitation services, prevention and health maintenance programs, and professional and community programs. As professional members of the health care team, PTs supervise support personnel, serve as consultants to other health care personnel, serve as consultants to families and caregivers, participate in administrative services, and conduct clinical research. PTs also serve as advocates for health policy and standards of care that help ensure optimum care for their patients/clients.

Graduates of the Doctor of Physical Therapy program are prepared to fulfill their professional obligations, provide leadership to the profession, and use their knowledge and skills to contribute to the health care of society.

The program is just under 3 years in length and spans eleven academic quarters. The curriculum consists of integrated didactic and clinical study with an emphasis on adult learning methodology. Foundational courses are emphasized during the first year, with subsequent quarters sequenced to progress through the hierarchy of educational objectives from simple to complex. All didactic material is organized for synthesis and application to professional practice.

For more information visit the Physical Therapy and Rehabilitation Science (<https://www.drexel.edu/cnhp/academics/doctoral/DPT-Doctor-Physical-Therapy/>) page on the College of Nursing and Health Professions website.

For application instructions, visit the Drexel's Graduate Admission web page for the Doctor of Physical Therapy (<http://drexel.edu/grad/programs/cnhp/professional-doctor-of-physical-therapy/>).

Degree Requirements

The DPT curriculum occurs in a 10-week quarter format over eleven quarters: fall, winter, spring, and summer I; fall, winter, spring, and summer II; and fall, winter and spring III. Classes begin in late September for first-year students. The curriculum is subject to modification.

NEUR 507	Neuroscience I	3.0
NEUR 508	Neuroscience II	2.0
PTRS 530	Kinesiology I	4.0
PTRS 531	Kinesiology II	3.0
PTRS 532	Human Gross Anatomy I	4.0
PTRS 533	Human Gross Anatomy II	4.0
PTRS 534	Physical Therapy Exam & Intervention I	3.0
PTRS 535	Physical Therapy Exam & Intervention II	3.0
PTRS 539	Topics in Pathophysiology I	2.0
PTRS 540	Topics in Pathophysiology II	4.0
PTRS 600	Clinical Reasoning	4.0
PTRS 610	Issues in Pharmacotherapy	3.0
PTRS 613	Integrated Clinical Experience I	0.5
PTRS 614	Integrated Clinical Experience II	0.5
PTRS 615	Integrated Clinical Experience III	0.5
PTRS 616	Integrated Clinical Experience IV	0.5
PTRS 620	Orthopedic Physical Therapy: Upper Extremity	4.0
PTRS 621	Orthopedic Physical Therapy: Lower Extremity	4.0
PTRS 622	Orthopedic Physical Therapy: Spine	4.0
PTRS 623	Physical Agents	3.0
PTRS 624	Functional Mobility	3.5
PTRS 627	Cardiopulmonary Physical Therapy I	4.0
PTRS 630	Cardiopulmonary Physical Therapy II	3.0
PTRS 639	Motor Learning	2.5
PTRS 641	Neurological Exam and Intervention I	4.0
PTRS 642	Neurological Exam and Intervention II	5.0
PTRS 643	Applied Biomechanics	3.0
PTRS 644	Integumentary Physical Therapy	1.5
PTRS 648	Prosthetics and Orthotics	3.0
PTRS 649	Health Professional Roles	2.5
PTRS 654	Topics in Health Policy & Services	3.0
PTRS 655	Health Administration	2.5
PTRS 656	Motor Control and Rehabilitation	2.0
PTRS 660	The Human Experience in Healthcare	3.0
or RHAB 1899	Independent Study	
PTRS 664	Pediatric Physical Therapy	4.5
PTRS 675	Life Span Development I: Birth to Adolescence	4.0
PTRS 676	Life Span Development II: Young Adulthood to Older Adulthood	3.0
PTRS 733	Advanced Clinical Reasoning	2.0
PTRS 751	Evidence-Based Practice	3.0
PTRS 752	Research and Measurement in Physical Therapy	2.0
PTRS 755	Evaluation of Research In Physical Therapy	3.0
PTRS 794	Clinical Experience I	1.5
PTRS 795	Terminal Clinical Experience II	2.0
or PTRS 797	Clinical Internship I	
PTRS 796	Terminal Clinical Experience III	4.5

or PTRS 798	Clinical Internship II	
Total Credits		128.0

Sample Plan of Study

Term		Credits
Term 1		
PTRS 530	Kinesiology I	4.0
PTRS 532	Human Gross Anatomy I	4.0
PTRS 534	Physical Therapy Exam & Intervention I	3.0
PTRS 600	Clinical Reasoning	4.0
PTRS 613	Integrated Clinical Experience I	0.5
Term Credits		15.5
Term 2		
PTRS 531	Kinesiology II	3.0
PTRS 533	Human Gross Anatomy II	4.0
PTRS 535	Physical Therapy Exam & Intervention II	3.0
PTRS 539	Topics in Pathophysiology I	2.0
PTRS 614	Integrated Clinical Experience II	0.5
PTRS 751	Evidence-Based Practice	3.0
Term Credits		15.5
Term 3		
NEUR 507	Neuroscience I	3.0
PTRS 615	Integrated Clinical Experience III	0.5
PTRS 620	Orthopedic Physical Therapy: Upper Extremity	4.0
PTRS 623	Physical Agents	3.0
PTRS 624	Functional Mobility	3.5
PTRS 639	Motor Learning	2.5
Term Credits		16.5
Term 4		
NEUR 508	Neuroscience II	2.0
PTRS 616	Integrated Clinical Experience IV	0.5
PTRS 621	Orthopedic Physical Therapy: Lower Extremity	4.0
PTRS 627	Cardiopulmonary Physical Therapy I	4.0
PTRS 641	Neurological Exam and Intervention I	4.0
Term Credits		14.5
Term 5		
PTRS 610	Issues in Pharmacotherapy	3.0
PTRS 794	Clinical Experience I	1.5
Term Credits		4.5
Term 6		
PTRS 622	Orthopedic Physical Therapy: Spine	4.0
PTRS 630	Cardiopulmonary Physical Therapy II	3.0
PTRS 648	Prosthetics and Orthotics	3.0
PTRS 649	Health Professional Roles	2.5
PTRS 656	Motor Control and Rehabilitation	2.0
Term Credits		14.5
Term 7		
PTRS 540	Topics in Pathophysiology II	4.0
PTRS 642	Neurological Exam and Intervention II	5.0
PTRS 644	Integumentary Physical Therapy	1.5
PTRS 675	Life Span Development I: Birth to Adolescence	4.0
Term Credits		14.5
Term 8		
PTRS 664	Pediatric Physical Therapy	4.5
PTRS 676	Life Span Development II: Young Adulthood to Older Adulthood	3.0
PTRS 733	Advanced Clinical Reasoning	2.0
PTRS 752	Research and Measurement in Physical Therapy	2.0
Term Credits		11.5
Term 9		
PTRS 643	Applied Biomechanics	3.0
PTRS 654	Topics in Health Policy & Services	3.0

PTRS 660	The Human Experience in Healthcare	3.0
or RHAB 1899	Independent Study	
PTRS 755	Evaluation of Research In Physical Therapy	3.0
Term Credits		12.0
Term 10		
PTRS 655	Health Administration	2.5
PTRS 795	Terminal Clinical Experience II	2.0
or 797	Clinical Internship I	
Term Credits		4.5
Term 11		
PTRS 796	Terminal Clinical Experience III	4.5
or 798	Clinical Internship II	
Term Credits		4.5
Total Credit: 128.0		

Clinical Education

A strong history of comprehensive clinical education exists for our professional students. The clinical education for the DPT program is integrated into the didactic portions of the curriculum so that knowledge obtained in the classroom is readily put into practice. The DPT program has contracts with hundreds of clinical sites across the nation, representing all facets of professional practice. Students build confidence by participating in part-time integrated clinical experiences (ICEs) during the first year of the program and 32-33 weeks of full-time clinical experiences that offer various levels of acuity in different clinical environments.

Students may select from clinical sites that offer experiences with all ages across the life span and in a variety of environments including, but not limited to acute care, pediatrics, adult rehabilitation, geriatrics, orthopedics, sports medicine, and industrial and occupational rehabilitation.

For more information visit the Physical Therapy and Rehabilitation Sciences Overview (<https://www.drexel.edu/cnhp/academics/doctoral/DPT-Doctor-Physical-Therapy/>) page on the College of Nursing and Health Professions web site.

Facilities

Teaching Facilities

Most classes are held in lecture halls, classrooms, or laboratories on the Center City (Health Sciences) Campus of Drexel University. The entire campus has wireless capability for easy internet access. The Department of Physical Therapy and Rehabilitation Sciences has two state-of-the-art dedicated laboratories where the clinical components of the professional curriculum are taught. In these laboratories equipment reflects current physical therapy practice and is part of a multi-disciplinary clinical learning and resource center. Included as part of the resource center is a standardized patient lab that utilizes paid actors to simulate various clinical situations while students' interactions with those "patients" are monitored by supervising faculty. This center provides a rich environment for student learning.

The department also utilizes an anatomy lab where dissection of human cadavers occurs during the first two terms of the program. The anatomy course work focuses on the areas most relevant to physical therapy making connections to clinical practice.

Our teaching resources also include supported distance learning technology. Instructional materials are provided through text, graphics, audio and video formats and are available online through a course

management system 24 hours a day. Our online courses are highly interactive through the use of web discussion boards and audio chat tools.

Additionally, the Professional DPT program uses its own faculty-staffed clinical sites as well as various clinical sites in the area to enhance the educational experience of the student. The department operates outpatient physical therapy sites in the Drexel Recreation Center on the University City campus, a multidisciplinary Parkway Health and Wellness Center on the Center City campus and a pro-bono practice in the 11th Street Family Health Center. Students rotate through these facilities getting individualized mentoring while connecting classroom content with clinical practice. These experiences are in addition to the 32-33 weeks of full-time clinical education the student will experience throughout the curriculum.

Research Facilities

The Department conducts hypothesis-driven research in human movement, biomechanics, motor control, community-based practice and family-centered care. Some of this research is conducted in a 23,000 square foot multidisciplinary center on the Center City Campus. The center has a gait and motion analysis lab containing a video-based motion analysis system with in-floor force plates, and neuromuscular performance labs equipped with custom-built force measuring systems, 16-channel EMG system and electromagnetic tracking systems. Other research is conducted via partnerships with organizations locally, nationally, and internationally. Other departments involved in the research center include Nutrition Sciences and Nursing which provides fertile ground for collaboration. Professional DPT students have the opportunity to work with faculty and PhD students on ongoing laboratory projects through optional research practica.

Physical Therapy DPT Faculty

Maria Benedetto, DPT (*University of Puerto Rico; Columbia University*). Associate Clinical Professor. Pediatrics, Motor learning and motor control; yoga for children; dance prevention and injury rehabilitation

Lisa Ann Chiarello, PT, PhD, PCS, FAPTA (*Hahnemann University*) *Director, Doctor of Health Science in Rehabilitation Sciences and Certificate in Advanced Practice in Pediatric Rehabilitation Programs*. Professor. Pediatric community-based practice; family-centered care; determinants of outcomes; and participation of children with physical disabilities.

Heather Cronin, PT, DPT, GCS (*Temple University*). Adjunct Professor. Geriatrics

David Ebaugh, PT, PhD (*Drexel University*). Adjunct Clinical Professor. Identification and treatment of neuromusculoskeletal impairments associated with shoulder pain and dysfunction; differential diagnosis of shoulder problems; orthopedic examinations and interventions

Margaret Finley, PT, PhD (*University of Maryland*). Associate Professor. Upper extremity movement patterns in persons with chronic neuromuscular disorders.

Kevin E. Gard, DPT, OCS (*Temple University*) *Vice-Chair, Department of Physical Therapy and Rehabilitation Sciences and Director, Professional Doctor of Physical Therapy Program*. Clinical Professor. Orthopedics; sports medicine.

Sarah Leuzzi, PT, DPT, CWS, MLT, FACCWS (*Temple University*). Adjunct Professor. Regional Vice President of Sales East Coast, American Medical Technologies; manual lymphatic drainage; wound care

Margery A. Lockard, PT, PhD (*Hahnemann University*). Clinical Professor. Orthopedic/musculoskeletal physical therapy; management of patients using prosthetic and orthotic devices; and anatomy, physiology and kinesiology.

Clare Milner, PhD, FACSM (*University of Durham, University of Leeds*) *Director, PhD in Rehabilitation Science*. Associate Professor. Biomechanics of lower extremity injury, injury prevention, and rehabilitation; overuse injuries in runners; gait in people with knee pathology

Kathryn D. Mitchell, PT, DPT, NCS (*Temple University*) *Assistant Director of Clinical Education*. Assistant Clinical Professor. Adult neuromuscular rehabilitation; balance and falls in Multiple Sclerosis.

Patrick O'Connor, PT, MPT, CCS, MBA (*Drexel University*) *Program Director, Kindred Hospitals Philadelphia*. Adjunct Professor. Cardiopulmonary Physical Therapy

Jeffrey Ostrowski, PT (*Jefferson University*). Adjunct Professor. Partner, Excel Physical Therapy; Orthopaedic Physical Therapy, Administration, Practice Management

Orestes Mikhail Quisumbing, PT, DPT, NCS (*Drexel University*). Adjunct Professor. Neurologic rehabilitation, spinal cord injury, stroke, amputation

Won Sung, PT, PhD (*Arcadia University; Drexel University*). Adjunct Professor. Orthopedic spine rehabilitation, movement coordination

Sara Tomaszewski, PT, DPT, OCS (*Duke University*). Clinical Instructor. Orthopedics and sports physical therapy, injury prevention, and return-to-sport decision making.

Sarah Wenger, PT, DPT, OCS (*Arcadia University; Temple University*) *Coordinator, Professional Practice Lab*. Assistant Clinical Professor. Health, wellness and fitness, models for preventative physical therapy, dance medicine.

Glenn Williams, PT, PhD, ATC (*University of Delaware*) *Chair, Department of Physical Therapy & Rehabilitation Sciences*. Associate Professor. Neuromuscular plasticity after joint injury, orthopaedic-sports rehabilitation, human performance, post-traumatic osteoarthritis.

Emeritus Faculty

Margo Orlin, PT, PhD, FAPTA (*Drexel University*). Associate Professor Emeritus. Walking and running biomechanics and participation in children with developmental disabilities, evaluation of enhancing participation for children and adolescents with cerebral palsy.

Robert J. Palisano, PT, ScD, FAPTA (*Boston University*). Distinguished Professor. Classification and prognosis for gross motor function in children and youth with cerebral palsy; interventions to improve activity and participation in children with physical disabilities; transition to adulthood for youth with disabilities.

Patricia Rubertone, PT, MPT, MSW, EdD (*Widener University*) *Director of Experiential Learning*. Associate Clinical Professor Emerita. Student learning; course design; judgment of physical therapy student clinic performance by novice vs. experienced clinical instructors.

Susan Smith, PT, PhD (*University of Connecticut, Texas Woman's University*). Associate Professor and Dean Emerita. Geriatrics: health promotion and interventions for manifestations of low bone mass; assessment of fall risk and fall prevention interventions for older adults

Nutrition Sciences

Major: Nutrition Sciences

Degree Awarded: Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 90.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 30.1901

Standard Occupational Classification (SOC) code: 11-9121

About the Program

The program mission is to develop scientists who are able to contribute to the scholarly generation of nutrition science knowledge, spanning the overlapping disciplines of human nutrition, nutritional biochemistry, food safety, human physiology, exercise physiology and community nutrition; and the translation of this knowledge with respect to health, disease prevention and treatment.

Nutrition scientists who have a PhD can be involved in research, education, industry, community health, and/or clinical practice. With the current epidemic of obesity and type 2 diabetes mellitus, the need for PhD-educated nutritionists who can discover and design new treatment interventions is of major public health interest.

Admission Requirements

Applicants must possess a minimum of a Bachelor's of Science degree in biology, chemistry, nutrition, exercise physiology, food science or a similar area with a strong science base, and have taken an advanced undergraduate course in biochemistry, as well as a course in human nutrition and a course in basic statistics.

- College/University transcripts with a minimal overall grade point average (GPA) of 3.0 (on a 4.0 scale)
- Graduate Record Exam (GRE): minimum combined score of 308 on the Verbal and Math sections
- Two letters of recommendation from advisors, supervisors, professors, and/or mentors
- Curriculum vitae
- Personal statement outlining career plan, topic of research interest and preferred Nutrition Sciences faculty mentor with whom he/she would like to work

Degree Requirements

The PhD program consists of 90.0 quarter credits. The 90 credits include 45.0 credits of course work, 45.0 credits of research, as well as a research dissertation. Additionally, all PhD students will be required to obtain a minimum of 10 contact hours of nutrition-related teaching experience.

Required Nutrition Courses (18 credits):

NFS 525	Nutritional Assessment Through the Life Cycle	3.0
NFS 601	Research Methods	3.0
NFS 602	Methods of Nutrition Research	3.0
NFS 680	Special Topics	3.0
NFS 810	Topics in Metabolic Nutrition	3.0

NFS 811	Topics in Community Nutrition	3.0
Required Statistics Courses (9 credits):		
RSCH 759	Foundations of Biostatistics	3.0
RSCH 811	Intermediate Biostatistics	3.0
RSCH 814	Intermediate Biostatistics II	3.0
Required Professional Skills Courses (9 credits):		
RSCH 770	Foundations in Research Methods	3.0
RSCH 813	Measurement Theory in Healthcare	3.0
RSCH 815	Scientific Inquiry and Writing	3.0
Electives:		
12.0 credits chosen from graduate nutrition, basic science or other courses, as determined by the faculty mentor and/or dissertation committee		12.0
Independent Research (30 credits):		30.0
NFS 997	Research	
Dissertation Research (12 credits):		12.0
NFS 999	Dissertation Research	
Total Credits		90.0

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.

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 & 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.

RoseAnn 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.

Beth L. Leonberg, MS, MA, RDN, CSP, FAND, LDN (*Colorado State University, Rowan University*) Director, Didactic Program in Dietetics . Associate Clinical Professor. 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.

Brandy-Joe Milliron, PhD (*Arizona State University*). Associate 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*). Visiting 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*). Adjunct 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.

Kavitha Penugonda, PhD (*Kansas State University*) Manager, Nutritional Biochemistry Laboratory. Assistant Clinical Professor. Nutrient bioavailability in foods; nutritional supplements on health

Jennifer Quinlan, PhD (*North Carolina State University*). Professor. Food microbiology; microbiological quality and safety of produce, dairy and meat products in markets in high vs. low socioeconomic 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 (fNIRS) and electroencephalography (EEG) and methodology and research design.

Sinclair A. Smith, MS, DSc (*Boston University*) Chair, Health Sciences. Professor. Effects of aging, dehydration, and oral creatine supplementation on skeletal muscle metabolism using phosphorus magnetic resonance spectroscopy. Anatomy, physiology, and exercise science.

Deeptha Sukumar, PhD (*Rutgers University*). Associate 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, ACSM-CEP, 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*). 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.

Physician Assistant (PA)

Major: Physician Assistant

Degree Awarded: Master of Health Sciences (MHS)

Calendar Type: Quarter

Total Credit Hours: 117.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.0912

Standard Occupational Classification (SOC) code: 29-1071

About the Program

The Drexel University Physician Assistant Program provides graduates with a Master of Health Science degree and eligibility to sit for the PANCE (Physician Assistant National Certifying Examination).

The physician assistant (PA) is a primary health care provider who, when graduated from an accredited program and national certified and state-licensed, is eligible to practice medicine with the legal supervision of a physician.

PA's perform many duties including, but not limited to, physical examinations, diagnosis and treatment of illnesses, ordering and interpretation of lab tests, assist in surgery, perform procedures, perform hospital rounds, prescribe medicines and provide patient education.

The mission of this program is to:

- Educate qualified primary care physician assistants
- Improve health care delivery in rural and urban medically underserved areas
- Promote the physician assistant profession

Additional Information

For more information about this program, contact: paadmissions@drexel.edu

For more details about the program, visit the College of Nursing and Health Professions Physician Assistant (<https://www.drexel.edu/cnph/academics/graduate/MHS-Physician-Assistant/>) page.

Admission Requirements

The Drexel University Physician Assistant Program utilizes the Central Application Service for Physician Assistants (CASPA). All applicants must complete the CASPA application process no later than September 1st of the year prior to expected date of matriculation. Applications must be e-submitted, complete (including the receipt by CASPA of all transcripts, reference forms, and other supporting documentation such as foreign transcript evaluations and TOEFL score) and received by CASPA by the September 1st deadline. Applicants may not apply directly to the Drexel University Physician Assistant Program. Applications made directly to the Office of Enrollment Management (Admissions) of Drexel University will not be processed.

- All applications must be verified by CASPA no later than September 1st.
- For the 2019-2020 application cycle (open mid-April - September 1, 2019) all prerequisites must be completed by the end of the fall semester. NOTE: Up to two (2) admission prerequisite courses may be incomplete at the time of application submission, but those courses must be completed by the end of the Fall 2019 term.

For additional details about the application process, visit the Physician Assistant Program's Admissions (<https://www.drexel.edu/cnhp/academics/graduate/MHS-Physician-Assistant/>) web page.

Application Prerequisites

- A minimum grade point average of 3.0 on a 4.0 grading scale from all colleges and universities attended is required for the following three (3) categories: non-science courses, natural science courses, and combined overall courses. Applications will not be reviewed unless the applicant has attained these minimum requirements at time of application.
- Meet the technical standards for admission, progression, and graduation from the Physician Assistant Program. Each applicant is expected to review completely the "Technical Standards for PA Program" PDF at the end of this page. Individuals unable to meet these technical standards, with or without reasonable accommodation, are counseled to pursue alternate careers.
- Official transcripts from all colleges and universities attended sent directly to CASPA.
- Non-United States-based educational institutional transcripts must be evaluated by an approved agency (see the listing of acceptable agencies on the CASPA website at https://portal.caspaonline.org/faq/foreign_transcripts.htm). Evaluation fees are the responsibility of the applicant. Evaluations must be sent directly to CASPA.
- Three completed reference forms with accompanying letters of recommendation attached and submitted as part of the official CASPA application. Preferred references are from individuals who have interacted with the applicant in a supervisory capacity or academic instructors who have personal knowledge of the applicant. Submission of references from friends, relatives, personal physicians, or instructors who do not possess a personal, supervisory knowledge of the applicants is discouraged.
- A personal statement recorded as part of the CASPA application.
- An applicant whose native language is not English must submit scores from the TOEFL iBT examination unless the applicant has graduated with a bachelor's degree from a U.S. college or university. The minimum required score for the iBT (Internet Based Testing) is 79 and a minimum score of 26 is required for the speaking component.

Find more detailed information at <http://www.toeflgoanywhere.org/>. Scores must be submitted directly to CASPA.

- Meet the minimum prerequisite coursework as detailed in the "Admission Requirements and Process" PDF below.

A minimum of 500 hours of clearly documented volunteer/paid direct hands-on patient contact accrued by the time of application and recorded as part of the official CASPA application is required. Ensure that all hours are accurately reported. Applicants may list the same position in multiple sections in order to account for multiple experiences (patient contact, related health care, research, shadowing, etc.) accrued in the same position as long as each hour is not reported in more than one experience category. Please review the "Patient Contact" PDF below for more information regarding acceptable forms of patient contact.

- Graduate Record Examination (GRE) scores are not required.
- The Physician Assistant Program does not grant advanced standing.

Degree Requirements

The intensive curriculum consists of professionally related coursework taken during a continuous period (the part-time option requires an additional calendar year) and gives students an understanding of both the health care system within which they will work and the functions appropriate to the role of the physician assistant. The curriculum is divided into a full year of didactic courses followed by an additional 15 months of supervised clinical practice.

Training begins with four quarters of didactic education which integrates patient interaction throughout. The clinical training phase consists of six (6) five-credit, five week clinical rotations in medicine, surgery, women's health, pediatrics, emergency medicine, and psychiatry. The clinical phase of the curriculum is completed on a full-time basis for both full and part-time students.

The final portion of the curriculum consists of two, 10-credit quarter-long, primary care practica (preceptorships). During the preceptorship phase, each student is assigned to two primary care sites for individualized clinical training with physician preceptors. Training sites during the clinical year are located throughout Pennsylvania and in other states. Students are expected to relocate during the clinical phase and are responsible for all associated financial costs, including transportation and living expenses.

The program is intensely challenging, both intellectually and physically, and requires stamina as well as personal and financial sacrifice on the part of the students. The program demands a high degree of integrity, self-sufficiency, motivation, and self-discipline, and highly developed study skills.

The Physician Assistant program utilizes electronic documentation and communications. Therefore, all students are required to have laptop computers with Web access capability.

Contact the Physician Assistant Program (<https://www.drexel.edu/cnhp/academics/graduate/MHS-Physician-Assistant/>) for more information on the sequencing for the part-time option.

Required Courses

First Year		
Fall		Credits
PA 540	Clinical Anatomy	5.0
PA 545	Physician Assistant Practice	1.0
PA 543	Ethical Issues in Physician Assistant Practice	2.0

PA 542	Patient Communication	2.0
PA 544	Clinical Assessment	5.0
Term Credits		15.0

Winter

In this quarter, part-time students may take PA 546 Health Policy for Physician Assistance Practice and/or an elective in addition to the required courses. This will enable them to take the first summer quarter off. addition to the required courses.

PA 548	Principles of Medical Science I	2.0
PA 556	Clinical Medicine I	5.0
PA 551	Pharmacology and Therapeutics I	3.0
PA 559	Clinical Skills I	2.0
PA 547	Evidence Based Medicine for Physician Assistants	3.0
Term Credits		15.0

Spring

PA 549	Principles of Medical Science II	2.0
PA 557	Clinical Medicine II	5.0
PA 552	Pharmacology and Therapeutics II	2.0
PA 560	Clinical Skills II	2.0
PA 554	Biopsychosocial Issues in Patient Care	5.0
Term Credits		16.0

Summer

In this quarter, part-time students may take PA 546 Health Policy for Physician Assistant Practice plus an elective if they wish to attend during the summer quarter.

PA 550	Principles of Medical Science III	2.0
PA 558	Topics in Clinical Practice	5.0
PA 553	Pharmacology and Therapeutics III	2.0
PA 561	Clinical Skills III	4.0
PA 546	Health Policy for Physician Assistant Practice	2.0
Term Credits		15.0

Second Year

Fall

The Clinical Phase (Full-time for all students, 5 quarters)		
Rotation I		5.0
Rotation II		5.0
Term Credits		10.0

Winter

Rotation III		5.0
Rotation IV		5.0
Graduate Project I		3.0
Term Credits		13.0

Spring

Rotation V		5.0
Rotation VI		5.0
Term Credits		10.0

Third Year

Summer

PA 635	Primary Care Practicum I	10.0
PA 638	Graduate Project II	3.0-6.0
Term Credits		13.0-16.0

Fourth Year

Fall

PA 637	Primary Care Practicum II	10.0
Term Credits		10.0

Total Credit: 117.0-120.0

***Clinical Year Rotation Courses**

The sequencing of the six clinical rotations will vary for individual students, but all students must take all six rotations.

PA 629	Internal Medicine Rotation	5.0
--------	----------------------------	-----

PA 630	Pediatrics Rotation	5.0
PA 631	Women's Health Rotation	5.0
PA 632	Behavioral Medicine Rotation	5.0
PA 633	Surgery Rotation	5.0
PA 634	Emergency Medicine Rotation	5.0

Physician Assistant Faculty

Patrick C. Auth, PhD, PA-C (*Drexel University*) *Department Chair, Physician Assistant Department.* Clinical Professor. Clinical reasoning of physician assistant students.

Adrian Banning, MMS, PA-C (*Arcadia University*) *Research Coordinator.* Assistant Clinical Professor. Dermatology, family practice, and evidence based medicine.

Geraldine A. Buck, DrPH, MHS, PA-C (*Drexel University*) *Director, Physician Assistant Post-Professional Master's Program.* Associate Teaching Professor. Public health.

Ryan Clancy, MSHS, MA, PA-C (*The George Washington University*) *Co-Director, Clinical Education.* Clinical Instructor. Primary care, behavioral and occupational health

Rosalie Coppola, MHS, PA-C (*Drexel University*). Associate Clinical Professor. Pediatrics, Standardized patients, clinical assessment

Ellen D. Feld, MD, FACP (*University of Cincinnati, College of Medicine*). Clinical Professor. Clinical medicine and ethical issues.

Gretchen L. Fox, MMSc, PA-C (*St. Francis College*) *Associate Program Director.* Associate Clinical Professor. Internal medicine/family practice.

Juanita Gardner, MPH, PA-C (*Drexel University*). Assistant Clinical Professor. Primary care and global health.

Julie Kinzel, MEd, PA-C (*Temple University*). Assistant Clinical Professor. Long term care experiences, geriatrics, gastroenterology and liver disease.

Daniela C. Livingston, PA-C, MD (*Medical School, Bucharest, Romania; University of Washington, Seattle*). Assistant Clinical Professor. Pediatrics, primary care and working with underserved populations, with a special emphasis on preventative pediatrics.

Ann McDonough Madden, MHS, BS, PA-C (*Drexel University*). Associate Clinical Professor. Healthcare disparities, urban health.

Catherine Nowak, MS, PA-C (*Mercy College*) *Director of Clinical Rotations.* Assistant Clinical Professor. Clinical education, behavioral health, women's health

Clare Pisoni, MPAS, PA-C (*University of Nebraska*). Clinical Instructor. Critical care medicine, surgery, simulation

Allison Rusgo, MHS, MPH, PA-C (*Drexel University*). Assistant Clinical Professor. Emergency medicine, internal medicine, global health

Megan Schneider, MMS, MSPH, PA-C (*Arcadia University*). Clinical Instructor. Emergency medicine, pathophysiology, clinical medicine

Diana D. Smith, MHS, PA-C (*Drexel University*) *Director, didactic curriculum.* Assistant Clinical Professor. Primary care, global health care; distance education.

Charles Stream, MPH, PA-C (*George Washington University*). Assistant Clinical Professor. Primary care, evidenced-based medicine

Rehabilitation Sciences

Major: Rehabilitation Sciences

Degree Awarded: Doctor of Health Science (DHSc)

Calendar Type: Quarter

Total Credit Hours: 48.0

Classification of Instructional Programs (CIP) code: 51.2314

Standard Occupational Classification (SOC) code: 29-1123

About the Program

The Doctor of Health Science (DHSc) in Rehabilitation Sciences program is designed to be an advanced doctoral degree program open to physical and occupational therapists seeking leadership roles in education and/or clinical practice. The aim of the program is to prepare physical and occupational therapists to be leaders in Rehabilitation Sciences by acquiring skills and educators, members of research teams and advocates for best practice. The curriculum includes foundation courses in the health professions, teaching, and research.

Program Delivery

Coursework is predominantly online, with onsite components arranged on preset week days or weekends during the curriculum. Most of the coursework will be offered without pre- or co-requisites to maximize students' ability to balance their work and personal lives while completing the degree. Each student chooses an area of scholarship that matches the expertise of one of our faculty members; an arrangement that ensures optimal mentorship for the students.

Objectives

Graduates of the Doctor of Health Science in Rehabilitation Sciences program will be prepared to:

- Assume leadership positions in professional, academic, clinical and/or community organizations.
- Educate students and practitioners in rehabilitation sciences in academic, clinical, and community organizations.
- Consult with consumer groups and organizations to create interprofessional partnerships to foster healthy communities.
- Contribute to and disseminate scholarship for transfer of knowledge in the rehabilitation sciences to promote best practice and quality education.

Additional Information

For more information, visit the Department of Physical Therapy and Rehabilitation Sciences (<https://www.drexel.edu/cnhp/academics/departments/Physical-Therapy/>) web page.

Admission Requirements

Applicants must possess a master's or clinical doctoral professional degree in physical therapy or a related field such as MPT, MSPT, MOT, DPT, or OTD or some other master's degree for admission consideration. In addition applicants must have a current, active US or Canadian license to practice their discipline. Applicants would complete a standard graduate application including submission of the following:

- Copy of professional license
- College/university transcripts with minimal overall GPA of 3.0
- GRE scores
- Two letters of recommendation from advisors, supervisors, professors, or mentors
- CV
- Personal statement outlining career plan and topic of research interest

Degree Requirements

Foundation Courses

NHP 680	Informatics in the Health Professions	3.0
NHP 766	Health Promotion, Fitness and Wellness	3.0
NHP 767	Leadership & Professional Issues	3.0
RHAB 768	Advancing the Practice of Rehabilitation	3.0
RSCH 758	Application of Evidence to Practice	3.0
RSCH 741	Foundations in Scholarly Inquiry & Writing	3.0

Teaching Courses

NHP 760	Academia for Health Professionals	1.0
NHP 762	Health Professional Education	3.0
NHP 822	Teaching Practicum	3.0

Research Courses

NHP 810	Biostatistical Applications	2.0
RSCH 519	Introduction to Biostatistics	3.0
RSCH 770	Foundations in Research Methods	3.0
RSCH 813	Measurement Theory in Healthcare	3.0

Elective Practicum Experience

		2.0
NHP 822	Teaching Practicum	
NHP 832	Leadership Practicum	
RSCH 823	Research Practicum	

Additional Elective Option

3.0
An Elective may be selected from courses and practica (including independent study) within and outside the program to support the student's plan of study.

Scholarship Experience *

NHP 818	Scholarship Question Development	1.0
NHP 827	Scholarship I	2.0
NHP 828	Scholarship II	2.0
NHP 829	Scholarship III	2.0

Total Credits 48.0

* Students must successfully complete comprehensive examination prior to enrolling in the Scholarship Experience series

Sample Plan of Study

Term 1		Credits
NHP 767	Leadership & Professional Issues	3.0
RSCH 519	Introduction to Biostatistics	3.0
Term Credits		6.0
Term 2		
RSCH 758	Application of Evidence to Practice	3.0
RSCH 741	Foundations in Scholarly Inquiry & Writing	3.0
Term Credits		6.0
Term 3		
NHP 762	Health Professional Education	3.0
RHAB 768	Advancing the Practice of Rehabilitation	3.0
Term Credits		6.0
Term 4		
NHP 818	Scholarship Question Development	1.0
NHP 822	Teaching Practicum	1.0
Term Credits		2.0

Term 5		
RSCH 813	Measurement Theory in Healthcare	3.0
NHP 822	Teaching Practicum	2.0
Term Credits		5.0
Term 6		
RSCH 770	Foundations in Research Methods	3.0
NHP 766	Health Promotion, Fitness and Wellness	3.0
Term Credits		6.0
Term 7		
NHP 810	Biostatistical Applications	2.0
NHP 680	Informatics in the Health Professions	3.0
Term Credits		5.0
Term 8		
NHP 760	Academia for Health Professionals	1.0
Elective Practicum Experience		2.0
Term Credits		3.0
Term 9		
NHP 827	Scholarship I	1.0
Elective		3.0
Term Credits		4.0
Term 10		
RHAB 827	Clinical Dissertation Research I	1.0
Term Credits		1.0
Term 11		
NHP 828	Scholarship II	2.0
Term Credits		2.0
Term 12		
NHP 829	Scholarship III	1.0
Term Credits		1.0
Term 13		
NHP 829	Scholarship III	1.0
Term Credits		1.0
Total Credit: 48.0		

Facilities

Teaching Facilities

The primary teaching resource for this program is supported distance learning technology. Instructional materials are provided through text, graphics, audio and video formats and are available online through a course management system 24 hours a day. The online courses are highly interactive through the use of web discussion boards, audio chat tools, and video conferencing. Program faculty share a belief that it is important to fully support distance learning students, and support will be offered via email, telephone, fax, and video-conferencing. The College of Nursing and Health Professions invests in state-of-the-art technology to foster an effective teaching and learning environment. The onsite portions of the program are held on the Center City (Health Sciences) Campus of Drexel University. The Department of Physical Therapy and Rehabilitation Sciences has two state-of-the-art dedicated teaching laboratories.

Research Facilities

The department's research facilities include over 9,000 square feet of well-equipped research laboratory space (Biomechanics, Gait, Pediatrics, and Neuromuscular Performance Labs), with equipment including force plates, EMG, motion analysis and human performance measurement equipment. This space includes conference rooms, PhD and post doc offices and is located next door to the College's 14,000 square feet, multi-disciplinary clinical practice.

The Department of Physical Therapy and Rehabilitation also values community partners as a central part of the research resources. Many faculty and students are involved in community-based research through collaborations with CanChild Centre, 11th Street Family Health Center, and numerous pediatric hospitals, out-patient facilities, and early intervention providers. Faculty are collaborating on research projects with nationally and internationally known researchers on several multi-site funded projects.

Rehabilitation Sciences DHSc Faculty

Lisa Ann Chiarello, PT, PhD, PCS, FAPTA (*Hahnemann University*)
Director, Doctor of Health Science in Rehabilitation Sciences and Certificate in Advanced Practice in Pediatric Rehabilitation Programs. Professor. Pediatric community-based practice; family-centered care; determinants of outcomes; and participation of children with physical disabilities.

Jane Fedorzayk, PT, PhD, CHT (*Temple University*). Adjunct Professor. Upper extremity tendinopathies and nerve injuries

Margaret Finley, PT, PhD (*University of Maryland*). Associate Professor. Upper extremity movement patterns in persons with chronic neuromuscular disorders.

Margery A. Lockard, PT, PhD (*Hahnemann University*). Clinical Professor. Orthopedic/musculoskeletal physical therapy; management of patients using prosthetic and orthotic devices; and anatomy, physiology and kinesiology.

Robert Maschi, PT, DPT, OCS, CSCS (*Temple University*). Assistant Clinical Professor. Orthopedics, musculoskeletal disorders, lower extremity biomechanics and movement analysis

Clare Milner, PhD, FACSM (*University of Durham, University of Leeds*)
Director, PhD in Rehabilitation Science. Associate Professor. Biomechanics of lower extremity injury, injury prevention, and rehabilitation; overuse injuries in runners; gait in people with knee pathology

Margaret O'Neil, PT, PhD, MPH (*MCP Hahnemann University; Duke University; University of North Carolina at Chapel Hill*). Adjunct 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).

Sheri Silfies, PT, PhD (*MCP Hahnemann University*). Adjunct Associate Professor. Identification and treatment of impairments in neuromuscular control of trunk mobility and stability in patients with low back pain, focusing on mechanism of recurrent low back pain; core control in athletes.

Glenn Williams, PT, PhD, ATC (*University of Delaware*)
Chair, Department of Physical Therapy & Rehabilitation Sciences. Associate Professor. Neuromuscular plasticity after joint injury, orthopaedic-sports rehabilitation, human performance, post-traumatic osteoarthritis.

Emeritus Faculty

Margo Orlin, PT, PhD, FAPTA (*Drexel University*). Associate Professor Emeritus. Walking and running biomechanics and participation in children with developmental disabilities, evaluation of enhancing participation for children and adolescents with cerebral palsy.

Robert J. Palisano, PT, ScD, FAPTA (*Boston University*). Distinguished Professor. Classification and prognosis for gross motor function in children and youth with cerebral palsy; interventions to improve activity and participation in children with physical disabilities; transition to adulthood for youth with disabilities.

Patricia Rubertone, PT, MPT, MSW, EdD (*Widener University*) *Director of Experiential Learning*. Associate Clinical Professor Emerita. Student learning; course design; judgment of physical therapy student clinic performance by novice vs. experienced clinical instructors.

Susan Smith, PT, PhD (*University of Connecticut, Texas Woman's University*). Associate Professor and Dean Emerita. Geriatrics: health promotion and interventions for manifestations of low bone mass; assessment of fall risk and fall prevention interventions for older adults

Rehabilitation Sciences

Major: Rehabilitation Sciences

Degree Awarded: Master of Health Sciences (MHS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Classification of Instructional Programs (CIP) code: 51.2308

Standard Occupational Classification (SOC) code: 29-1123

About the Program

Individuals cannot enroll directly in the Master of Health Sciences in Rehabilitation Sciences program. Requirements for the degree completion include successful completion of 45.0 credit hours concluding with a case study or a clinical project.

Upon completion of the MHS program, graduates will be prepared to:

- Analyze the impact of injury or disease process on musculoskeletal or neuromuscular function within a specific population, including orthopedics, pediatrics, and hand rehabilitation.
- Improve their practice through clinical decision-making that is consistent with concepts of health promotion, client-centered care and current best evidence.
- Facilitate the transfer of health care policy and research findings into clinical practice.
- Evaluate methods of service delivery and intervention strategies and procedures at individual and program levels.
- Serve effectively as clinical educators and consultants to consumers and colleagues.
- Engage in professional life-long learning and contribute to the field of rehabilitation.

Additional Information

For more information, visit the Department of Physical Therapy and Rehabilitation Sciences (<https://www.drexel.edu/cnhp/academics/departments/Physical-Therapy/>) web page.

Degree Requirements (MHS)

Master of Health Sciences (MHS): 45.0 quarter credits

Core Requirements

RSCH 519	Introduction to Biostatistics	3.0
RSCH 523	Methods for Health Research	3.0
PTRS 650	Motor Control and Learning Rehabilitation	3.0

PTRS 651	Applied Tissue Biomechanics	3.0
PTRS 721	Teaching Concepts in Rehabilitation	3.0
PTRS 758	Evidence-Based Rehabilitation	4.0

Concentration

Students select a minimum of 16-18 credits in one of the following concentrations. 16.0-18.0

Hand and Upper Quarter Rehabilitation Concentration Options

PTRS 767	Foundations in Hand Therapy
PTRS 768	Upper Quarter Joint Pathology
PTRS 769	Nerve Injuries of the Upper Quarter
PTRS 770	Diseases That Affect the Hand

Pediatrics Concentration Options *

PTRS 740	Issues in Pediatric Health & Rehabilitation
PTRS 760	Pediatric Decision Making
PTRS 761	Pediatric Clinical Application
PTRS 772	Selected Topics in Pediatrics

Orthopedics Concentration Options *

PTRS 590	Advanced Musculoskeletal Anatomy
PTRS 765	Spinal Rehabilitation
PTRS 766	Extremity Rehabilitation
PTRS 767	Foundations in Hand Therapy
PTRS 768	Upper Quarter Joint Pathology
PTRS 769	Nerve Injuries of the Upper Quarter
PTRS 770	Diseases That Affect the Hand
PTRS 771	Work Injury Management
RHAB 763	Biomechanics in Rehabilitation
RHAB 764	Biomechanics in Human Movement
RHAB 765	Introduction to Movement Science

Electives * 8.0

PTRS 612	Pharmacotherapeutics
RHAB 824	Teaching Practicum I
RHAB 825	Teaching Practicum II
RHAB 826	Teaching Practicum III
RHAB 816	Special Topics
RHAB 1899	Independent Study

Final Project

PTRS 786	MHS Final Project I	1.0-2.0
PTRS 787	MHS Final Project II	1.0-2.0

Total Credits 45.0-49.0

* Additional courses (as approved). Number of credits required for electives is dependent upon total credits in concentration selected. Contact the Rehabilitation Sciences Master of Health Science Program (<https://www.drexel.edu/cnhp/academics/departments/Physical-Therapy/>) for more details.

Facilities

Teaching Facilities and Resources

Most classes are held in lecture halls, classrooms, or laboratories on the Center City (Health Sciences) Campus of Drexel University. The entire campus has wireless capability for easy internet access. The Department of Physical Therapy and Rehabilitation Sciences has two state-of-the-art dedicated laboratories. Our teaching resources also include supported distance learning technology. Instructional materials are provided through text, graphics, audio and video formats and are available online through a course management system 24 hours a day. Our online courses are highly interactive through the use of web discussion boards, audio chat tools, and video conferencing.

Research Facilities

The department's research facilities include over 9,000 square feet of well-equipped research laboratory space (Biomechanics, Gait, Pediatrics, and Neuromuscular Performance Labs), with equipment including force plates, EMG, motion analysis and human performance measurement equipment. This space includes conference rooms, PhD and post doc offices and is located next door to the Colleges 14,000 square feet, multi-disciplinary clinical practice.

The Department of Physical Therapy and Rehabilitation also values community partners as a central part of the research resources. Many faculty and students are involved in community-based research through collaborations with CanChild Centre, 11th Street Family Health Center, and numerous pediatric hospitals, out-patient facilities, and early intervention providers. Faculty are collaborating on research projects with nationally and internationally known researchers on several multi-site funded projects.

Physical Therapy and Rehabilitation Sciences Faculty

Maria Benedetto, DPT (*University of Puerto Rico; Columbia University*). Associate Clinical Professor. Pediatrics, Motor learning and motor control; yoga for children; dance prevention and injury rehabilitation

Benjamin Binder-Markey, PT, DPT, PhD (*Northwestern University, University of Delaware*). Assistant Professor. Skeletal muscle adaptations after neural injury and effects on function

Lisa Ann Chiarello, PT, PhD, PCS, FAPTA (*Hahnemann University*) Director, Doctor of Health Science in Rehabilitation Sciences and Certificate in Advanced Practice in Pediatric Rehabilitation Programs. Professor. Pediatric community-based practice; family-centered care; determinants of outcomes; and participation of children with physical disabilities.

Margaret Finley, PT, PhD (*University of Maryland*). Associate Professor. Upper extremity movement patterns in persons with chronic neuromuscular disorders.

Kevin E. Gard, DPT, OCS (*Temple University*) Vice-Chair, Department of Physical Therapy and Rehabilitation Sciences and Director, Professional Doctor of Physical Therapy Program. Clinical Professor. Orthopedics; sports medicine.

Margery A. Lockard, PT, PhD (*Hahnemann University*). Clinical Professor. Orthopedic/musculoskeletal physical therapy; management of patients using prosthetic and orthotic devices; and anatomy, physiology and kinesiology.

Robert Maschi, PT, DPT, OCS, CSCS (*Temple University*). Assistant Clinical Professor. Orthopedics, musculoskeletal disorders, lower extremity biomechanics and movement analysis

Clare Milner, PhD, FACSM (*University of Durham, University of Leeds*) Director, PhD in Rehabilitation Science. Associate Professor. Biomechanics of lower extremity injury, injury prevention, and rehabilitation; overuse injuries in runners; gait in people with knee pathology

Kathryn D. Mitchell, PT, DPT, NCS (*Temple University*) Assistant Director of Clinical Education. Assistant Clinical Professor. Adult neuromuscular rehabilitation; balance and falls in Multiple Sclerosis.

Annalisa Na, PT, DPT, PhD, OCS (*University of Delaware*). Assistant Research Professor. Interactions of multimorbidity diseases on functional outcomes in older adults

Sinclair A. Smith, MS, DSc (*Boston University*) Chair, Health Sciences. Professor. Effects of aging, dehydration, and oral creatine supplementation on skeletal muscle metabolism using phosphorus magnetic resonance spectroscopy. Anatomy, physiology, and exercise science.

Sara Tomaszewski, PT, DPT, OCS (*Duke University*). Clinical Instructor. Orthopedics and sports physical therapy, injury prevention, and return-to-sport decision making.

Sarah Wenger, PT, DPT, OCS (*Arcadia University; Temple University*) Coordinator, Professional Practice Lab. Assistant Clinical Professor. Health, wellness and fitness, models for preventative physical therapy, dance medicine.

Glenn Williams, PT, PhD, ATC (*University of Delaware*) Chair, Department of Physical Therapy & Rehabilitation Sciences. Associate Professor. Neuromuscular plasticity after joint injury, orthopaedic-sports rehabilitation, human performance, post-traumatic osteoarthritis.

Emeritus Faculty

Margo Orlin, PT, PhD, FAPTA (*Drexel University*). Associate Professor Emeritus. Walking and running biomechanics and participation in children with developmental disabilities, evaluation of enhancing participation for children and adolescents with cerebral palsy.

Robert J. Palisano, PT, ScD, FAPTA (*Boston University*). Distinguished Professor. Classification and prognosis for gross motor function in children and youth with cerebral palsy; interventions to improve activity and participation in children with physical disabilities; transition to adulthood for youth with disabilities.

Patricia Rubertone, PT, MPT, MSW, EdD (*Widener University*) Director of Experiential Learning. Associate Clinical Professor Emerita. Student learning; course design; judgment of physical therapy student clinic performance by novice vs. experienced clinical instructors.

Susan Smith, PT, PhD (*University of Connecticut, Texas Woman's University*). Associate Professor and Dean Emerita. Geriatrics: health promotion and interventions for manifestations of low bone mass; assessment of fall risk and fall prevention interventions for older adults

Certificate of Advanced Study in Complementary and Integrative Therapies

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.3300

Standard Occupational Classification (SOC) Code: 29-1199

About the Program

The Certificate of Advanced Study in Complementary and Integrative Therapies (CIT) program is designed to provide practicing healthcare professionals with an "evidence-based program" in complementary and integrative therapies. This knowledge will allow them to assess, guide and evaluate patient use and to integrate CIT into their professional practice. The program provides students with the cultural and theoretical basis for applying complementary and integrative therapies while focusing on the skills and techniques of specific therapies.

This program is applicable to a wide range of healthcare professionals including nurses, nurse practitioners, physician's assistants, creative arts therapists, couple and family therapists, women's health practitioners, members of oncology organizations, members of AHNA and more. Admission requires a minimum of a bachelor's degree from an accredited college or university.

The program content is congruent with the educational standards set forth by the American Association of Holistic Nurses (AHNA) and the Foundations in Clinical Aromatherapy course adheres to the educational standards (level one) set forth by the National Association for Holistic Aromatherapy (NAHA).

American Holistic Nurses Credentialing Corporation, Inc. (<http://www.ahncc.org/school-endorsement-program/current-endorsed-nursing-programs/>) has endorsed Drexel University's Complementary and Integrative Health Master's and Certificate Programs, which allows graduates of these programs to sit for the nationally accredited board certification in holistic nursing.

Features and Benefits:

- Embraces the foundational principles of holistic Integrative care, focusing on the mind, body, spirit approach to achieve optimal health and healing within the framework of conventional healthcare.
- Courses are taught by internationally-recognized leaders in Complementary and Integrative Therapies and faculty trained in both conventional healthcare and integrative therapies.
- Program is taught wholly online in a highly dynamic learning format that engages students.

Admission Requirements:

Individuals submitting an application must fulfill the following:

- 2.75 GPA or above on all previous coursework
- Minimum of a bachelor's degree from an accredited college or university
- Official transcripts from all universities or colleges attended
- Nurse, physician assistants, and other healthcare professionals who hold licensure or a certificate: copy of license, eligibility for licensure, or certificate
- Current resume or curriculum vitae
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study
 - References will not be accepted from colleagues or family members.
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:

- Why you are choosing this particular program of study
- Your plans upon completion of the certificate
- How your current work experience will enhance your experience in this program
- International students will need to meet university international student admissions guidelines, including TOEFL Program Requirements.

Program Requirements

Required Courses

CIT 501	Foundations of Phytotherapy	3.0
CIT 502	Foundations of Complementary and Integrative Therapies	3.0
CIT 503	Holistic Living For The Caregiver	3.0
Select one of the following:		3.0
CIT 511	Spirituality, Health and Healing	
CIT 512	Body Movement Therapies	
CIT 513	Yoga for the Enlightened Practitioner	
CIT 552	Integrative Advanced Relaxation Techniques (I-ART)	
CIT 600	Foundations in Clinical Aromatherapy	
CIT 602	Women's Integrative Health	
CIT 617	Qigong: Bio-energy Therapy	
CIT 618	Principles of Holistic Nursing	
CIT 619	Principles of Bioenergy Therapies	
CIT 620	Integrative Meditation: Where East Meets West	
CIT 628	Special Topics in Complementary and Integrative Therapies	
CIT 690	Independent Study	
Total Credits		12.0

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel College of Nursing and Health Professions Complementary and Integrative Therapies (<http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Advanced-Study-Complementary-and-Integrative-Therapies/>) web page and the Drexel University Online Complementary and Integrative Therapies (<http://online.drexel.edu/online-degrees/nursing-degrees/cert-cit/>) web page.

Certificate in Forensic Trends and Issues in Contemporary Healthcare

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 9.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 43.0106

Standard Occupational Classification (SOC) Code: 19-4092

About the Program

NOTE: This program is currently undergoing revision and therefore no applications will be accepted for the 2019-2020 academic year. Please check back in summer 2020 for an update.

The certificate program examines contemporary trends and issues related to the wide range of interpersonal violence, crime and sudden violent death that may be encountered in a variety of healthcare settings. Theoretical tenets, methods for assessment and related implications for intervention and/or referral will be examined from a multifaceted perspective—including that of the offender, crime victim, families, and the healthcare community-at-large.

Program Goals

- Examine social attitudes and perceptions toward victimization and offending behavior;
- Identify the psychological, physical and legal aspects of victimization;
- Assess victim trauma and identify appropriate interventions for victimized clients;
- Assess the motivational intent and behavior patterns of offenders who commit aggressive crimes;
- Analyze institutional approaches and subsequent response patterns to victims and offenders in a variety of settings (e.g., inpatient, outpatient, primary care settings, academic, etc.);
- Assess ethical dimensions of healthcare issues relative to the role and scope of practice and healthcare providers;
- Examine healthcare policy assessment, development and/or modification to enhance health promotion of offenders and victims across the lifespan.

Admission Requirements

Admission to this program requires completion of a BS/BA degree. The program is intended for providers and educators in the healthcare sciences, as well as professionals who have direct contact with victims and/or offenders across disciplines and areas of practice (e.g. social workers, criminal justice, police, high school teachers, etc). The program is open to practitioners, graduate student and healthcare educators across the continuum of specialties and agencies.

- 2.75 GPA or above on all previous coursework
- A baccalaureate degree with a major in a health-related field from an accredited college or university
- Official transcripts from all universities or colleges attended
- A copy of your United States RN license (License verification from your nursing license registry website is acceptable)
- Current Resume/CV
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study
 - References will not be accepted from colleagues or family members.
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate

- How your current work experience will enhance your experience in this program

TOEFL Requirement

International applicants, as well as immigrants to the United States and US permanent residents whose native language is not English and who have not received a bachelor's degree or higher in the United States, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on US military bases abroad may be waived from the TOEFL requirements after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If you take the TOEFLiBT exam, you must have a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher.
- If you take the TOEFL, you must have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Program Requirements

Requirements (choose 3)		9.0
IPS 519	Forensic Science Foundations	
IPS 528	Victimology – Contemporary Trends	
IPS 533	Forensic Mental Health	
IPS 670	Interdisciplinary Perspectives of Health Law	
Total Credits		9.0

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel College of Nursing and Health Professions Forensic Trends and Issues in Contemporary Healthcare (<http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Forensic-Trends-and-Issues-in-Contemporary-Healthcare/>) web page and the Drexel University Online Forensic Trends and Issues in Contemporary Healthcare (<http://online.drexel.edu/online-degrees/nursing-degrees/cert-ftch/>) web page.

Post-Master's Certificate in Geriatrics

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's Certificate

Number of Credits to Completion: 20.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.0912

Standard Occupational Classification (SOC) Code: 29-1071

About the Program

The PA Post-Master's Certificate in Geriatrics consists of three didactic courses and one clinical practicum (20.0 quarter credit hours). The certificate program is offered part-time for working professionals and is one year in length; the program begins in the Winter Term of each year (January), and runs through the Fall term of the following year (December).

The three didactic courses are offered online, and the clinical practicum in geriatrics is a supervised clinical practice experience.

The PA Post-Master's Certificate in Geriatrics program is designed to:

- enhance the knowledge and skills of Physician Assistants in clinical geriatrics
- build competencies in patient-centered, evidence-based clinical practice
- improve access to high-quality geriatric care

Admission Requirements

Applicants to the PA Post-Master's Certificate (PMC) program in geriatrics must be/have:

- Master's degree (minimum GPA 3.0)
- Graduate of an ARC-PA accredited PA Program
- Current NCCPA certificate
- Active, unrestricted license for clinical practice as a Physician Assistant (PA)
- Minimum of one year of clinical practice as a PA
- Transcripts from all universities, colleges, post-secondary educational institutions
- Personal statement describing reasons for pursuing the PMC and professional goals/plans
- Two letters of reference

Program Requirements

PA 810	Clinical Applications of Geriatric Physiology	5.0
PA 811	Geriatrics I	5.0
PA 812	Geriatrics II	5.0
PA 819	Geriatrics Clinical Practicum	5.0
Total Credits		20.0

Sample Plan of Study

Term		Credits
Term 1	PA 819	5.0
	Term Credits	5.0
Term 2	PA 810	5.0
	Term Credits	5.0
Term 3	PA 811	5.0
	Term Credits	5.0
Term 4	PA 812	5.0
	Term Credits	5.0
Total Credit:		20.0

Additional Information

Additional information is available on the Drexel University Online (<http://online.drexel.edu/online-degrees/certificateprograms.aspx>) website or the College of Nursing and Health Professions (<http://www.drexel.edu/cnhp/academics/post-masters/>) website.

Certificate of Advanced Study in Holistic Hospice and Palliative Care

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.3306

Standard Occupational Classification (SOC) Code: 29-1199

NOTE: This program is currently undergoing revision and therefore no applications will be accepted for the 2019-2020 academic year. Please check back in summer 2020 for an update.

About the Program

The Certificate of Advanced Study in Holistic Hospice and Palliative Care provides students with a mind-body-spirit approach to end-of-life care. Graduates of the program develop mastery in providing compassionate spiritual care to patients and their families.

The use of Complementary and Integrative Therapies (CIT) within the scope of end-of-life care provides practitioners the tools needed to treat the holistic spectrum of the patient and their family, while integrating an effective and efficient delivery of care. The program's curriculum focuses on evidenced-based complementary and integrative therapy approaches that can be integrated within the framework of conventional healthcare practice.

Features and Benefits:

- This holistic program is driven by the principle of patient-centered care that provides compassionate and supportive integrative care to both the patient and their family.
- Courses are taught by internationally recognized leaders in Complementary and Integrative Therapies and faculty trained in both conventional healthcare and integrative therapies.
- Courses are offered wholly online in a highly dynamic learning format that engages students.

American Holistic Nurses Credentialing Corporation, Inc. (<http://www.ahncc.org/school-endorsement-program/current-endorsed-nursing-programs/>) has endorsed Drexel University's Complementary and Integrative Health Master's and Certificate Programs, which allows graduates of these programs to sit for the nationally accredited board certification in holistic nursing.

Admission Requirements:

- 2.75 GPA or above on all previous coursework
- A baccalaureate degree with a major in a health-related field from an accredited college or university
- Official transcripts from all universities or colleges attended
- Nurse, nurse practitioner, physician assistants, and other healthcare professionals who hold licensure or a certificate: copy of license, eligibility for licensure, or certificate
- Current resume or curriculum vitae
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study
 - References will not be accepted from colleagues or family members.
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- International students will need to meet university international student admissions guidelines, including TOEFL Program Requirements.

Program Requirements

Required Courses

CIT 503	Holistic Living For The Caregiver	3.0
or NURS 539	Holistic Living for the Caregiver	
CIT 621	Spirituality in Hospice and Palliative Care	3.0
or NURS 635	Spirituality in Hospice and Palliative Care	
CIT 622	Holistic Therapies in Hospice and Palliative Care	3.0
or NURS 622	Holistic Therapies in Hospice and Palliative Care	
CIT 623	Cultural Perspectives in Hospice and Palliative Care	3.0
or NURS 623	Cultural Perspectives in Hospice and Palliative Care	
Total Credits		12.0

Sample Plan of Study

First Year

Term 1		Credits
CIT 503	Holistic Living For The Caregiver	3.0
Term Credits		3.0
Term 2		
CIT 621	Spirituality in Hospice and Palliative Care	3.0
Term Credits		3.0
Term 3		
CIT 622	Holistic Therapies in Hospice and Palliative Care	3.0
Term Credits		3.0
Term 4		
CIT 623	Cultural Perspectives in Hospice and Palliative Care	3.0
Term Credits		3.0
Total Credit:		12.0

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor

jnr56@drexel.edu
267.359.5692

Certificate of Advanced Study in Integrative Addiction Therapies

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Bacaleaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.3300

Standard Occupational Classification (SOC) Code: 29-1199

NOTE: This program is currently undergoing revision and therefore no applications will be accepted for the 2019-2020 academic year. Please check back in summer 2020 for an update.

About the Program

The Certificate of Advanced Study in Integrative Addiction Therapies prepares healthcare professionals to treat patients suffering from substance use disorders within the holistic spectrum by healing the body, mind, and spirit. Students will learn to integrate evidence-based complementary and integrative therapies (CIT) such as nutritional neuroscience, neurofeedback, meditation, auricular acupuncture, and Qigong bioenergy therapies within the framework of conventional healthcare. These integrative therapies will enable healthcare practitioners to incorporate innovative, caring and holistic methods to an underserved population.

Substance use disorders are among this country's most ubiquitous health and social issues. This cutting edge program is designed to empower practitioners to utilize complementary and integrative therapies within the scope of conventional healthcare practice to treat substance use disorders and enhance patient outcomes. It will provide practitioners the tools needed to treat the substance use disorder patient (and their family) within the holistic spectrum, healing body, mind and spirit.

A holistic, integrative treatment program for addiction requires combining neuronutritional treatment with other facets (bio, psycho, social, spiritual, economic), including counseling and education to support lifestyle change.

Features and Benefits:

- This ground-breaking Integrative Addiction Therapies program is the first program of its kind worldwide.
- It is the first program to offer future addiction healthcare professionals the skills needed to help their patients achieve health and recovery within the holistic spectrum healing mind, body and spirit, using natural and integrative methods.
- Courses are taught by internationally recognized leaders in Complementary and Integrative Therapies and distinguished psychotherapists in the field of Integrative Addiction Therapies.
- Courses are offered wholly online in a dynamic and interactive learning environment.

American Holistic Nurses Credentialing Corporation, Inc. (<http://www.ahncc.org/school-endorsement-program/current-endorsed-nursing->

programs/) has endorsed Drexel University's Complementary and Integrative Health Master's and Certificate Programs, which allows graduates of these programs to sit for the nationally accredited board certification in holistic nursing.

Admission Requirements:

- 2.75 GPA or above on all previous coursework
- A baccalaureate degree with a major in a health-related field from an accredited college or university
- Official transcripts from all universities or colleges attended
- Nurse, nurse practitioner, physician assistants, and other healthcare professionals who hold licensure or a certificate: copy of license, eligibility for licensure, or certificate
- Current resume
- One letter of recommendation
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- International students will need to meet university international student admissions guidelines, including TOEFL Program Requirements.

Program Requirements

Required courses

CIT 503	Holistic Living For The Caregiver	3.0
CIT 624	Foundations of Integrative Addiction Therapy	3.0
CIT 625	Spirituality, Empowerment, and Transformation	3.0
CIT 631	Introduction to Nutritional Neuroscience	3.0
Total Credits		12.0

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu
267.359.5692

Post-Master's Certificate in Music Therapy

Certificate Level: Graduate

Admissions Requirements: Master's degree

Certificate Type: Post-Master's Certificate

Number of Credits to Completion: 53.5

Instructional Delivery: Campus

Calendar Type: Quarter

Expected Time to Completion: 3 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.2305

Standard Occupational Classification (SOC) Code: 29-1129

About the Program

The Post-Master's Certificate (PMC) in Music Therapy is designed for students who hold a Master's degree in mental health counseling, and want to make the transition to Board Certified Music Therapist, or integrate Music Therapy approaches into their counseling practice. Students who successfully complete the certificate program are eligible for Board Certification through the Certification Board for Music Therapist, a nationally recognized and transferable credential. While an undergraduate degree in Music Therapy or a music-related field is not required to be eligible for the PMC in Music Therapy, applicants must pass a music audition. Upon review of applicant's transcript, additional coursework may be required to meet board certification requirements.

Students in the PMC program take classes alongside students in the Master of Arts in Music Therapy & Counseling program. Through a balance of classroom education and clinically supervised practicum and internship experiences, students develop a strong foundation for skilled clinical practice. The 53.5 quarter-credit curriculum includes music therapy coursework in areas such as clinical musicianship; clinical improvisation; theories and methods for children, adolescents, adults and older adults, and technological applications.

Music therapists use music within a therapeutic relationship to address physical, emotional, cognitive and social needs of individuals. Research shows that music therapy is an effective treatment for children, adolescents, adults, and older adults with mental health needs, developmental and learning disabilities, Alzheimer's disease and other aging-related conditions, substance abuse problems, acute and chronic pain, and brain injuries. Graduates of the MA in Music Therapy & Counseling program go on to work in a variety of clinical environments, including but not limited to: medical and behavioral health in-patient and out-patient settings; community health and wellness centers; schools and afterschool programs; trauma-informed settings; correctional facilities; elder care facilities, and private practices. Students also pioneer new frontiers in therapy application through clinical work and research.

Admissions

For additional information about the program, visit the College of Nursing and Health Professions' Post-Master's Certificate in Music Therapy website. Admission requirements for the certificate program are similar to those for the MA program in Music Therapy (p. 119). For additional information about admission to the program, visit the College of Nursing and Health Professions' Creative Arts Therapies (<https://www.drexel.edu/cnhp/academics/departments/Creative-Arts-Therapies/>) web site.

Program Requirements

Required Courses

ARTS 671	Advanced Music Therapy and Counseling Skills II: Group Processes	2.0
ARTS 672	Multicultural Perspectives in Music Therapy and Counseling	2.0
CATX 501	Foundations of the Creative Arts Therapies	3.0
CATX 570	Clinical Musicianship I	2.5
CATX 571	Clinical Musicianship II	2.5
CATX 572	Clinical Musicianship III	2.5
CATX 573	Clinical Musical Improvisation	4.0
CATX 575	Music Therapy Theories & Methods: Children and Adolescents	4.0
CATX 577	Music Therapy Theories & Methods: Adults and Older Adults	4.0
CATX 579	Technological Applications in Music Therapy	2.0
CATX 673	Advanced Topics in Music Therapy and Counseling I: Music, Imagery and the Therapeutic Relationship	3.0

CATX 674	Advanced Topics in Music Therapy and Counseling II: Integrative and Community Processes	3.0
CATX 678	Advanced Clinical Improvisation & Musical Analysis	4.0
Clinical Education		
CTCN 512	Clinical Practicum & Practicum Supervision I	2.0
CTCN 522	Clinical Practicum & Practicum Supervision II	2.0
CTCN 532	Clinical Practicum & Practicum Supervision III	2.0
CTCN 612	Clinical Internship & Internship Supervision I	2.0
CTCN 622	Clinical Internship & Internship Supervision II	2.0
CTCN 632	Clinical Internship & Internship Supervision III	2.0
Culminating Project		
Complete at least 3 credits		3.0
CATX 625	Culminating Project in Music Therapy I	
CATX 626	Culminating Project in Music Therapy II	
Total Credits		53.5

Post-Master's Certificate in Nurse Anesthesia

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's Certificate

Number of Credits to Completion: 71.0

Instructional Delivery: Campus

Calendar Type: Quarter

Expected Time to Completion: 3 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3804

Standard Occupational Classification (SOC) Code: 29-1151

About the Program

The Post Master's Certificate (PMC) in Nurse Anesthesia program is a full-time program that offers 6.0 theoretical nursing and research credits, 9.0 quarter credit basic science component, 31.0 quarter credits of a didactic anesthesia component and a 25.0 credits in a clinical component. Upon successful completion program outcomes student is awarded a post master's certificate in nurse anesthesia and is eligible to take the national certification examination offered by the National Board of Certification and Recertification of Nurse Anesthetists (NBCRNA).

The nurse anesthesia program is accredited by the:

Council on Accreditation of Nurse Anesthesia Educational Programs
222 S. Prospect Ave, Suite 304
Park Ridge, IL 60068
847-692-7050

Admission Requirements

This certificate program is offered to those individuals who have earned a master's degree in nursing and seek further preparation in nurse anesthesia. Transcripts are reviewed and course work is determined on an individual basis. Contact the College of Nursing for more specific admission requirements (<https://www.drexel.edu/cnhp/academics/post-masters/Certificate-PM-Nurse-Anesthesia/>).

Required courses

NURS 503	Basic Principles of Nurse Anesthesia	3.0
NURS 504	Overview of Nurse Anesthesia	3.0
NURS 505	Chemistry and Physics	2.0
NURS 507	Nurse Anesthesia Pharmacology I	3.0
NURS 508	Nurse Anesthesia Clinical Practicum I	1.0

NURS 510	Advanced Principles of Nurse Anesthesia I	3.0
NURS 511	Nurse Anesthesia Pharmacology II	3.0
NURS 512	Nurse Anesthesia Clinical Practicum II	1.0
NURS 515	Advanced Principles of Nurse Anesthesia II	3.0
NURS 516	Nurse Anesthesia Clinical Practicum III	2.0
NURS 517	Nurse Anesthesia Clinical Practicum IV	3.0
NURS 518	Advanced Principles of Nurse Anesthesia III	3.0
NURS 521	Advanced Pathophysiology I	3.0
NURS 522	Advanced Pathophysiology II	3.0
NURS 523	Advanced Pathophysiology III	3.0
NURS 527	Evidence Based Approaches to Practice	3.0
NURS 530	Anesthesia Seminar	1.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning *	4.0
NURS 659	Advanced Principles of Nurse Anesthesia IV	3.0
NURS 683	Nurse Anesthesia Clinical Practicum V	3.0
NURS 684	Nurse Anesthesia Clinical Practicum VI	3.0
NURS 687	Clinical Residency I	6.0
NURS 688	Clinical Correlative Seminars	3.0
NURS 689	Clinical Residency II	6.0
Total Credits		71.0

* 1.0 credit Independent Study course may be substituted based upon review of MSN transcript.

Clinical Nurse Leader Post-Master's Certificate

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's Certificate

Number of Credits to Completion: 30.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3801

Standard Occupational Classification (SOC) Code: 29-1141

About the Program

The Clinical Nurse Leader (CNL) oversees care coordination of a distinct group of patients, is a resource for clinical decision making, and serves as a lateral integrator of care. This clinical leader puts evidence-based practice into action to ensure that patients benefit from the latest innovations in care delivery. The CNL collects and evaluates patient outcomes, assesses cohort risk, and has the decision-making authority to change care plans when necessary. This clinician functions as part of an interdisciplinary team by communicating, planning, and implementing care directly with other health care professionals including physicians, pharmacists, social workers, therapists, clinical nurse specialists, and nurse practitioners. The CNL is a leader in the health care delivery system across all setting in which health care is delivered.

Students in this certificate program have the opportunity to learn about healthcare management, policy and quality improvement at the point of care with individuals seeking health care, while obtaining knowledge of healthcare systems, finance and economics. In addition, students will be given the opportunity to learn about advanced clinical assessment, pathophysiology, and advanced pharmacology, if not taken as part of their original MSN.

Students will also learn about designing and redesigning client care based on evidence-based knowledge and analysis of outcomes, as well as gain knowledge of healthcare reimbursement and issues in planning care across the lifespan, as well as the following:

- Application of tools for risk analysis
- Utilize epidemiological methodology to collect data and knowledge acquisition in planning quality improvement programs
- Manage and develop therapeutic partnerships
- Develop, monitor disease management programs to support improved outcomes

Admission Requirements

- Masters degree (MSN) from a program fully accredited by NLN and/or CCNE
- Official transcripts from all previous educational institutions required
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- Curriculum Vitae or resume
- GPA of 3.0 or above on all previous coursework
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study
 - References will not be accepted from colleagues or family members.

TOEFL Requirements

International applicants, as well as immigrants to the United States and US permanent residents whose native language is not English and who have not received a bachelor's degree or higher in the United States, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on U.S. military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If you take the TOEFLiBT exam, you must have a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher.
- If you take the TOEFL, you must have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

The 3 P's (Advanced Pharm, Advanced Pathophysiology and Advanced Clinical Physical Assessment) may be waived if taken within 5 years.

Program Requirements

NURS 531	Epidemiology in Action: Tracking Health & Disease	3.0
NURS 532	Evaluation of Health Outcomes	3.0
NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 602	Foundations for Clinical Nurse Leader	4.0
NURS 603	Clinical Nurse Leader Capstone Immersion I	5.0

NURS 604	Clinical Nurse Leader Capstone Immersion II	5.0
Total Credits		30.0

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel College of Nursing and Health Professions MSN in Clinical Nurse Leader (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Clinical-Nurse-Leader/>) web page and on the Drexel University Online MSN Clinical Nurse Leader (<http://online.drexel.edu/online-degrees/nursing-degrees/msn-clinical/>) web page.

Post-Baccalaureate Certificate in Nursing Innovation

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

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: 51.3801

Standard Occupational Classification (SOC) Code: 29.1141

About the Program

NOTE: This program is currently undergoing revision and therefore no applications will be accepted for the 2019-2020 academic year. Please check back in summer 2020 for an update.

This Nursing Innovation Certificate program is for individuals who want to understand the theories of innovation, examine some successful and failed innovations, as well as learn what it takes to be a successful intra/entrepreneur. This program is ideal for the student who seeks to re-invent and innovate in nursing practice in a variety of roles, as clinician, educator, administrator, clinical scientist, or in the business environment of healthcare. This certificate is available for individuals that hold a Bachelor's degree.

This program provides a five-course grouping of classes focusing on re-inventing and promoting innovative nursing practice in a variety of roles, as clinician, educator, administrator, clinical scientist or in the business environment of healthcare. Courses are chosen from the MSN in Nursing Innovation. It is designed to emphasize entrepreneurial and intrapreneurial approaches to advanced nursing practice.

Admission Requirements:

- 2.75 GPA or above on all previous coursework
- A baccalaureate degree with a major in a health-related field from an accredited college or university
- Official transcripts from all universities or colleges attended
- A copy of your United States RN license (License verification from your nursing license registry website is acceptable)

- Current Resume/CV
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study
 - References will not be accepted from colleagues or family members.
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Describe your proposed capstone project.
 - Would your capstone project be intrapreneurial or entrepreneurial?
 - Is your capstone a project, program, or product?
 - Who is your target audience?
- International students will need to meet university international student admissions guidelines, including TOEFL Program Requirements.

Program Requirements

Required Courses

NURS 564	The Business of Healthcare	3.0
NURS 586	Innovation in Advanced Nursing Practice: Theory and Application	3.0
NURS 587	Case Studies in Intra/Entrepreneurship and Innovation in Nursing	3.0
NURS 652	Innovation Capstone Project	6.0
PROJ 501	Introduction to Project Management	3.0
Total Credits		18.0

For Additional Information:

For more information about this program, contact:

Ms. Jillian Randall
Academic Advisor
jnr56@drexel.edu
267.359.5692

Post-Baccalaureate Certificate in Integrated Nursing Care of Autism Spectrum Disorder (ASD)

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post Baccalaureate

Number of Credits to Completion: 9.0 - 12.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3801

Standard Occupational Classification (SOC) Code: 29-1141

About the Program

NOTE: This program is currently undergoing revision and therefore no applications will be accepted for the 2019-2020 academic year. Please check back in summer 2020 for an update.

Autism spectrum disorder (ASD) is a condition that has significant health implications across the lifespan for affected people and for family members.

This certificate program focuses specifically on the *integrated care* of the complex health problems of people affected by autism spectrum disorder, as well as the collaborations among patients, families, and healthcare providers. The program prepares students to pursue a highly innovative role in an area of practice in which the value of nursing care needs to be developed. Graduates of the certificate program will reshape how care is provided to people with ASD in multiple settings across the lifespan.

This post-baccalaureate certificate is designed for nurses already working in fields such as pediatrics, family practice, mental health, and school nursing. Students in master's programs may pursue this certificate as a graduate minor to achieve a specialization in autism spectrum disorder nursing care. Students in the master's programs may also take courses to fulfill elective requirements.

Goals and Objectives

- To provide nurses with information on the nursing care across the lifespan of people with autism spectrum disorders.
- To examine the prevalence, etiology, and clinical characteristics of autism spectrum disorder in the context of the family and team approach to care.
- To integrate scientific and evidence based knowledge of autism spectrum disorder with the clinical skills of the registered nurse working with this population across the lifespan.
- To integrate scientific and evidence based knowledge of autism spectrum disorder with the clinical skills of the registered nurse who specialized in the adult population.
- To formulate a practice philosophy and long term professional agenda in ASD care to include practice, education, and research.

Curriculum

Required course work for the Certificate in Integrated Nursing Care of Autism Spectrum Disorder is dependent upon the desired focus of study.

Admission Requirements

- Bachelor's Degree from a fully accredited program.
- 2.75 GPA or above on all previous coursework.
- Official transcripts from all previous educational institutions required.
- A copy of your United States RN license (License verification from your nursing license registry website is acceptable).
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- Curriculum Vitae or Resume.
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study.
 - References will not be accepted from colleagues or family members.

TOEFL Requirement

International applicants, as well as immigrants to the United States and U.S. permanent residents whose native language is not English and who have not received a bachelor's degree or higher in the United States, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on U.S. military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If you take the TOEFLiBT exam, you must have a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher.
- If you take the TOEFL, you must have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Program Requirements

Select one Spectrum Disorder Focus

Across the Lifespan		12.0
NURS 540	ASD I: Introduction to Autism Spectrum Disorder	
NURS 541	ASD II: Health and Behavioral Care Planning and Intervention for Children and Adolescents	
NURS 542	ASD III: Health and Behavioral Care Planning and Intervention for Adults with ASD	
NURS 543	ASD IV: Nursing Leadership and Advocacy for ASD	
Pediatric Focus		9.0
NURS 540	ASD I: Introduction to Autism Spectrum Disorder	
NURS 541	ASD II: Health and Behavioral Care Planning and Intervention for Children and Adolescents	
NURS 543	ASD IV: Nursing Leadership and Advocacy for ASD	
Adult Focus		9.0
NURS 540	ASD I: Introduction to Autism Spectrum Disorder	
NURS 542	ASD III: Health and Behavioral Care Planning and Intervention for Adults with ASD	
NURS 543	ASD IV: Nursing Leadership and Advocacy for ASD	

Sample plan of study for Across the Lifespan Focus

First Year (Part-Time)

Term		Credits	
Term 1	NURS 540	ASD I: Introduction to Autism Spectrum Disorder	3.0
	Term Credits		3.0
Term 2	NURS 541	ASD II: Health and Behavioral Care Planning and Intervention for Children and Adolescents	3.0
	Term Credits		3.0
Term 3	NURS 542	ASD III: Health and Behavioral Care Planning and Intervention for Adults with ASD	3.0
	Term Credits		3.0
Term 4	NURS 543	ASD IV: Nursing Leadership and Advocacy for ASD	3.0
	Term Credits		3.0

Total Credit: 12.0

Additional Information

For more information about this program, contact:

Jillian Randall

Senior Academic Advisor

jnr56@drexel.edu

267.359.5692

Post-Baccalaureate Certificate in Nursing Education

Certificate Level: Graduate

Admission Requirements: Bachelor's Degree

Certificate Type: Post Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3817

Standard Occupational Classification (SOC) Code: 25-1072

About the Program

This certificate program provides a four-course grouping of classes that focus on knowledge and skills required for nurse educator roles. Courses are chosen from the MSN in Nursing Education curriculum. Upon completion of this certificate program, the student will have 12.0 graduate credits from an NLN/CCNE-approved master's in nursing program.

Admission Requirements

- Bachelor's Degree from a fully accredited program.
- 2.75 GPA or above on all previous coursework.
- Official transcripts from all previous educational institutions required.
- A copy of your United States RN license (License verification from your nursing license registry website is acceptable)
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- Curriculum Vitae or Resume.
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study
 - References will not be accepted from colleagues or family members.

TOEFL Requirement

International applicants, as well as immigrants to the United States and U.S. permanent residents whose native language is not English and who have not received a bachelor's degree or higher in the United States, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on U.S. military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If you take the TOEFLiBT exam, you must have a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher.
- If you take the TOEFL, you must have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Program Requirements

NURS 591	Foundations of Nursing Education	3.0
NURS 606	Curriculum Design for Higher Level Cognition	3.0
NURS 613	The Role and Responsibility of the Nursing Professor	3.0
or NURS 616	Teaching Methods in Nursing Education	
NURS 615	Assessment, Measurement and Evaluation	3.0
Total Credits		12.0

Sample Plan of Study

Term 1		Credits
NURS 591	Foundations of Nursing Education	3.0
Term Credits		3.0
Term 2		Credits
NURS 606	Curriculum Design for Higher Level Cognition	3.0
Term Credits		3.0
Term 3		Credits
NURS 613	The Role and Responsibility of the Nursing Professor	3.0
or 616	Teaching Methods in Nursing Education	
Term Credits		3.0
Term 4		Credits
NURS 615	Assessment, Measurement and Evaluation	3.0
Term Credits		3.0
Total Credit: 12.0		

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel College of Nursing and Health Professions Nursing Education Certificate (<http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Nursing-Education-Faculty-Role/>) web page and on the Drexel University Online N (<http://online.drexel.edu/online-degrees/nursing-degrees/cert-pm-cnf/>) Nursing Education Certificate (<http://online.drexel.edu/online-degrees/nursing-degrees/cert-ed/>) web page.

Leadership in Health Systems Management

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3817

Standard Occupational Classification (SOC) Code: 25-1072

About the Program

This certificate program focuses on development of a leadership style and skills set essential for individuals in or seeking administrative roles. The program provides a four-course grouping of classes from the MSN in Nursing Leadership in Health Systems Management curriculum. Selected classes provide essential skills for supervisory and management positions that help professionals perform in their expanded roles and grow as emerging leaders.

Emphasis will be placed on fiscal and organizational management, strategic planning, integrated quality outcomes measurement, organizational structures, marketing, and management of human resources within organizations. The program provides the student with information and strategies to problem solve, make decisions, resolve conflict and operationalize the mission and goals of the healthcare delivery organization.

Admission Requirements

- Bachelor's Degree from a fully accredited program.
- Current, unrestricted United States RN license.
- 2.75 GPA or above on all previous coursework.
- Official transcripts from all previous educational institutions required.
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- Curriculum Vitae or Resume.
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study.
 - References will not be accepted from colleagues or family members.

TOEFL Requirement

International applicants, as well as immigrants to the United States and US permanent residents whose native language is not English and who have not received a bachelor's degree or higher in the United States, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If you take the TOEFLiBT exam, you must have a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher.
- If you take the TOEFL, you must have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Program Requirements

Required Courses		
NURS 557	Leadership and Stewardship in the Health Professions	3.0
NURS 558	Economics of Healthcare Management & Policy	3.0

NURS 559	Operations Management in Contemporary Healthcare Organizations	3.0
Select one of the following:		3.0
NURS 562	Workforce Management in Healthcare Organizations	
NURS 564	The Business of Healthcare	
NURS 567	Strategic Management: Power, Politics and Influence in Healthcare Systems	
Total Credits		12.0

Sample Plan of Study

Term 1		Credits
NURS 557	Leadership and Stewardship in the Health Professions	3.0
Term Credits		3.0
Term 2		
NURS 558	Economics of Healthcare Management & Policy	3.0
Term Credits		3.0
Term 3		
NURS 559	Operations Management in Contemporary Healthcare Organizations	3.0
Term Credits		3.0
Term 4		
One of the following courses:		3.0
NURS 561	Spirituality, Health and Healing	
NURS 562	Workforce Management in Healthcare Organizations	
NURS 567	Strategic Management: Power, Politics and Influence in Healthcare Systems	
Term Credits		3.0
Total Credit: 12.0		

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu
267.359.5692

Additional information is also available on the Drexel College of Nursing and Health Professions Nursing Leadership in Health Systems Management Certificate (<http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Nursing-Leadership-in-Health-Systems-Management/>) (<https://www.drexel.edu/cnhp/academics/graduate/MSN-Nursing-Leadership-in-Health-Systems-Management/>) web page and the Drexel University Online Nursing Leadership in Health Systems Management Certificate (<http://online.drexel.edu/online-degrees/nursing-degrees/cert-lead/>) web page.

Adult-Gerontology Acute Care Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Post-Master's
Number of Credits to Completion: 39.0; 800 clinical hours
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 51.3822

Standard Occupational Classification (SOC) Code: 29-1171

About the Program

The online Adult-Gerontology Acute Care Nurse Practitioner (AGACNP) program is designed to prepare practitioners for professional practice in the acute management of medical, surgical, and critical care adult-older adult patient populations. This certificate is offered to those individuals who have earned a master's degree in nursing and seek further preparation as an Adult Gerontology Acute Care Nurse Practitioner. Graduates will be eligible to sit for the AACN and/or ANCC's Adult Gerontology Acute Care Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-4 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

Program Requirements

Required Courses		
Support Courses		
NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
Concentration Courses		
NURS 554	Pharmacology for Adult-Gerontology Acute Care Nurse Practitioners	3.0
NURS 570	Adult Gerontology Acute Care NP I: Introduction to Adult Gerontology Acute Care Medicine	5.0
NURS 571	Adult Gerontology Acute Care Nurse Practitioner II: Mgmt/Care of Patients in Acute/Crit Care Med Set	5.0
NURS 572	Adult Gerontology Acute Care Nurse Practitioner III: Mgmt/Care of Patients in Acute Surgical Setting	5.0
NURS 573	Adult Gerontology Acute Care NP IV: Management of Care of Patients in Critical Care Settings	5.0
NURS 580	Adult Gero Acute Care NP V: Mgmt/Care of Clients in Acute, Critical Care, Med or Surg Settings	5.0
Total Credits		39.0

Additional Information

For more details, go to the Post-Masters Certificate page (<http://drexel.edu/cnhp/academics/post-masters/>) on the College of Nursing and Health Profession's website.

Adult-Gerontology Primary Care Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Post-Master's
Number of Credits to Completion: 34.0; 640 clinical hours
Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3822

Standard Occupational Classification (SOC) Code: 29-1171

About the Program

The Post-Master's Certificate in Adult-Gerontology Primary Care (AGPC) Nurse Practitioner program is intended for MSN prepared professionals who would like to gain further knowledge in the primary care continuum. It is designed to prepare practitioners who will take advanced nursing roles as clinicians, educators, researchers, and leaders in the rapidly changing, evidence-driven healthcare environment. Emphasis is placed on evidence-based practice, interdisciplinary collaboration, and critical use of evolving technology. Graduates will be prepared to provide care for adults throughout their lifespan to promote maximal health, reduce risks and manage acute and chronic health conditions.

All graduates will be eligible to sit for the certification exam as an Adult-Gerontology Primary Care Nurse Practitioner through the American Academy of Nurse Practitioners (AANP) and/or American Nurses Credentialing Center (ANCC).

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-4 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

Program Requirements

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0

Concentration Courses

NURS 641	Advanced Pharmacology for Adult-Gerontology Primary Care Nurse Practitioners	3.0
NURS 660	Adult-Gero Primary Care I: Introduction to Adult-Gero Primary Care and Care of the Young-Adult	5.0
NURS 661	Adult-Gerontology Primary Care II: Management and Care of Adult Patients in Primary Care	5.0
NURS 662	Adult-Gerontology Primary Care III: Management of the Older-Adult Patient in Primary Care	5.0
NURS 663	Adult-Gerontology Primary Care IV: Gerontology Management and Care	5.0

Total Credits 34.0

Additional Information

For more details, go to the Post-Masters Certificate page (<http://drexel.edu/cnhp/academics/post-masters/>) on the College of Nursing and Health Profession's website.

Family/Individual Across the Lifespan Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's

Number of Credits to Completion: 38.0 quarter credits; 720 clinical hours

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3805

Standard Occupational Classification (SOC) Code: 29-1171

About the Program

The Family/Individual Across the Lifespan Nurse Practitioner (FNP) online program focuses on the application of advanced-practice nursing knowledge -- including physical, psychosocial, and environmental assessment skills -- to manage common health and illness problems of clients of all ages and their families. This certificate is offered to those individuals who have earned a master's degree in nursing and seek further preparation to become a Family/Individual Across the Lifespan Nurse Practitioner (FNP). Graduates will be eligible to sit for the AANP's Family/Individual Across the Lifespan Nurse Practitioner Certification Examination and/or the ANCC's Family/Individual Across the Lifespan Nurse Practitioner Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On-Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-4 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

Program Requirements

Required Courses

Support Courses

NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0

Concentration Courses

NURS 534	FNP I: Primary Care of the Emerging Family	5.0
NURS 535	FNP II: Primary and Episodic Care of Infants, Children and Adolescents	5.0
NURS 536	FNP III: Primary Care of Adults and Older Adults Across the Adult Age Spectrum I	5.0
NURS 537	FNP IV: Primary Care of Adults and Older Adults Across the Adult Age Spectrum II	5.0
NURS 538	FNP V: Integrative Practicum in Family Practice Across the Lifespan	4.0
NURS 556	Pharmacology for Family Nurse Practitioners	3.0

Total Credits 38.0

Additional Information

For more details, go to the Post-Masters Certificate page (<http://drexel.edu/cnhp/academics/post-masters/>) on the College of Nursing and Health Profession's website.

Pediatric Acute Care Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's

Number of Credits to Completion: 39.0; 800 clinical hours

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3809

Standard Occupational Classification (SOC) Code: 29-1171

About the Program

The Pediatric Acute Care Nurse Practitioner Certificate is an elite post-graduate program that prepares students to deliver advanced care to infants, children and adolescents with acute, critical, and complex health conditions. Students will build upon primary care experience through courses that emphasize evidence-based practice, interdisciplinary collaboration, and the critical use of new technology. The program's curriculum was developed and is taught by Drexel University's renowned faculty from the nationally ranked College of Nursing and Health Professions. Upon completing the program, graduates pursue practice roles across the continuum of acute care services ranging from high-acuity hospital based emergency or intensive care settings to specialty based practices. Graduates are eligible to sit for the PNCB's Pediatric Acute Care Nurse Practitioner Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. Students are required to attend On-Campus visits during the clinical course work within the curriculum. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

Program Requirements

Required Courses

Support Courses		
NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 646	Pharmacology for the Pediatric Nurse Practitioner	3.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
Concentration Courses		
NURS 642	PNP I: Primary Care of Infants, Children and Adolescents	5.0

NURS 643	PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care	5.0
NURS 649	Ped Nurse Pract AC I:Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
NURS 650	Ped Nurse Pract AC II:Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
NURS 651	PNP Management of the Medically Fragile and Technology Dependent Child in the Community	5.0
Total Credits		39.0

Additional Information

For more details, go to the Post-Masters Certificate page (<http://drexel.edu/cnhp/academics/post-masters/>) on the College of Nursing and Health Profession's website.

Pediatric Primary Care Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's

Number of Credits to Completion: 34.0; 640 clinical hours

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3809

Standard Occupational Classification (SOC) Code: 29-1171

About the Program

The online Pediatric Primary Care Nurse Practitioner (PNP) program is directed toward preparing nurse practitioners who will take advanced nursing roles as clinicians, educators, researchers, and leaders in the rapidly changing, evidence-driven health care environment. This certificate is offered to those individuals who have earned a master's degree in nursing and seek further preparation to become a Pediatric Primary Care Nurse Practitioner. Graduates will be eligible to sit for the ANCC's Pediatric Primary Care Nurse Practitioner Certification Examination and/or for the PNCB's Pediatric Primary Care Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulations and evaluation. OCI visits occur as a part of the clinical portion of the program. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

Program Requirements

Required Courses

Support Courses		
NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0

NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
Concentration Courses		
NURS 646	Pharmacology for the Pediatric Nurse Practitioner	3.0
NURS 642	PNP I: Primary Care of Infants, Children and Adolescents	5.0
NURS 643	PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care	5.0
NURS 647	PNP III: Management and Care of Adolescents in the Primary Care Setting	5.0
NURS 648	PNP IV: Primary Care of Children with Special Health Care Needs	5.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
Total Credits		34.0

Additional Information

For more details, go to the Post-Masters Certificate page (<http://drexel.edu/cnhp/academics/post-masters/>) on the College of Nursing and Health Profession's website.

Pediatric Primary Care and Pediatric Acute Care Dual Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's

Number of Credits to Completion: 44.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3809

Standard Occupational Classification (SOC) Code: 29-1171

About the Program

The Pediatric Primary Care and Pediatric Acute Care Nurse Practitioner Program at Drexel University will prepare the Pediatric Nurse Practitioner to perform acts of medical diagnosis and treatment through didactic lectures, problem-based learning, clinical practice hours, standardized patient experiences and high-fidelity simulation.

This innovative dual option track coincides with the new models of healthcare delivery and the increasing demand for PNPs to provide care for children and their families across the entire continuum of health and illness, including acute critical conditions. The clinical practice settings for the dual certification track options provides students with a mixed inpatient/outpatient experience ranging from specialty clinics and primary care settings. Diverse clinical settings provide supervised clinical hours to allow the student advance practitioner to perform advanced physical assessment, critical thinking, diagnostic reasoning and management of care in collaboration with licensed physician and APN's in accredited institutions. Students graduating from this track will be eligible to sit for both the Pediatric Primary Care and the Pediatric Acute Care Board Certifications through the PNCB.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. Students are required to attend On-Campus visits during

the clinical course work within the curriculum. *Mandatory on-campus visits each quarter are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

Program Requirements

Support Courses		
NURS 548	Advanced Pathophysiology	3.0
NURS 549	Advanced Pharmacology	3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning	4.0
NURS 664	Professional Issues for Nurse Practitioners	1.0
Concentration Courses		
NURS 642	PNP I: Primary Care of Infants, Children and Adolescents	5.0
NURS 643	PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care	5.0
NURS 646	Pharmacology for the Pediatric Nurse Practitioner	3.0
NURS 647	PNP III: Management and Care of Adolescents in the Primary Care Setting	5.0
NURS 649	Ped Nurse Pract AC I: Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
NURS 650	Ped Nurse Pract AC II: Acute-Chronic Care of Infants, Children and Adolescents Management	5.0
NURS 651	PNP Management of the Medically Fragile and Technology Dependent Child in the Community	5.0
Total Credits		44.0

Additional Information

For more details, go to the Post-Masters Certificate page (<http://drexel.edu/cnhp/academics/post-masters/>) on the College of Nursing and Health Profession's website.

Psychiatric Mental Health Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's

Number of Credits to Completion: 34.0; 640 clinical hours

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional (CIP) Code: 51.3810

Standard Occupational Classification (SOC) Code: 29-1123

About the Program

The online Psychiatric Mental Health Nurse Practitioner (PMHNP) program prepares practitioners to provide a wide range of services to patients across the lifespan and their families. This certificate is offered to those individuals who have earned a master's degree in nursing and seek further preparation as a Psychiatric Mental Health Nurse Practitioner. Once the certificate program is successfully completed, students will be eligible to sit for the ANCC's Psychiatric and Mental Health Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On-Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-3 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits each quarter are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

Program Requirements

Required Courses

Support Courses			
NURS 548	Advanced Pathophysiology		3.0
NURS 549	Advanced Pharmacology		3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning		4.0
NURS 664	Professional Issues for Nurse Practitioners		1.0
Concentration Courses			
NURS 555	Psychopharmacology Across the Lifespan		3.0
NURS 592	PMHNP I: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology I		5.0
NURS 593	PMHNP II: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology II		5.0
NURS 594	PMHNP III: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology III		5.0
NURS 595	PMHNP IV: Adv Mental Hlth NP Management and Care of Clients in Diverse Pop Across the Lifespan		5.0
Total Credits			34.0

Additional Information

For more details, go to the Post-Masters Certificate page (<http://drexel.edu/cnhp/academics/post-masters/>) on the College of Nursing and Health Profession's website.

Women's Health/Gender-Related Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate

Admission Requirements: Master's degree

Certificate Type: Post-Master's

Number of Credits to Completion: 37.0; 640 clinical hours

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.3822

Standard Occupational Classification (SOC) Code: 29-1171

About the Program

The online Women's Health/Gender Related Nurse Practitioner program supplies nurses with the skills necessary to provide advanced care to women and their partners throughout the lifespan with a specialized emphasis on reproductive and gynecologic health needs. Graduates are also qualified to provide a myriad of gender related services focusing on health promotion and disease prevention that range from well-woman care, prenatal and postpartum care, and common and complex women's

health issues in both primary settings and women's health specialty practices. Additionally, this track offers the opportunity for students to work in transdisciplinary simulated scenarios to promote a better understanding and respect of discipline-specific roles, improve existing communication and collaboration within disciplines, and initiate teamwork development in order to promote patient safety and high-quality patient care.

This certificate is offered to those individuals who have earned a master's degree in nursing and seek further preparation to become a Women's Health/Gender Related Nurse Practitioner (WH/GRNP). Graduates are eligible to sit for the NCC's Women's Health/Gender Related Nurse Practitioner Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. OCI visits occur 2-4 times during the clinical portion of the program and range from 2-3 days. *Mandatory on-campus visits are essential to students transitioning into the NP role.*

During the On-Campus Intensives, students engage in simulated clinical learning experiences conducted in the College of Nursing and Health Professions' state-of-the-art, multidisciplinary patient simulation lab. These visits provide direct guidance and mentoring from faculty, as well as the opportunity to collaborate with peers.

Program Requirements

Required Courses

Support Courses			
NURS 548	Advanced Pathophysiology		3.0
NURS 549	Advanced Pharmacology		3.0
NURS 550	Advanced Health Assessment & Diagnostic Reasoning		4.0
NURS 664	Professional Issues for Nurse Practitioners		1.0
Concentration Courses			
NURS 680	Primary Care for Women's Health		3.0
NURS 682	Pharmacology for the Women's Health Nurse Practitioner		3.0
NURS 690	WHNP I: Mngmnt & Care of the Common Gyn and Gender Related Issues throughout the Lifespan		5.0
NURS 691	WHNP II: Mngmnt & Care of the Complex Gyn and Gender Related Issues of Women throughout the Lifespan		5.0
NURS 692	WHNP III: Management & Care of the Low Risk Obstetrical and Post Partum Needs of Women and Families		5.0
NURS 693	WHNP IV: Mngmnt & Care of the High Risk Obstetrical and Post Partum Needs of Women and Families		5.0
Total Credits			37.0

Additional Information

For more details, go to the Post-Masters Certificate page (<http://drexel.edu/cnhp/academics/post-masters/>) on the College of Nursing and Health Profession's website.

Service to Veterans

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.3818
 Standard Occupational Classification (SOC) Code: 29-1141

NOTE: This program is currently undergoing revision and therefore no applications will be accepted for the 2019-2020 academic year. Please check back in summer 2020 for an update.

About the Program

This online certificate marks achievement of advanced understanding, comprehension and application of the issues surrounding the veteran or veteran family member who has returned from military service and is entering or has entered civilian life. This combination of six courses provides the learner with the necessary knowledge to identify specific health and learning needs of veterans, and to provide advocacy resources to help meet those needs. These courses will all be delivered through online instruction. By completing this certificate, the learner will be able to identify, refer and advocate for the veteran and veteran family members with necessary specialized skills and knowledge, to address many health and educational needs of this unique group.

Admission Requirements

- Bachelor's Degree from a fully accredited program.
- 2.75 GPA or above on all previous coursework.
- Official transcripts from all previous educational institutions required.
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- Curriculum Vitae or Resume.
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study
 - References will not be accepted from colleagues or family members.

International Students: International applicants, as well as immigrants to the United States and U.S. permanent residents whose native language is not English and who have not received a bachelor's degree or higher in the United States, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on U.S. military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If you take the TOEFLiBT exam, you must have a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher.
- If you take the TOEFL, you must have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Program Requirements

Required Courses

IPS 548	Foundations in Transdisciplinary Professional Collaboration	3.0
IPS 549	The Military and Veteran Culture	3.0
IPS 551	Veteran Advocacy	3.0
IPS 553	Neuroscience of Learning	3.0

Select one concentration from the list below **6.0**

Health Professions

IPS 552	Veteran Healthcare Policy
IPS 550	The Unique Health Care Needs of our Military and Veterans

Substance Use Disorders (select 2)

BACS 534	Approaches to Substance Use Disorders
BACS 535	Motivational Enhancement Skills
BACS 540	Treatment Planning and Relapse Prevention

Education

EDAE 601	Foundations of Adult Education
EHRD 660	Principles of Adult Learning

Legal Studies

LSTU 502S	Ethics and Professional Standards
LSTU 505S	Health Care Quality, Patient Safety and Risk Management

Business (select 2)

ORGB 625	Leadership and Professional Development
ORGB 631	Leading Effective Organizations
ORGB 640	Negotiations for Leaders

Public Health (6 credits) *

Total Credits **18.0**

* Select 6.0 credits of PBHL 500 level or higher. Prior departmental approval is required.

Additional Information

For more information about this program, contact:

Jillian Randall
 Senior Academic Advisor
 jnr56@drexel.edu (jnr56@drexel.edu)
 267.359.5692

Sexual Health and Wellness

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 12.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.0001
Standard Occupational Classification (SOC) Code: 21.1091

NOTE: No applications will be accepted for the 2019-2020 academic year. Please check back in summer 2020 for an update.

About the Program

This program will prepare health professionals with the knowledge, skills, and attitudes required to provide comprehensive and sensitive sexual health care to their patients and their partners. Students who complete the certificate program will be able to discuss a wide range of patient sexual health issues, promote sexual wellness, and provide patient education on various sexual health topics.

This post-baccalaureate certificate should allow graduate students from various health-related programs of study to obtain a deeper knowledge base and improved skill set related to human sexuality. Not only can many sexual problems and dysfunctions be clinically managed to improve patient quality of life, but patient education, health promotion,

and risk reduction counseling can reduce negative and unintended consequences of sex while enhancing overall patient health and sexual wellness. Issues such as unwanted pregnancy, HIV and other sexually transmitted diseases, sexual assault and abuse, and lack of access to family planning, along with increased incidences of breast, gynecological and prostate cancers challenge health professionals across disciplines to increase their knowledge and skills to appropriately address the sexual health needs of their patients. In addition, greater social acceptance and legal protection for lesbian, gay, bisexual, and transgender (LGBT) individuals has increased the need for health professionals to combat health disparities and discrimination within these populations and better serve these clients.

The intended audience of this post baccalaureate certificate program is health professionals – both clinical and non-clinical who seek to specialize in sexual health and medicine. This program is designed to enhance the graduate education of physicians; nurse practitioners; physician assistants; nurses in inpatient, outpatient, or school settings; social workers; health educators; behavioral health counselors; and other health professionals. It is important to note that this program prepares the healthcare professional as a sexual health educator not as a sex therapist.

Admissions Requirements

- Bachelor's Degree from a fully accredited program.
- 2.75 GPA or above on all previous coursework or last 60 credits completed.
- Official transcripts from all previous educational institutions required.
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- Curriculum Vitae or Resume.
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study
 - References will not be accepted from colleagues or family members.

International Students: International applicants, as well as immigrants to the United States and U.S. permanent residents whose native language is not English and who have not received a bachelor's degree or higher in the United States, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on U.S. military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If you take the TOEFLiBT exam, you must have a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher.
- If you take the TOEFL, you must have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Program Requirements

IPS 534	Introduction to Patient Sexuality	3.0
IPS 535	Sexual Function and Dysfunction	3.0
IPS 536	Sexuality Counseling & Interviewing	3.0
IPS 537	Medical Management of Sexual Health and Wellness Across the Continuum	3.0
or IPS 538	Foundations of Sexuality Education and Health Promotion	
Total Credits		12.0

Sample Plan of Study

First Year (Part-Time)

Term 1		Credits
IPS 534	Introduction to Patient Sexuality	3.0
Term Credits		3.0
Term 2		
IPS 535	Sexual Function and Dysfunction	3.0
Term Credits		3.0
Term 3		
IPS 536	Sexuality Counseling & Interviewing	3.0
Term Credits		3.0
Term 4		
IPS 537	Medical Management of Sexual Health and Wellness Across the Continuum	3.0
or 538	Foundations of Sexuality Education and Health Promotion	
Term Credits		3.0
Total Credit: 12.0		

Additional Information

For more information about this program, contact:

Jillian Randall
Senior Academic Advisor
jnr56@drexel.edu
267.359.5692

Certificate in Substance Use Disorder Treatment

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.1501

Standard Occupational Classification (SOC) Code: 21-1011

About the Program

This certificate is designed for individuals with bachelor's degrees in psychology, social work, nursing, or other allied health professions who want to advance their knowledge of substance use disorders treatment and supervision practices. It is offered through the Counseling and Family Therapy Department's Behavioral Health Counseling Program within the College of Nursing and Health Professions of Drexel University, and is designed for individuals working in health care settings serving people with substance use disorders. The certificate requires the completion of six online courses for a total of 18.0 quarter credits. Completion of this

certificate does not in and of itself certify clinical expertise. The required coursework can also be applied toward a specialty focus area for students in the Innovations and Intra/Entrepreneurship Advanced Practice Nursing Track.

Each course focuses on a core competency needed to facilitate recovery from substance abuse. Students will acquire knowledge concerning the etiology of substance use behavior; the bio-psycho-social nature of addiction; substance use patterns across the lifespan and; recovery and relapse prevention. Students will also develop skills related to motivational enhancement, cognitive / behavioral change and workforce supervision.

Program goals

The goal of this certificate program is for students to:

- Gain an understanding of the bio-psycho-social dynamics of substance use;
- Develop evidence-based treatment competencies;
- Gain educational training hours to either obtain or maintain a credential as a drug/alcohol counseling professional.

In and of itself, this certificate does not take the place of supervised, clinical training, but rather serves as one of several possible components required to obtain a professional certification or clinical license to practice.

Program Requirements

Required Courses

BACS 534	Approaches to Substance Use Disorders	3.0
BACS 535	Motivational Enhancement Skills	3.0
BACS 540	Treatment Planning and Relapse Prevention	3.0
BACS 568	Substance Use Counseling with Special Populations	3.0
BACS 560	Preventing Substance Use Disorders	3.0
BACS 570	Clinical Supervision Skills	3.0
Total Credits		18.0

Sample Plan of Study

Term 1		Credits
BACS 534	Approaches to Substance Use Disorders	3.0
BACS 535	Motivational Enhancement Skills	3.0
Term Credits		6.0
Term 2		Credits
BACS 540	Treatment Planning and Relapse Prevention	3.0
BACS 568	Substance Use Counseling with Special Populations	3.0
Term Credits		6.0
Term 3		Credits
BACS 560	Preventing Substance Use Disorders	3.0
BACS 570	Clinical Supervision Skills	3.0
Term Credits		6.0
Total Credit:		18.0

Certificate of Advanced Study in Women's Integrative Health

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.3300

Standard Occupational Classification (SOC) Code: 29-1199

NOTE: This program is currently undergoing revision and therefore no applications will be accepted for the 2019-2020 academic year. Please check back in summer 2020 for an update.

About the Program

The Certificate of Advanced Study in Women's Integrative Health provides healthcare professionals with a mind-body-spirit approach to care. Studies have shown that women desire a broader, integrative approach to their healthcare and share a philosophical congruence with Complementary and Integrative Health (CIH) core values. In this program, students learn to integrate evidence-based complementary and integrative health therapies such as phytomedicine, nutrition, mind/body, and energy therapy modalities within the framework of conventional healthcare practice.

Integrative healthcare reaffirms the importance of the relationship between practitioner and patient, focuses on the whole person, and utilizes all appropriate therapeutic approaches, both conventional biomedicine and CIH practices to achieve optimal health and healing. Women's Integrative Health provides a model of care that is most compatible and reflective of women's emotional and psychological needs in the health care relationship and prepares students to incorporate an innovative, caring and holistic spectrum of treatment. Students learn to explore the fullness of women's lives, taking into account a woman's beliefs, intuitions, and preferences for care which allows them to form a healing partnership, while providing their patients with the finest possible healthcare.

Features & Benefits:

- Courses are taught by leading women's integrative health practitioners and internationally-recognized experts in complementary and integrative therapies
- Offered by Drexel's top-ranked College of Nursing and Health Professions
- Pioneering program in women's integrative health is the first university program to offer practitioners evidenced-based integrative treatment
- Coursework is designed for nurse practitioners, nurses, physician assistants, nutrition scientists and other health care professionals

American Holistic Nurses Credentialing Corporation, Inc. (<http://www.ahncc.org/school-endorsement-program/current-endorsed-nursing-programs/>) has endorsed Drexel University's Complementary and Integrative Health Master's and Certificate Programs, which allows graduates of these programs to sit for the nationally accredited board certification in holistic nursing.

Admission Requirements:

- 2.75 GPA or above on all previous coursework
- A baccalaureate degree with a major in a health-related field from an accredited college or university
- Official transcripts from all universities or colleges attended
- Nurse, nurse practitioner, physician assistants, and other healthcare professionals who hold licensure or a certificate: copy of license, eligibility for licensure, or certificate

- Current Resume/CV
- One professional letter of recommendation from either previous or immediate supervisors or former faculty members who can attest to your clinical knowledge, skill, and potential aptitude for graduate study
 - References will not be accepted from colleagues or family members.
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
 - Why you are choosing this particular program of study
 - Your plans upon completion of the certificate
 - How your current work experience will enhance your experience in this program
- International students will need to meet university international student admissions guidelines, including TOEFL Program Requirements.

TOEFL Requirement:

International applicants, as well as immigrants to the United States and U.S. permanent residents whose native language is not English and who have not received a bachelor's degree or higher in the United States, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on U.S. military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If you take the TOEFLiBT exam, you must have a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher.
- If you take the TOEFL, you must have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Program Requirements

CIT 503	Holistic Living For The Caregiver	3.0
CIT 534	Witches, Wise Women and Women Healers	3.0
CIT 602	Women's Integrative Health	3.0
CIT 658	Advanced Women's Integrative Health	3.0
Total Credits		12.0

Additional Information

For more information about this program, contact:

Jillian Randall
 Senior Academic Advisor
 jnr56@drexel.edu
 267.359.5692

Additional information is also available on the Drexel College of Nursing and Health Professions Women's Integrative Health (<http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Advanced-Study-Womens-Integrative-Health/>) web page and the Drexel University Online Women's Integrative Health (<http://online.drexel.edu/online-degrees/nursing-degrees/cert-aswih/>) web page.

LeBow College of Business

About the College

LeBow College of Business (<http://www.lebow.drexel.edu/>) is among just 25 percent of business schools nationwide accredited by the Association to Advance Collegiate Schools of Business (AACSB). Drexel LeBow offers a range of master's level degrees including the master of science (MS), master of business administration (MBA) and executive master of business administration (EMBA). LeBow also offers two doctoral degrees: a PhD in business and an executive doctorate in business administration (DBA). Additionally the School of Economics (<http://catalog.drexel.edu/graduate/schoolofeconomics/>) offers master of science and doctoral degrees.

The MBA degree offers a variety of delivery formats – face-to-face or online, part-time or full-time and at a satellite campus in Malvern, Penn. Additionally, the Drexel LeBow MBA offers customization and specialization in areas such as finance, marketing, entrepreneurship/innovation and business analytics.

Prospective students interested in Drexel LeBow graduate programs are not required to have undergraduate degrees in business.

Majors

- Accounting (MSA) (p. 172)
- Business Administration (MBA) (p. 174)
 - Executive Program (p. 178)
 - Concentrations (p.)
 - MBA/Public Health MPH (<http://catalog.drexel.edu/graduate/schoolofpublichealth/mphmba/>)
- Business Administration (DBA) (p. 179)
- Business Administration (PhD) (p. 183)
- Business Analytics (MSBSAN) (p. 186)
- Marketing (MSM) (p. 187)
- Quantitative Finance (MSQF) (<http://catalog.drexel.edu/graduate/collegeofbusiness/quantitativefinance/>)
- Sport Management (MS) (<http://catalog.drexel.edu/graduate/collegeofbusiness/sportmanagement/>)
- Supply Chain Management and Logistics (MSSCML) (p. 189)

Minors

- **NEW:** Accounting
- Athletic Administration (<http://catalog.drexel.edu/graduate/collegeofbusiness/athleticadministrationgminor/>)
- Business (<http://catalog.drexel.edu/graduate/collegeofbusiness/businessgminor/>)
- Business Analytics (<http://catalog.drexel.edu/graduate/collegeofbusiness/businessanalyticsgminor/>)
- Business Analytics Management (<http://catalog.drexel.edu/graduate/collegeofbusiness/businessanalyticsmanagementgminor/>)
- Finance (<http://catalog.drexel.edu/graduate/collegeofbusiness/financegminor/>)
- Marketing (<http://catalog.drexel.edu/graduate/collegeofbusiness/marketinggminor/>)

- Operations Research (<http://catalog.drexel.edu/graduate/collegeofbusiness/operationsresearchgminor/>)
- Sport Management (<http://catalog.drexel.edu/graduate/collegeofbusiness/sportmanagementgminor/>)
- Sustainable Operations Management (<http://catalog.drexel.edu/graduate/collegeofbusiness/sustainableoperationsmanagementgminor/>)
- **NEW:** Taxation

Certificates

- Advanced Business (p. 191)
- Business Analytics (<http://catalog.drexel.edu/graduate/collegeofbusiness/businessanalyticspbc/>)

About the Curriculum

Graduate business programs at Drexel University's LeBow College of Business provide a high-quality education that blends theory and practice. Students receive individualized attention to help them achieve short-term and long-term career goals.

The Drexel LeBow MBA enrolls approximately 800 students representing diverse backgrounds, 20 percent of whom are enrolled full-time.

Approximately 50 percent of the full-time students are international.

Drexel LeBow MBA students have come from more than 40 countries in Asia, Europe, South America and Canada.

Following in the mission of the University's founder, A.J. Drexel, to provide practical applications of learning, the Drexel LeBow faculty have backgrounds in corporate management and scholarly research. Drexel LeBow faculty combine strengths in teaching and research. They also enjoy strong ties with the corporate community. Corporate and entrepreneurial leaders add to the full-time faculty by coming to campus as guest lecturers or as adjunct professors.

Centers and Facilities

This marriage of academic rigor and practical applications can also be seen in the development of the school's Centers of Excellence. Centers of Excellence are catalysts for research and innovation, think tanks for nationally significant trends and issues, and incubators for opportunities in business and integration among disciplines. LeBow's Centers of Excellence provide students with meaningful experiential learning and impact the performance of business in our region and around the world. As part of the curriculum Drexel LeBow MBA students will take courses which reside in the centers and will see firsthand how practical learning is applied.

The Centers are:

- Institute for Strategic Leadership (<http://www.lebow.drexel.edu/academics/centers/strategic-leadership/>)
- Center for Corporate Governance (<https://www.lebow.drexel.edu/academics/centers/corporate-governance/>)
- Dana and David Dornsife Office for Experiential Learning (<https://www.lebow.drexel.edu/academics/centers/experiential-learning/>)

Facilities

Accounting

Major: Accounting

Degree Awarded: Master of Science in Accounting (MSA)

Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 52.0305
Standard Occupational Classification (SOC) code: 11-3031

About the Program

The Master of Science in Accounting is a market-driven degree designed to prepare students to become leaders in the field. The program deepens students' understanding of accounting concepts, sharpens business acumen and provides the analytical and communication skills needed to become a successful accounting professional. The MS in Accounting degree prepares students for the CPA exam and beyond. The program combines theory with practice, encouraging MS in Accounting students to become well-connected to the dynamic accounting industry and share their expertise with their community through programs such as VITA (Volunteer Income Tax Assistance). Upon completion of the program, students will be eligible to be licensed in the state of Pennsylvania.

This 45.0 credit MS in Accounting program is delivered on-campus, both full-time and part-time.

- Full-time can be completed in as little as 12 months
- Part-time completion varies by student

This selective Master of Science in Accounting program is designed for students who hold a bachelor's degree preferably in the area of Accounting from an AACSB (or equivalent) accredited institution. Applicants must have earned a minimum grade of C in each of the following prerequisite courses and an overall GPA of 3.0 (B) or above.

Prerequisite Requirements

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
ACCT 331	Cost Accounting	4.0
ACCT 341	Principles of Auditing	4.0
TAX 341	Individual Income Taxes	4.0

Students with undergraduate degrees in accounting from non-US schools may be eligible for admission to the program. These students will be responsible for assessing whether their academic backgrounds make them eligible to sit for the CPA examination.

Students with undergraduate degrees in areas outside of accounting can be considered for admission to the program only after they acquire the necessary prerequisite undergraduate accounting and/or business courses. These students should contact the LeBow Graduate Student Services (<http://www.lebow.drexel.edu/academics/graduate/resources/advising/>) to determine what courses are needed to gain admission to the MS in Accounting program.

State CPA Requirements

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. Students planning to apply for a CPA license in Pennsylvania need to obtain 225.0 quarter credit hours, the equivalent to 150.0 semester hours. Students should contact the Accounting Department (<http://www.lebow.drexel.edu/faculty-and-research/disciplines/accounting/>) for additional information.

www.lebow.drexel.edu/faculty-and-research/disciplines/accounting/) for additional information.

Degree Requirements

Required Core Courses

ACCT 600	Accounting Analysis & Theory	3.0
ACCT 604	International Financial Reporting	3.0
ACCT 605	Assurance Services	3.0
ACCT 606	Current Issues in the Accounting Profession	3.0
BLAW 626	Fundamentals of Business Organizations Law	3.0
Select three of the following:		9.0
ACCT 603	Strategic Cost Management	
ACCT 607	Forensic Investigation	
ACCT 608	Government and Not-for-Profit Accounting	
ACCT 622	Advanced Financial Accounting	
ACCT 628	Accounting Valuation Issues	
ACCT 644	Internal Auditing	
ACCT 650	Accounting Information Systems	
ACCT 653	Analytical Accounting and Systems	
ACCT T680	Special Topics in ACCT	
STAT 610	Statistics for Business Analytics	
TAX 620	Individual Taxation	
TAX 630	Corporate Taxation	
TAX 645	Joint Venture Taxation	
TAX 710	Accounting for Income Taxes	
TAX 715	Tax Experiential Learning	
Co-Op/Internship or Consulting Course		
BUSN 615	Graduate Internship	
BUSN 715	Business Consulting Projects	
TAX T680	Special Topics in TAX	

Students must choose one of the following Graduate Minors (or one approved by your Program Manager): Tax, Finance, Business Analytics, Business Analytics Management, Computational Data Science or Applied Data Science or Choose 4 courses from the Research Concentration list:

Research Concentration		
ACCT 648	Introduction to Accounting Research	
ECON 548	Mathematical Economics	
ECON 550	Econometrics	
ECON 610	Microeconomics	
STAT 628	Applied Regression Analysis	
STAT 630	Multivariate Analysis	

Business Elective Courses 9.0

Students take any three (3) business courses from within the LeBow College of Business. Students should consult with their program manager for the full list of approved electives available each term.

Total Credits	45.0
---------------	------

Students should contact the Accounting Department (<http://www.lebow.drexel.edu/Faculty/Departments/Accounting/>) for additional information.

Sample Plan of Study

First Year

Term 1		Credits
ACCT 600	Accounting Analysis & Theory	3.0
ACCT 604	International Financial Reporting	3.0
Elective		6.0
Term Credits		12.0

Term 2		Credits
BLAW 626	Fundamentals of Business Organizations Law	3.0
Electives		9.0
Term Credits		12.0

Term 3		
ACCT 605	Assurance Services	3.0
ACCT 606	Current Issues in the Accounting Profession	3.0
Electives		6.0
Term Credits		12.0
Term 4		
Electives		9.0
Term Credits		9.0
Total Credit: 45.0		

Accounting Faculty

Stephen B. Bates, DBA (*Wilmington University*). Assistant Clinical Professor.

Maureen Breen, PhD (*West Chester University*). Assistant Clinical Professor. Financial reporting, internal controls in corporate and not-for-profit sectors.

Hshui Chang, PhD (*University of Minnesota*) KPMG Professor of Accounting.

Hui Lam Choy, PhD (*University of Rochester*). Associate Professor. Financial accounting.

Mary Copeland, MS, MBA (*American University*). Assistant Clinical Professor.

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.

Barbara Murray Grein, PhD (*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, PhD (*University of Arizona*). Associate Professor. Strategic cost management; corporate governance; capital markets research in accounting; human capital investment.

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.

Johnny Lee, PhD (*University of Utah*). Associate Clinical Professor. Accounting information systems; e-business; managerial accounting; supply chain management

Gordian Ndubizu, PhD (*Temple University*). Professor. Financial accounting.

Duri Park, PhD (*Ohio State University*). Assistant Professor. Financial accounting, insider trading, investments, and cash holdings.

Jennifer Wright, MTA (*Villanova University*) Assistant Department Head, Accounting and Tax. Associate Clinical Professor.

MBA Programs

Major: Business Administration

Degree Awarded: Master of Business Administration (MBA)

Calendar Type: Quarter

Total Credit Hours: 49.0

Classification of Instructional Programs (CIP) code: 52.0201

Standard Occupational Classification (SOC) code: 11-1021

About the MBA

The Drexel LeBow MBA offers a customizable, cross-disciplinary plan of study that prepares students to solve complex business problems across industries. The rigorous, comprehensive degree program is designed to emphasize the broad perspective of business concepts through innovative coursework, experiential learning and career coaching.

Grounded by a strong academic foundation in business, the program offers several opportunities to specialize and align students' specific area of interest, including business concentrations and dual degree options. Graduate minors from schools throughout the University are also available, allowing students to tailor their plan of study to fit their specific career goals.

Learning Outcomes and Competencies

Leadership Skills

Leadership and Collaboration - Leads individuals, teams, and organizations to attain common business goals and manage change

Communication - Effectively communicates in writing and speaking in business settings

Professional Development and Advancement - Takes initiative and responsibility for one's professional development and career advancement

Business Acumen

Financial Acumen - Integrates quantitative and qualitative analyses to recommend financial decisions that support financial and strategic goals

Marketing Strategy - Applies marketing theories and tools to make sound marketing decisions and recommendations

Global Mindset - Integrates global perspectives to function effectively in diverse business contexts

Strategic Analysis - Provides the ability to develop a fine-grained analysis of the overall business situation of the firm

Information Systems and Analytics - Collects, manages, and analyzes data, and uses insights gained to set and achieve business goals

Business Operations - Applies quantitative and qualitative tools and operations knowledge to dissect, find structure in, and optimize operations

Business Law - Analyzes and applies the law in decision-making

Solving Business Problems

Identifying and Framing Relevant Complex Business Problems – Uses integrated problem solving and project management skills to identify, structure, and solve complex managerial problems

Structuring and Implementing Integrated Solutions - Integrates all business disciplines and uses decision-making tools to formulate an organization's strategic direction and implements solutions to emergent business problems

Students selecting a concentration can choose from the following options:

- Accounting
- Business Analytics
- Finance
- Entrepreneurship/Innovation Management
- Marketing
- Supply Chain Management and Logistics

Program Delivery

The College offers one MBA degree delivered in the format that best suits a student's lifestyle; full-time or part-time, on campus or online. The MBA can be completed at Drexel's main campus in Philadelphia or at a satellite campus in Malvern, Pa., in as little as 18-24 months. Professionals seeking more flexibility in earning the MBA at their own pace can personalize their studies by combining on-campus and online classes.

Please contact Drexel LeBow's Graduate Admissions Office directly to discuss which MBA delivery option (<https://www.lebow.drexel.edu/academics/graduate/mba/>) is best suited for you.

Degree Requirements

The Master of Business Administration (MBA) curriculum remains firmly grounded on the best features of the "traditional" MBA. Among these features is a broad overview of business, complemented by at least one area of concentration.

Students selecting a concentration can choose from the following options:

- Accounting
- Business Analytics
- Entrepreneurship/Innovation Management
- Finance
- Healthcare Management (See advisor for scheduling options)
- Marketing
- Supply Chain and Logistics

Program Requirements

REQUIRED COURSES

ACCT 510	Essentials of Financial Reporting	2.0
BLAW 510	Analyzing Legal Options in Decision-Making	1.0
ECON 601	Managerial Economics	3.0
FIN 601	Corporate Financial Management	3.0
MGMT 510	Business Problem Solving	3.0
MGMT 520	Strategy Analysis	2.0
MGMT 530	Managing and Leading the Total Enterprise	2.0
MGMT 770	MBA Capstone	2.0
MKTG 510	Marketing Strategy	2.0
ORGB 511	Leading in Dynamic Environments: A Personal, Relational, and Strategic Approach	3.0
ORGB 520	Leading High-Performance Teams	1.0
POM 510	Operations and Supply Chain Management	2.0
STAT 510	Introduction to Statistics for Business Analytics	2.0
Experiential Requirement-Select one course.		3.0

BUSN 615	Graduate Internship	
BUSN 715	Business Consulting Projects	
INTB 790	Seminar in International Business	
MGMT 680	Leading for Innovation	
MIS 652	Business Agility and IT	
ORGB 640	Negotiations for Leaders	
TAX 715	Tax Experiential Learning	
Concentration Requirements		9.0
Free Electives		9.0
Total Credits		49.0

Students selecting a concentration can choose from the following:

Real Estate Management & Development Concentration

Required Courses

BLAW 631	Real Estate Law for Managers and Developers	3.0
REMD 675	Real Estate Finance	3.0
Select One of the following		3.0
CMGT 535	Community Impact Analysis	
ECON 625	Urban and Real Estate Economics	
FIN 622	Financial Institutions & Markets	
MKTG 638	New Product Planning, Strategy, and Development	
ORGB 640	Negotiations for Leaders	
POM 610	Supply Chain Management I	
REAL 568	Real Estate Development	
REMD T680	Special Topics in REMD	
Total Credits		9.0

Business Analytics Concentration

Requirements

STAT 632	Datamining for Managers	3.0
Select two of the following:		6.0
ECON 650	Business & Economic Strategy: Game Theory & Applications	
FIN 642	Business Conditions and Forecasting	
MIS 630	Inter-Active Decision Support Systems	
MIS 633	Predictive Business Analytics with Relational Database Data	
MKTG 606	Customer Analytics	
MKTG 607	Marketing Experiments	
OPR 601	Managerial Decision Models and Simulation	
OPR 626	System Simulation	
POM 610	Supply Chain Management I	
STAT 634	Quality & Six-Sigma	
STAT 636	Experimental Design	
STAT T680	Special Topics in STAT	
Total Credits		9.0

Finance Concentration

Required Courses

Select three of the following, of which 2 MUST be from FIN		9.0
ACCT 601	Managerial Accounting	
BLAW 620	Legal Aspects of Employment	
BLAW T680	Special Topics in BLAW	
ECON 614	Macroeconomics	
ECON 630	International Economics	
ECON 650	Business & Economic Strategy: Game Theory & Applications	
FIN 602	Advanced Financial Management	
FIN 622	Financial Institutions & Markets	
FIN 624	Risk Management	
FIN 626	Investment Management	
FIN 635	Entrepreneurial Finance	

FIN 640	Mergers and Acquisitions
FIN 642	Business Conditions and Forecasting
FIN 648	International Financial Management
FIN 790	Seminar in Finance
FIN T680	Special Topics in FIN
INTB 620	International Business Management
MGMT 655	Knowledge Management
MIS 624	Systems Analysis & Design
MIS 630	Inter-Active Decision Support Systems
MKTG 630	Global Marketing
MKTG 646	Services Marketing
OPR 601	Managerial Decision Models and Simulation
POM 610	Supply Chain Management I
POM 624	Management of Service Firms
REMD 675	Real Estate Finance
STAT 634	Quality & Six-Sigma
TAX 660	Tax Basis for Decision Making
<hr/>	
Total Credits	9.0

Marketing Concentration

Required Courses

Select three of the following, of which 2 MUST be from MKTG : 9.0

BLAW T680	Special Topics in BLAW
ECON 540	Intro to Econometrics and Data Analysis
ECON 610	Microeconomics
FIN 642	Business Conditions and Forecasting
FIN 648	International Financial Management
INTB 620	International Business Management
MGMT 655	Knowledge Management
MIS 624	Systems Analysis & Design
MIS 630	Inter-Active Decision Support Systems
MIS 632	Database Analysis and Design for Business
MKTG 602	Marketing Experiential Project
MKTG 606	Customer Analytics
MKTG 607	Marketing Experiments
MKTG 622	Buyer Behavior Theory
MKTG 624	Channels of Distribution Management
MKTG 627	Digital Marketing
MKTG 628	Logistics and Supply Chain Management
MKTG 630	Global Marketing
MKTG 634	Integrated Marketing Communications Management
MKTG 636	Business to Business Marketing
MKTG 638	New Product Planning, Strategy, and Development
MKTG 646	Services Marketing
MKTG 652	Marketing Information Management and Research
MKTG T680	Special Topics in MKTG
OPR 601	Managerial Decision Models and Simulation
POM 624	Management of Service Firms
POM 610	Supply Chain Management I
STAT 634	Quality & Six-Sigma
<hr/>	
Total Credits	9.0

Entrepreneurship/Innovation Management Concentration

Required Courses

Select two of the following: 6.0

BLAW 620	Legal Aspects of Employment
BLAW 646	Legal Issues in New Ventures
FIN 635	Entrepreneurial Finance
MGMT 640	Strategic Human Resource Management
MGMT 655	Knowledge Management

MIS 624	Systems Analysis & Design
MIS 630	Inter-Active Decision Support Systems
MIS 632	Database Analysis and Design for Business
MKTG 638	New Product Planning, Strategy, and Development

Electives

Select one of the following: 3.0

ACCT 601	Managerial Accounting
BUSN T680	Special Topics in BUSN
ECON 540	Intro to Econometrics and Data Analysis
ECON 610	Microeconomics
ECON 650	Business & Economic Strategy: Game Theory & Applications
FIN 602	Advanced Financial Management
FIN 642	Business Conditions and Forecasting
FIN 648	International Financial Management
FIN 649	Comparative Financial Analysis
INTB 620	International Business Management
MGMT 655	Knowledge Management
MKTG 622	Buyer Behavior Theory
MKTG 624	Channels of Distribution Management
MKTG 630	Global Marketing
MKTG 634	Integrated Marketing Communications Management
MKTG 646	Services Marketing
ORGB 640	Negotiations for Leaders
OPR 601	Managerial Decision Models and Simulation
POM 610	Supply Chain Management I
POM 615	Supply Chain Management II
POM 624	Management of Service Firms
STAT 634	Quality & Six-Sigma
TAX 660	Tax Basis for Decision Making
<hr/>	
Total Credits	9.0

Supply Chain Management & Logistics Concentration

POM 610	Supply Chain Management I	3.0
POM 615	Supply Chain Management II	3.0

Select One of the Following: 3.0

ECON 650	Business & Economic Strategy: Game Theory & Applications
FIN 642	Business Conditions and Forecasting
FIN 635	Entrepreneurial Finance
MIS 624	Systems Analysis & Design
MIS 630	Inter-Active Decision Support Systems
MKTG 606	Customer Analytics
MKTG 624	Channels of Distribution Management
MKTG 638	New Product Planning, Strategy, and Development
OPR 601	Managerial Decision Models and Simulation
POM 624	Management of Service Firms
POM 630	Transportation & Logistics Management
POM T680	Special Topics in POM
STAT 634	Quality & Six-Sigma
STAT 632	Datamining for Managers
<hr/>	
Total Credits	9.0

General Business Concentration

Complete 9 graduate credits. See an advisor for suggestions. 9.0

Total Credits 9.0

Sample Plan of Study

First Year

Term 1		Credits
ACCT 510	Essentials of Financial Reporting	2.0
MGMT 530	Managing and Leading the Total Enterprise	2.0

ORGB 511	Leading in Dynamic Environments: A Personal, Relational, and Strategic Approach	3.0
	Term Credits	7.0
Term 2		
FIN 601	Corporate Financial Management	3.0
MGMT 510	Business Problem Solving	3.0
	Term Credits	6.0
Term 3		
BLAW 510	Analyzing Legal Options in Decision-Making	1.0
ECON 601	Managerial Economics	3.0
STAT 510	Introduction to Statistics for Business Analytics	2.0
	Term Credits	6.0
Term 4		
MGMT 520	Strategy Analysis	2.0
	Experiential Elective	3.0
	Elective	3.0
	Term Credits	8.0
Second Year		
Term 5		
MKTG 510	Marketing Strategy	2.0
ORGB 520	Leading High-Performance Teams	1.0
POM 510	Operations and Supply Chain Management	2.0
	Term Credits	5.0
Term 6		
	Electives	6.0
	Term Credits	6.0
Term 7		
	Electives	6.0
	Term Credits	6.0
Term 8		
MGMT 770	MBA Capstone	2.0
	Elective	3.0
	Term Credits	5.0

Total Credit: 49.0

Facilities

MBA Program Faculty

Marco Airaud, PhD (*University of Pennsylvania Philadelphia*). Associate Professor. Computational economics, international economics, macroeconomics and monetary economics.

Murugan Anandarajan, PhD (*Drexel University*) *Interim Associate Dean for Academic Affairs*. 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.

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.

Jie Cai, PhD (*University of Iowa*) *Department of Finance*. Associate Professor. Investment banking, mergers and acquisitions, corporate finance and corporate governance.

Suresh Chandran, PhD (*Vanderbilt University*). Clinical Professor. Corporate entrepreneurship; corporate social responsibility; global management; intellectual property and employee rights; Sustainability; Technological Innovation.

Lauren D'Innocenzo, PhD (*University of Connecticut*). Associate Professor. Team effectiveness, contextual influences, emergent team dynamics, shared leadership, multi-level modeling, and groups/teams.

Qizhi Dai, PhD (*University of Minnesota*). Associate Professor. Business Value of Information Technology, eCommerce, Economics of Information Technology, Information System Management.

Pia DiGirolamo, PhD (*Purdue University*). Assistant Clinical Professor. Macroeconomics, international finance.

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.

Elea Feit, PhD (*University of Michigan*) *Department of Marketing*. Assistant Professor. Bayesian hierarchical models, interactive (eCommerce), marketing research, missing data.

Christopher Gaffney, PhD (*Rutgers University, New Brunswick*). Assistant Clinical Professor. Applied Probability, Decision Theory, Risk Analysis

Cuneyt Gozu, PhD (*University of Albany*). Associate Clinical Professor. Attitudes; Groups/Teams; Leadership; Motivation; Power and Influence

Michael Howley, PhD (*Arizona State University*). 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*). Associate Professor. Consumer n-store decision making, consumer planning, health marketing, memory and learning.

Daniel Korschun, PhD (*Boston University*). Associate Professor. Brand and corporate reputation management, corporate social responsibility, internal marketing, marketing strategy, relationship marketing.

Rosalie S. Kreider, JD (*Villanova University*) *Department of Legal Studies*. Clinical Professor. Business law, international business law.

David Kurz, EdD (*University of Pennsylvania*). Associate Clinical Professor. Business Education; Groups/Teams; Leadership; Supply Chain Leadership.

Jeongsik Lee, PhD (*University of California Los Angeles*). Assistant Professor. Economics of Innovation; Social networks; Technology management

Johnny Lee, PhD (*University of Utah*). Associate Clinical Professor. Accounting information systems; e-business; managerial accounting; supply chain 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

Dali Ma, PhD (*University of Chicago*). Associate Professor. Social hierarchy; Social networks; Sociology of entrepreneurship; Sociology of transitional China

Mary Mawritz, PhD (*University of Central Florida*). Associate Professor. Abusive supervision; deviant behavior; leadership.

Bruce D. McCullough, PhD (*University of Texas Austin*). Professor. Applied Econometrics, Data Mining, Econometric Techniques, Reliability of Statistical and Econometric Software.

V. K. Narayanan, PhD (*University of Pittsburgh*). Deloitte Touche Jones Stubbs Professor. Cognition and Strategy; Corporate Entrepreneurship; Organization design

Gordian Ndubizu, PhD (*Temple University*). Professor. Financial accounting.

Edward Nelling, PhD, CFA (*University of Pennsylvania-Wharton Department Head*). 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.

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

Natalie Pedersen, JD (*Harvard University Department of Legal Studies*). Associate Professor. Employment law; employment discrimination; implicit bias.

Christian Resick, PhD (*Wayne State University*). Associate Professor. Groups/Teams; Leadership; Organizational Culture and Fit; Personality.

Patricia Robak, PhD (*Lehigh University Department of Finance*). Clinical Professor. Investments, money and banking, international finance.

Konstantinos Serfes, PhD (*University of Illinois at Champaign-Urbana*). Professor. Industrial organization; microeconomics; game theory

Samir Shah, DPS (*Pace University*). Clinical Professor. Drexel University's Provost Fellow India Partnerships

Prashant Srivastava, PhD (*Oklahoma State University*). Associate Clinical Professor. New product development, supply chain management, B2B marketing, sales, strategic alliances, organizational learning, market orientation, healthcare marketing, and database marketing.

Srinivasan Swaminathan, PhD (*University of Texas-Austin*). Professor. Marketing research and strategy, pricing and promotions, loyalty and satisfaction.

Samuel H. Szewczyk, PhD (*Pennsylvania State University*). 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.

Daniel Tzabbar, PhD (*University of Toronto*). Associate Professor. Accessing and managing knowledge; Alliances; Human capital; Organizational learning and change; Social Capital; Technology Entrepreneurship; Technology Innovation

Chen Wang, PhD (*University of British Columbia*). Associate Professor. Consumer curiosity, self-regulation and goals, sensory perception.

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 Management Department*). Associate Professor. Attitudes; Diversity; Groups/Teams; Leadership; Organizational Culture and Fit.

Executive MBA Program

Major: Business Administration

Degree Awarded: Master of Business Administration (MBA)

Calendar Type: Quarter

Total Credit Hours: 49.0

Classification of Instructional Programs (CIP) code: 52.0101

Standard Occupational Classification (SOC) code: 11-1021

About the Program

The Executive MBA program is designed for executives, entrepreneurs, and professionals with an average of 15 years of experience (and a minimum of seven years) who are currently in a managerial or managerial-track position. Graduates of the Executive MBA program are catalysts, effective leaders who demonstrate mastery of problem-solving and strategy development in increasingly complex business environments.

Working within an intimate cohort with diverse experiences and backgrounds, Executive MBA students complete a robust cross-disciplinary plan of study with an emphasis on strategic leadership and business solutions. Students collaborate in high-performance teams, which enable them to gain diverse perspectives and learn new strategies for problem-solving. The program includes comprehensive leadership self-assessment tools, including an executive coach to help design and implement a personal career development plan and reinforce leadership skills. During the program students will have the opportunity to choose electives from an array of contemporary interdisciplinary courses.

Through their professional experience and academic research, our world-class faculty foster an environment where applied learning and real-world application is an integral part of the experience. Highly engaged Executive MBA alumni further enhance this close-knit community, opening their

doors to help students build connections and uncover opportunities to benefit their careers.

Program Delivery

The Executive MBA program delivers 18 months of study in a 20-month period. Courses are primarily taught in residency format with accompanying online elements. The program begins with the LeBow Leadership Experience, a six-day introductory immersion that teaches the tenets of high impact, transformational leadership, and ends with an international immersion experience that applies the concepts and principles learned in the classroom to a global business setting. Past international immersions have examined the transitioning economies of Cuba and South Africa, the rising consumerism and urbanization of China, and Vietnam's emergence as a global outsourcing giant.

Additional Information

For additional information about the program, visit the Executive MBA (<http://www.lebow.drexel.edu/academics/graduate/mba/executive-mba/>) web page.

Admission Requirements

The Executive MBA program has separate admission procedures. A personal interview is required. Students admitted to the program have an average of 15 years work experience and significant potential for advancement in their organizations. A minimum of 7 years of professional experience (including 2 years of management) is required. Students must be admitted to the Executive MBA program to register for Executive MBA cohorted classes.

For further information, please contact:

Mark Dierkes
Director of Recruitment
Executive MBA Program
215-571-3272
med24@drexel.edu

About the Curriculum

Each year, the Executive MBA curriculum is revised to strengthen the best of our program, and include new content and teaching methods to make the entire Drexel experience richer, more rewarding, and more relevant to our students. It is built around 19 courses delivered through various types of executive learning experiences, including classroom meetings with online supplemental sessions, campus immersions, international immersions, online courses, plus six 1-credit elective courses that span an array of disciplines. The program blends proven learning elements that go far beyond a typical MBA program.

The Executive MBA begins with the six-day Drexel Leadership Experience and ends with a 7-10 day international immersion. In between, class sessions are mostly clustered in an on-campus residency format.

Sample Plan of Study:

First Year

MGMT 510 – Business Problem Solving – 2 credits
ORGB 510 – Leading in Dynamic Environments – 2 credits
ORGB 520 – Leading High Performance Teams – 1 credit
STAT 510 – Introduction to Statistics for Business Analytics – 2 credits

MGMT 530 – Managing and Leading the Total Enterprise – 2 credits

ORGB 530 – Career and Professional Development – 1 credit
ACCT 510 – Essentials of Financial Reporting – 2 credits

Executive Electives Week – Classes TBA – 3 credits
ORGB 640 – Negotiations for Leaders – 3 credits
BLAW 510 – Analyzing Legal Options in Decision-Making – 1 credit

MIS 612 – Aligning Information Systems and Business Strategies – 3 credits

MGMT 520 – Strategy Analysis – 2 credits

POM 510 – Operations and Supply Chain Management – 2 credits

Second Year

FIN 601 – Corporate Financial Management – 3 credits

FIN 610 – Corporate Governance – 3 credits

MKTG 510 – Marketing Strategy – 2 credits

ECON 601 – Managerial Economics – 3 credits

ACCT 603 – Strategic Cost Management – 3 credits

Executive Electives Week – Classes TBA – 3 credits

INTB 790 – Seminar in International Business – 3 credits

MGMT 770 - MBA Capstone - 2 credits

Doctorate in Business Administration (DBA)

Major: Business Administration

Degree Awarded: Doctorate in Business Administration (DBA)

Calendar Type: Quarter

Total Credit Hours: 60.0

Classification of Instructional Programs (CIP) code: 52.0201

Standard Occupational Classification (SOC) code: 11-1021

About the DBA

The Doctorate in Business Administration (DBA) is a part-time executive doctoral program designed to equip executives and senior managers with scientific methods to address complex industry and organizational challenges. The program integrates and leverages Drexel's 120+ year history of experiential learning to provide a broad theoretical perspective of current business issues as well as a strong foundation in applied research and analysis to enrich critical knowledge, skills, and abilities. Through an integrative framework of empirical exploration and evidence-based decision making, executives learn the "science of business" and develop successful data driven strategies and solutions that can be applied to their respective organizations.

The DBA cohorted format enables candidates to complete the program in 2.5 years (10 consecutive quarters), using a lockstep executive residency and online model. DBA candidates complete a minimum of 60.0 credits beyond the Master's degree. As part of the accelerated nature of the program and focus on complex business challenges, the program employs a mentored dissertation model. It is expected that applicants will have a minimum of 10 years of industry and/or leadership experience.

Program Highlights

- 2.5 Year, Part-time, Cohorted Executive Program
- Executive Residency Format with Online Components
- 16 Courses, 60 Credits post-Masters
- Mentored Dissertation Model

- Integrated, Cross-Disciplinary Course Work
- Drexel DBA Faculty Collaboration from Management, Marketing, Decision Sciences and MIS, Accounting, Economics, Finance, Design, Biomedical Engineering, and Psychology

DBA Learning Outcomes

Upon degree completion, graduates of the DBA program will be able to...

- Demonstrate knowledge of both theoretical and applied business research methodology.
- Integrate knowledge from business and non-business disciplines to generate novel ideas, strategies, and practical approaches to address business issues faced by senior leadership in organizations.
- Demonstrate mastery of scientific inquiry methods that examine empirical support for theoretical frameworks as applied to business problems.
- Demonstrate an ability to address complex industry challenges using frameworks of empirical examination that build prescriptive conclusions and real world knowledge.

Admission Requirements

The DBA provides a broad theoretical and practical perspective on current business issues as well as a strong foundation in applied research and analysis. The LeBow College of Business seeks applicants with a minimum of 10 years of senior industry and/or leadership experience, exceptional ability and the motivation needed to successfully complete the DBA. Admission into this part-time cohorted program requires a Master's degree and is highly selective.

In reviewing an applicant's credentials, the DBA admissions committee will consider:

- Completed Application Form
- Prior Academic Accomplishments: All course work taken prior to application will be reviewed. Applicants should have attained a minimum grade point average of 3.3 (on a 4.0 scale) for all graduate course work completed.
- Graduate Management Admissions Test (GMAT) or Graduate Records Examination (GRE): DBA applicants are NOT required to submit scores from either the GMAT or GRE. However, individuals who have taken these exams prior may forward their scores in support of their application.
- Personal Statement: Explain how the applicant's educational and personal experiences have influenced the decision to pursue a DBA, professional objectives in attaining a DBA, and the applicant's strategy (time, effort, and organizational and family support) to excel in the program.
- Essay(s): Please reference the program webpage for specific essay(s) requirement for the application.
- Letters of Recommendation: Two letters of recommendation must be submitted in support of the application. Applicants are strongly encouraged to seek recommendations from professionals who can assess the applicant's likelihood of success in an executive doctoral program.
- Current Resume or CV: Include relevant industry positions, achievements or research.
- Interview: Upon request of the DBA admission committee, selected candidates will be requested to participate in an admissions interview.

Admission Procedures

The DBA Program admits students each fall. To be considered for scholarship and admission, the completed application must be received by the LeBow College of Business Office of Graduate Admissions no later than **April 30th**. It is the applicant's responsibility to ensure that all transcripts, essays/personal statements and letters of recommendation, as well as the application form and fee, are received by Drexel University by this deadline.

Please contact Mark Dierkes, Director of Executive Program Recruitment, at med24@drexel.edu or at 215-571-3272 directly with any questions concerning required entrance exams (such as the GMAT), evaluation of undergraduate or graduate records (grades, scores, total years and subjects studied, etc.), and any other issues regarding application to the College.

Degree Requirements

Required Courses

BUSN 910	Applied Organizational & Consumer Behavior	4.0
BUSN 911	Opportunities in a Data Driven Economy	4.0
BUSN 912	Corporate Growth and Risk Strategies	4.0
BUSN 913	Driving Innovation and Design	4.0
BUSN 914	Navigating the Changing Business Environment	4.0
BUSN 921	Applied Behavioral Research	4.0
BUSN 923	Qualitative Inquiry Methods	4.0
BUSN 925	Survey Research	4.0
BUSN 924	Analyzing Quantitative Data	4.0
BUSN 941	Dissertation Research, Applied Methodology Workshop	4.0
BUSN 942	Dissertation Research, Data Collection Strategy	4.0
BUSN 943	Dissertation Research, Literature Review and Proposal Defense	4.0
BUSN 944	Dissertation Research, Data Collection Process	5.0
BUSN 945	Dissertation Research, Data Analysis	5.0
BUSN 946	Dissertation Research, Discussion and Contribution Chapter	1.0
BUSN 947	Dissertation Research, Final Defense	1.0-9.0
Total Credits		60.0-68.0

Dissertation

DBA candidates are required to complete and submit doctoral dissertation for committee approval. The dissertation is an integral part of the DBA program and serves as a demonstration of academic excellence in applying the science of business with all its expected rigor to an important problem of interest to the industry, as well as providing insight based on theory and supported by appropriate methodological and statistical rigor.

The dissertation process is comprised of a series of lockstep courses, culminating in two major milestones: defense of the proposal and defense of the completed research. The dissertation will need to show relevance, be tied to appropriate scientific literature, and have appropriate methodology and analysis to support the conclusions. Each student will be assigned a dissertation chair, who will guide the student through the process starting in year one, and committee who will evaluate the proposal and the completed research. Both proposal defense and completed research defense must attain a passing grade for the degree to be conferred. There are no qualifying or candidacy exams.

Sample Plan of Study

First Year		
Term 1		Credits
BUSN 910	Applied Organizational & Consumer Behavior	4.0
BUSN 925	Survey Research	4.0
Term Credits		8.0
Term 2		
BUSN 911	Opportunities in a Data Driven Economy	4.0
BUSN 921	Applied Behavioral Research	4.0
Term Credits		8.0
Term 3		
BUSN 912	Corporate Growth and Risk Strategies	4.0
BUSN 924	Analyzing Quantitative Data	4.0
Term Credits		8.0
Second Year		
Term 4		
BUSN 913	Driving Innovation and Design	4.0
BUSN 923	Qualitative Inquiry Methods	4.0
Term Credits		8.0
Term 5		
BUSN 914	Navigating the Changing Business Environment	4.0
BUSN 941	Dissertation Research, Applied Methodology Workshop	4.0
Term Credits		8.0
Term 6		
BUSN 942	Dissertation Research, Data Collection Strategy	4.0
BUSN 943	Dissertation Research, Literature Review and Proposal Defense	4.0
Term Credits		8.0
Term 7		
BUSN 944	Dissertation Research, Data Collection Process	5.0
Term Credits		5.0
Third Year		
Term 8		
BUSN 945	Dissertation Research, Data Analysis	5.0
Term Credits		5.0
Term 9		
BUSN 946	Dissertation Research, Discussion and Contribution Chapter	1.0
Term Credits		1.0
Term 10		
BUSN 947	Dissertation Research, Final Defense	1.0-9.0
Term Credits		1.0-9.0

Total Credit: 60.0-68.0

Course Descriptions

BUSN 910 Applied Organizational and Consumer Behavior 4.0 Credits

The course provides an interdisciplinary and integrative understanding of various theoretical perspective on how to organize effectively. Theories, research and practice from the areas of strategic management, organizational behavior, human resource, management, MIS and marketing will be explored for ways to leverage both internal and external data to compete in the 21st century economy and build business strategy and translate that into organizational knowledge strategy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 911 Opportunities of Data Driven Economy 4.0 Credits

This course explores the growing role of data in Business. It examines the critical skills and capabilities an organization needs for success, including leadership, culture, methods and tools for becoming data driven, while also balancing human judgment. Lectures, readings, cases, and guest speakers consider the impact and challenges of gathering, storing, analyzing and providing access to data to facilitate effective decision making.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 910 [Min Grade: B]

BUSN 912 Corporate Growth and Risk Strategies 4.0 Credits

This course will discuss competitive advantage aspects as they relate to organizational growth and risk management including in contexts related to intercompany relationships. Theories, research and practice from the areas of strategic management, organizational behavior, human resource, management, MIS and marketing will be explored to learn theories frameworks on corporate development and growth and risk management studies associated with such development and growth.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 910 [Min Grade: B] and BUSN 911 [Min Grade: B]

BUSN 913 Driving Innovation and Design 4.0 Credits

This course explores the latest thinking on competitive strategies for innovation, innovation culture, product design & design thinking, creative insights and stimulating creativity behavior and such measurements using an interdisciplinary approach.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 912 [Min Grade: B]

BUSN 914 Navigating the Changing Business 4.0 Credits

This course provides the foundation to apply current economic, consumer behavior and HR capital trends guided by scholarly based findings and analysis to apply to business issues in the new digital and global economy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 913 [Min Grade: B]

BUSN 921 Applied Behavioral Research 4.0 Credits

This course introduces behavioral research thinking. The course will provide an overview of applied behavioral research methodologies, including experimental, quasi-experimental, and survey research techniques. Students will learn the advantages of each methodology and when to apply it. Students will also be introduced to measurement theory, validity, reliability, and how to conduct research ethically. There will be detailed discussions on the data and how it was collected as well as hands-on demonstrations of the statistical methodologies that were applied. Students will learn what the statistical assumptions are, what the parameters mean, and how to practically interpret the results.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 923 Qualitative Inquiry Methods 4.0 Credits

This course introduces students to approaches in 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. 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

Prerequisites: BUSN 921 [Min Grade: B]

BUSN 924 Analyzing Quantitative Data 4.0 Credits

In this course, students will learn to test hypotheses and assess theory in business and behavioral contexts as those relate to analyzing survey data, archival data, and experimental data. Through hands-on exercises that revisit and reconstruct published research, students will learn commonly used statistical methods that test hypotheses and learn how to interpret results, as well as look for problems as revealed through the statistical testing that might lend support to alternative models. Methods discussed include linear regression, dimension reduction, analysis of variance and GLM, and logistic regression models.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 922 [Min Grade: B] or BUSN 925 [Min Grade: B]

BUSN 925 Survey Research 4.0 Credits

This course will introduce students to the art and craft of survey research. Students will become familiar with the theoretical underpinnings of survey research and at the same time get hands-on experience designing, deploying, and analyzing surveys. The course will cover all aspects of conducting survey research: selecting a sample, formulating individual questions, measurement scales, designing a questionnaire, and analyzing the collected data.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 921 [Min Grade: B]

BUSN 941 Dissertation Research, Applied Methodology Workshop 4.0 Credits

This applied methodology workshop focuses candidates on development of well-defined research questions, appropriate methodology approaches, outline of the Hypotheses, and elucidation about the Importance of the research topics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 942 Dissertation Research, Data Collection Strategy 4.0 Credits

This applied dissertation research course focuses candidates on the development of well-defined data collection strategy. This may include, but is not limited to, analyzing archival data, designing the survey to be used, or determining how to use existing organizational changes in a quasi-experimental design to assess phenomena. This will include IRB permission as necessary.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 941 [Min Grade: B]

BUSN 943 Dissertation Research, Literature Review and Proposal Defense 4.0 Credits

This applied dissertation research course focuses candidates on the development of the literature review section that will be included in the dissertation. The literature review should present the theoretical background of the dissertation and support the propositions and hypotheses.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 942 [Min Grade: B]

BUSN 944 Dissertation Research, Data Collection Process 5.0 Credits

This applied dissertation research course focuses candidates on the development of the data collection process for the dissertation. The data can be collected through surveys, quasi-experimental designs, panel data, or any other source approved by the dissertation chair and committee.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 943 [Min Grade: B]

BUSN 945 Dissertation Research, Data Analysis 5.0 Credits

This applied dissertation research course focuses candidates on completing the data analysis for the dissertation. It is expected that the student will consult with the Dissertation Chair and professors on the appropriate analyses methods that should be applied.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 944 [Min Grade: B]

BUSN 946 Dissertation Research, Discussion and Contribution Chapter 1.0 Credits

This applied dissertation research course focuses candidates on completing the Discussion and Contribution chapter of the dissertation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 945 [Min Grade: B]

BUSN 947 Dissertation Research, Final Defense 1.0 Credits

This applied dissertation research course focuses candidates on completing the Dissertation and after consultation and approval by the Dissertation Chair to submit it for Final Defense before the Committee.

College/Department: LeBow College of Business

Repeat Status: Repeatable for credit

Facilities

DBA Interdepartmental LeBow Faculty

Murugan Anandarajan, PhD (*Drexel University*) *Interim Associate Dean for Academic Affairs*. 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.

Hasan Ayaz, PhD (*Drexel University*) *School of Biomedical Engineering, Science and Health Systems*. Associate Professor. Optical brain imaging,

cognitive neuroengineering, brain computer interface (BCI), functional near infrared (fNIR), and near infrared spectroscopy (NIRS).

Lauren D'Innocenzo, PhD (*University of Connecticut*). Associate Professor. Team effectiveness, contextual influences, emergent team dynamics, shared leadership, multi-level modeling, and groups/teams.

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.

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.

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.

Teresa Harrison, PhD (*University of Texas Austin*) Associate Dean, Academic Affairs. Associate Professor. Econometrics, public finance, industrial organization, empirical microeconomics including health and nonprofit organizations.

Yanliu Huang, PhD (*The Wharton School, University of Pennsylvania*). Associate Professor. Consumer n-store decision making, consumer planning, health marketing, memory and learning.

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.

Mary Mawritz, PhD (*University of Central Florida*). Associate Professor. Abusive supervision; deviant behavior; leadership.

Rajiv Nag, PhD (*Pennsylvania State University*). Clinical 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. Cognition and Strategy; Corporate Entrepreneurship; Organization design

Mark Stehr, PhD (*University of California at Berkeley*) Assistant Director School of Economics. Associate Professor. Health economics, health behaviors, public finance, public policy.

Rajneesh Suri, PhD (*University of Illinois at Urbana-Champaign*) Associate Dean for Research, Marketing Department. Professor. Pricing, promotions and branding.

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.

Daniel Tzabbar, PhD (*University of Toronto*). Associate Professor. Accessing and managing knowledge; Alliances; Human capital; Organizational learning and change; Social Capital; Technology Entrepreneurship; Technology Innovation

Jonathan C. Ziegert, PhD (*University of Maryland*) Management Department. Associate Professor. Attitudes; Diversity; Groups/Teams; Leadership; Organizational Culture and Fit.

Wendy van Ginkel, PhD (*Eramus University Rotterdam*) Management Department. Associate Professor. Team dynamics; Knowledge sharing; Diversity; Team cognition.

Daan van Knippenberg, PhD (*Leiden University*) Joseph F. Rocereto Professor, Academic Director of the Institute of Strategic Leadership. Professor. Leadership; Diversity; Teams; Team Innovation.

Business Administration

Major: Business Administration

Degree Awarded: Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 60.0 (Post-Master's) or 90.0 (Post-Bachelor's)

Classification of Instructional Programs (CIP) code: 52.0101

Standard Occupational Classification (SOC) code: 11-1021

About the Program

Drexel's PhD in Business program prepares candidates for careers in academic research and teaching. The PhD in Business includes specializations in accounting, finance, marketing, management (organizational behavior and strategy), and operations & business analytics. PhD degrees are delivered as full-time, on-campus degrees and normally require about five years to complete. The LeBow faculty take a hands-on approach to research and mentoring students on a daily basis. The support of LeBow's collaborative, collegial research environment provides our doctoral students with tremendous research opportunities.

The program enables students to complete their doctoral coursework in two years. Students begin specializing in their chosen area during the first year of study. For information about doctoral work in economics, please visit the PhD in Economics (p. 194) web page.

PhD students complete a minimum of 60.0 quarter credits beyond the master's degree. Students who enter the program without a master's degree must complete 90.0 credits beyond the bachelor's degree. Degree Requirements describe the basic structure of the PhD in Business curriculum.

For additional information about the program visit the PhD Program in Business (<http://www.lebow.drexel.edu/Prospects/Doctorate/>) page.

Admission Requirements/Financial Aid

The LeBow College of Business seeks applicants with exceptional ability and motivation who can succeed in a research-oriented program. Admission to this full-time program is competitive and highly selective. Applicants are only admitted for full-time status. Applicants must specify their proposed area of specialization, and their credentials are ultimately compared to the credentials of other applicants in the same specialization area. There may be relatively few openings in a given area. A master's degree is not a requirement, although most admitted students have one.

In reviewing an applicant's credentials, the faculty consider the following factors:

- *Prior Academic Accomplishments*: The faculty will examine all course work taken prior to application, paying particular attention to the specific courses that have been completed. Applicants should have attained a minimum grade point average of 3.0 (on a 4.0 scale) for all undergraduate course work completed. They also should have attained a minimum 3.3 average for any graduate-level course work taken. The faculty generally expect applicants to demonstrate a substantially higher level of accomplishment than these minimum requirements.
- *Graduate Management Admissions Test (GMAT) or Graduate Records Examination (GRE)*: Applicants to all specializations within the PhD program are required to submit scores from either the GMAT or GRE. While all specializations will accept either one, applicants applying to the Accounting, Management (Organization or Strategy), Finance, or Marketing specializations should submit GMAT scores. Applicants to the specializations in Operations & Business Analytics or Economics should submit the GREs. GMAT and GRE scores are not accepted if they are more than five years old.
- *Test of English as a Foreign Language (TOEFL)*: Applicants whose native language is not English and who have not already received a degree from a U.S. university, must also submit scores from the Test of English as a Foreign Language (TOEFL).
- *Personal Statement/Essay*: Each applicant must submit a personal statement. The personal statement should explain the applicant's educational and personal experiences that have influenced the decision to pursue a PhD and should discuss the candidate's career plans and goals. The faculty are especially interested in learning about an applicant's prior research experience and the commitment to future research in the applicant's area of specialization.
- *Letters of Recommendation*: Two letters of recommendation must be submitted in support of the application. Applicants are strongly encouraged to seek recommendations from academics or other professionals who can assess the applicant's likelihood of success in a research-oriented PhD program.

Admission Procedures

The PhD Program in Business admits students each Fall. To be considered for admission, the completed application must be received by the LeBow College of Business Office of Graduate Admissions no later than **January 15th**. It is the applicant's responsibility to ensure that all transcripts, test scores and letters of recommendation, as well as the application form and the personal statement, are received by Drexel University no later than January 15th.

Assistantships and Financial Aid

LeBow generally provides 5 years of tuition and stipend support conditional on satisfactory progress throughout the program. PhD students are also provided with substantial support for traveling to academic conferences. Each applicant to the PhD program is automatically considered for a graduate assistantship as well as for admissions into the program. First-year graduate assistants are assigned to work with a faculty member on research and/or teaching activities. During the second and subsequent years, graduate assistants are generally assigned a combination of teaching and research responsibilities. Assistants receive a stipend and 27.0 credits of tuition remission per academic year. Doctoral students who are making satisfactory progress toward the degree can expect to be provided with an

assistantship through the Spring Quarter of their fifth year from the date they start the program.

Additional Information

For questions about applying, please contact:

The LeBow PhD Program Office
Bennett S. LeBow College of Business
Drexel University
3141 Chestnut Street
Philadelphia, PA 19104-2875
lebowphd@drexel.edu

Degree Requirements

60 credits (Post-Master's degree)

90 credits (Post-Bachelor's degree)

- 15.0 credits of core courses
- 30.0 credits of specialization requirements
- 15.0 credits of dissertation research
- 30.0 credits for students without Master's degree

Core Program

PhD students in business select one of two broad streams of research:

- behavioral based research; or
- economics based research.

Within each stream all students pursue a common set of core courses during their first year of study. This core consists of course work in research methodology (three courses) and economics (two courses) or behavioral science (two courses). In addition to these core courses, students also take courses in their specializations during their first year in the program.

Each research stream consists of 5 core courses. All courses are 3.0 credits each.

Economics Stream Core Courses *

ECON 902	Mathematical Economics	3.0
ECON 910	Advanced Microeconomics I	3.0
ECON 940	Econometrics I	3.0
ECON 941	Econometrics II	3.0
STAT 931	Statistics for Economics	3.0
Total Credits		15.0

* Operations and Business Analytics students may make substitutions for the econometrics series. Their research methodology sequences is comprised of Statistics, STAT 924 Multivariate Analysis I and OPR 922 Operations Research Methods I.

Economics Stream First Year Core Sequence

Fall		Credits
ECON 902	Mathematical Economics	3.0
STAT 931	Statistics for Economics	3.0
Term Credits		6.0
Winter		
ECON 910	Advanced Microeconomics I	3.0
ECON 940	Econometrics I	3.0
Term Credits		6.0
Spring		

ECON 941	Econometrics II	3.0
Term Credits		3.0
Total Credit:		15.0

Behavioral Stream

Behavioral Stream Core Courses

STAT 924	Multivariate Analysis I	3.0
STAT 932	Statistics for Behavioral Science	3.0
MGMT 906	Foundations of Research in Behavioral Science	3.0
MGMT 907	Research Analysis in Behavioral Sciences	3.0
MKTG 940	Multivariate II	3.0
Total Credits		15.0

Behavioral Stream First Year Core Sequence

Fall		Credits
MGMT 906	Foundations of Research in Behavioral Science	3.0
STAT 932	Statistics for Behavioral Science	3.0
Term Credits		6.0
Winter		
MGMT 907	Research Analysis in Behavioral Sciences	3.0
STAT 924	Multivariate Analysis I	3.0
Term Credits		6.0
Spring		
MKTG 940	Multivariate II	3.0
Term Credits		3.0
Total Credit:		15.0

First-Year Examination

After the completion of the core coursework, students are examined on their competence in the core material and their readiness to proceed to their specialization area.

Specialization

The PhD Program in Business offers specializations in six areas:

- Accounting
- Finance
- Marketing
- Organizational Behavior (Management)
- Operations & Business Analytics
- Strategy (Management)

Each specialization area consists of 10 courses (30.0 credits) in addition to the 5 stream courses. The courses outside of the stream courses are either department requirements or electives selected by the student with the approval of their PhD coordinator. Up to 3 of the electives may be independent studies or dissertation research courses subject to the approval of the student's PhD coordinator and the Director of the LeBow PhD Program. The requirements of each area of specialization are discussed in detail on the LeBow College of Business PhD Program Areas of Specialization (<http://www.lebow.drexel.edu/academics/doctorate/>) web page.

Candidacy Examination

At the completion of their coursework, students take written and oral candidacy examinations. These examinations test each student's preparation for dissertation research. Once the candidacy examinations are passed, the student is recognized as a PhD candidate.

Doctoral Dissertation

The doctoral dissertation is a piece of original research designed to make a contribution to the student's chosen discipline. Each candidate selects a dissertation adviser and an advisory committee of additional faculty members is formed. The candidate prepares a detailed dissertation proposal that is defended before the University community. After successfully defending the proposal, the candidate conducts the research (15.0 credit minimum) and prepares a written dissertation. The completed dissertation is then defended in a final oral examination.

Dissertation Format Review

In addition to meeting the Thesis Advisory Committee's standards of originality and scholarly content, all doctoral dissertations must conform to university format requirements. Students should obtain a copy of the Thesis Manual from the Graduate College of Drexel University (<http://www.drexel.edu/graduatecollege/>) or from the Thesis Reviewer in 5038 MacAlister Hall.

Facilities

Selected Faculty Researchers

ACCOUNTING

Hsuhui Chang, PhD (<http://www.lebow.drexel.edu/people/hsiuhichang/>) (*University of Minnesota*) *Department of Accounting and Tax, KPMG Endowed Chair and Department Head.* Professor.

Anthony P. Curatola, PhD (<http://www.lebow.drexel.edu/people/anthonycuratola/>) (*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.

DECISION SCIENCES

Avijit Banerjee, PhD (<http://www.lebow.drexel.edu/people/anthonycuratola/>) (*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

Seung-Lae Kim, PhD (<http://www.lebow.drexel.edu/people/seung-laekim/>) (*Penn State University*) *Department of Decision Sciences.* Professor. Inventory control, Production Planning and Control, Quality Management, Six-Sigma, Supply Chain Management

FINANCE

Michele Lowry, PHD (<http://www.lebow.drexel.edu/people/michellelowry/>) (*University of Rochester*) *Department of Finance.* TD Bank Professor of Finance. Empirical Corporate Finance, including initial public offerings, mergers, and corporate governance.

Ralph Walkling, PhD (<http://www.lebow.drexel.edu/people/ralphwalkling/>) (*University of Maryland*) *Stratakis Professor of Corporate Governance, Department of Finance.* Professor. Corporate governance, mergers and acquisitions.

MANAGEMENT

Jeffrey H. Greenhaus, PhD (<http://www.lebow.drexel.edu/people/jeffreygreenhaus/>) (*New York University*) *William A. Mackie Professor of Management.* Professor. Work-Life Balance.

V. K. Narayanan, PhD (<http://www.lebow.drexel.edu/people/vadakenarayanan/>) (*University of Pittsburgh*) *Delloitte Touche Jones Stubbs Professor*. Cognition and Strategy; Corporate Entrepreneurship; Organization design

MARKETING

Rolph E. Anderson, PhD (<http://www.lebow.drexel.edu/people/rolphanderson/>) (*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.

Bert Rosenbloom, PhD (<http://www.lebow.drexel.edu/people/bertrosenbloom/>) (*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.

Business Analytics

Major: Business Analytics

Degree Awarded: Master of Science in Business Analytics (MSBSAN)

Calendar Type: Quarter

Total Credit Hours: 45.0

Classification of Instructional Programs (CIP) code: 52.1302

Standard Occupational Classification (SOC) code: 15-2041; 19-3022; 25-1011; 25-1022

About the Program

The MS in Business Analytics program is designed for students who have an interest in quantitative methods, data analysis, and using computer programs to solve business problems.

Students learn how to access and analyze data for the purpose of improved business decision-making. This program prepares students to make good business decisions with fact-based insights and an understanding of business performance from a systems view, using statistical and quantitative analysis of data as well as explanatory and predictive modeling.

The program draws upon three traditional areas of business intelligence:

- *statistics*, to explore and uncover relationships in data;
- *operations research*, to develop mathematical models for data-supported decision making; and
- *management information systems*, to access and create databases that support the other two areas.

Additional Information

For additional information about the program, students should contact the Department of Decision Sciences and MIS (<https://www.lebow.drexel.edu/faculty-and-research/disciplines/decision-sciences-and-mis/>).

Degree Requirements

Operations Research

OPR 601	Managerial Decision Models and Simulation	3.0
---------	---	-----

Statistics

STAT 610	Statistics for Business Analytics	3.0
STAT 630	Multivariate Analysis	3.0

STAT 642	Data Mining for Business Analytics	3.0
----------	------------------------------------	-----

Management Information Systems

MIS 612	Aligning Information Systems and Business Strategies	3.0
MIS 632	Database Analysis and Design for Business	3.0
MIS 633	Predictive Business Analytics with Relational Database Data	3.0
MIS 636	Python Programming for Business Applications	3.0

Capstone Project

BSAN 710	Business Analytics Capstone Project	3.0
Students Select One Concentration*		9.0

Information Systems Concentration

Select three of the following:

MIS 624	Systems Analysis & Design
MIS 630	Inter-Active Decision Support Systems
MIS 634	Advanced Business Analytics with Relational Database Data
MIS 641	MIS Policy and Strategy
MIS 650	Management of Health Care Info Systems
MIS 651	Information Systems Outsourcing Management
MIS 652	Business Agility and IT
MIS 661	Managing with Enterprise Application Software using SAP - Logistics
MIS 662	Managing with Enterprise Application Software using SAP - Accounting & Analytics

Statistics Concentration

Select three of the following:

ECON 550	Econometrics
ECON 560	Time Series Econometrics
ECON 639	Applied Industrial Analysis
FIN 642	Business Conditions and Forecasting
MKTG 606	Customer Analytics
STAT 628	Applied Regression Analysis
STAT 634	Quality & Six-Sigma
STAT 636	Experimental Design
STAT 638	Advanced Statistical Quality Control

Modeling Concentration

Select three of the following:

ECON 548	Mathematical Economics
ECON 610	Microeconomics
ECON 650	Business & Economic Strategy: Game Theory & Applications
OPR 622	Operations Research II
OPR 624	Advanced Mathematical Program
OPR 626	System Simulation
OPR 640	Decision Models for the Public Sector
OPR 660	OR Models in Finance

Functional Area of Business Concentration

To complete a concentration in one of these fields, the student will develop a plan of study that is mutually approved by the student and the Department Head.

Select three 600-level courses from either: ACCT, FIN, MKTG, POM or ECON

Free Electives*	6.0
Select two 600-level courses within LeBow.	

Experiential Learning Requirement

BUSN 615	Graduate Internship	3.0
or BUSN 715	Business Consulting Projects	

Total Credits	45.0
---------------	------

* Courses outside LeBow can be substituted with permission from your Program Manager.

Sample Plan of Study

First Year		
Term 1		Credits
MIS 612	Aligning Information Systems and Business Strategies	3.0
OPR 601	Managerial Decision Models and Simulation	3.0
STAT 610	Statistics for Business Analytics	3.0
Term Credits		9.0
Term 2		
MIS 633	Predictive Business Analytics with Relational Database Data	3.0
MIS 636	Python Programming for Business Applications	3.0
STAT 630	Multivariate Analysis	3.0
Term Credits		9.0
Term 3		
MIS 632	Database Analysis and Design for Business	3.0
STAT 642	Data Mining for Business Analytics	3.0
Elective		3.0
Term Credits		9.0
Term 4		
Experiential Learning Requirement		3.0
Term Credits		3.0
Second Year		
Term 5		
BSAN 710	Business Analytics Capstone Project	3.0
Electives		6.0
Term Credits		9.0
Term 6		
Electives		6.0
Term Credits		6.0
Total Credit: 45.0		

Facilities

Business Analytics Faculty

Murugan Anandarajan, PhD (*Drexel University*) *Interim Associate Dean for Academic Affairs*. 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*). 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.

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.

Jinwook Lee, PhD (*Rutgers University, New Brunswick*). Assistant Professor. Decision Models, Mathematical Programming, Risk Assessment Stochastic Optimization, Stochastic Processes.

Merrill W. Liechty, PhD (*Duke University*). Clinical Professor. Bayesian statistics, portfolio selection, higher moment estimation, higher moment estimation, Markov Chain Monte Carlo

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*). Clinical Professor. Drexel University's Provost Fellow India Partnerships

Chaojiang Wu, PhD (*University of Cincinnati*). Assistant Professor. Computational Statistics, Data Analytics, Data Mining, Decision Models, Predictive Analytics

Marketing

Major: Marketing

Degree Awarded: Master of Science in Marketing (MSM)

Calendar Type: Quarter

Total Credit Hours: 45.0

Classification of Instructional Programs (CIP) code: 52.1401

Standard Occupational Classification (SOC) code: 11-2021

About the Program

The Master of Science in Marketing provides students with a focused training in marketing science and it develops the technical skills necessary for success in today's business environment. Marketers require a higher level of technical capabilities to respond to today's dynamic marketing. At the same time, new tools such as neuroscience, analytics, and the proliferation of digital media empower marketers to better understand customers and respond to their needs and wants. These skills offer a higher level of training not typically available in graduate marketing education.

Additional Information

For more information about the program, contact the Department of Marketing (<https://www.lebow.drexel.edu/academics/graduate/master-of-science/ms-marketing/>). For more detailed information please contact Lori Miceli at lr398@drexel.edu or 215-895-0975, Program Manger for Master of Science in Marketing.

Admission Requirements

The LeBow College of Business seeks applicants with exceptional ability and motivation. Students who hold a bachelor's degree, either in Marketing or another discipline, may apply to the MS program. Students who lack some part of this preparation may be considered for admission conditional on their completing the appropriate undergraduate courses as non-matriculated students during the summer term before they begin the program in the fall.

In reviewing an applicant's credentials, the following factors will be considered:

- **Prior Academic Accomplishments:** All course work taken prior to application will be examined, paying particular attention to the specific courses that have been completed. Applicants should have attained a minimum grade point average (GPA) of 3.0 (on a 4.0) scale for all undergraduate course work completed.
- **Graduate Record Examination (GRE) or Graduate Management Aptitude Test (GMAT):** Applicants are required to submit GRE or GMAT scores. Scores of more than five years old are not accepted.
- **Test of English as a Foreign Language (TOEFL):** Applicants whose native language is not English and who have not already received a degree from a U.S. university must also submit scores from the Test of English as a Foreign Language (TOEFL).
- **Personal Statement/Essay:** Each applicant must submit a personal statement. The personal statement should explain the applicant's educational and personal experiences that have influenced the decision to pursue an MS and should discuss the candidate's career plans and goals.
- **Letters of Recommendation:** Two letters of recommendation must be submitted in support of the application. Applicants are strongly encouraged to seek recommendations from academics or other professionals who can assess the applicant's likelihood of success in the MS program.

Degree Requirements

Required Courses

MKTG 601	Marketing Strategy & Planning	3.0
MKTG 622	Buyer Behavior Theory	3.0
MKTG 630	Global Marketing	3.0
MKTG 652	Marketing Information Management and Research	3.0
STAT 601	Business Statistics	3.0
or STAT 610	Statistics for Business Analytics	

Required Electives - Choose 7 of the following (2 must be from MKTG) 21.0

BLAW 605	Legal Options in Decision Making	
BMES 509	Entrepreneurship for Biomedical Engineering and Science	
BMES 510	Biomedical Statistics	
BMES 524	Introduction to Biosensors	
BMES 538	Biomedical Ethics and Law	
BMES 551	Biomedical Signal Processing	
BMES 621	Medical Imaging Systems I	
BUSN 501	Measuring and Maximizing Financial Performance	
CCM 555	Ethnography of Communication	
CCM 745	Digital Subjectivities	
CCM 777	Communication Network Analysis	
COM 535	Digital Publishing	
COM 586	International Communication	
COM 610	Theories of Communication and Persuasion	
FIN 601	Corporate Financial Management	
MGMT 601	Managing the Total Enterprise	

MKTG T580	Special Topics in MKTG	
MKTG T680	Special Topics in MKTG	
MKTG T780	Special Topics in MKTG	
MKTG T880	Special Topics in MKTG	
MKTG 606	Customer Analytics	
MKTG 607	Marketing Experiments	
MKTG 634	Integrated Marketing Communications Management	
MKTG 638	New Product Planning, Strategy, and Development	
MKTG 646	Services Marketing	
MKTG 654	Corporate Brand & Reputation Management	
ORGB 625	Leadership and Professional Development	
PSY 512	Cognitive Psychology	
PSY 611	Computer-Based Research Methods for Psychological Research	
PSY 615	Judgment & Decision-making	
PSY 811	Multilevel Regression	
PSY 812	Cognitive Neuroscience	
Experiential Learning *		9.0
BUSN 603	Market Policies and Practices	
BUSN 615	Graduate Internship	
BUSN 715	Business Consulting Projects	
INTB 790	Seminar in International Business	
Total Credits		45.0

* Students unable to complete 9.0 credits of Experiential Learning should complete additional electives.

Sample Plan of Study

First Year

Term 1		Credits
MKTG 601	Marketing Strategy & Planning	3.0
MKTG 652	Marketing Information Management and Research	3.0
STAT 610 or 601	Statistics for Business Analytics Business Statistics	3.0
Elective		3.0
Term Credits		12.0

Term 2

MKTG 622	Buyer Behavior Theory	3.0
MKTG 630	Global Marketing	3.0
Required Marketing Elective		3.0
Elective		3.0
Term Credits		12.0

Term 3

Required Marketing Elective		3.0
Electives		6.0
Term Credits		9.0

Term 4

BUSN 603, 615, 715, or INTB 790	Market Policies and Practices Graduate Internship Business Consulting Projects Seminar in International Business	3.0
Term Credits		3.0

Second Year

<hr/>		
<hr/>		
<hr/>		
<hr/>		
Term 5		
Electives		9.0
Term Credits		9.0

Total Credit: 45.0

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.

William Halvena, PhD (*Columbia University*). Associate Clinical Professor. Quantitative Marketing, Marketing Research, Consumer Behavior

Michael Howley, PhD (*Arizona State University*). 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*). Associate Professor. Consumer n-store decision making, consumer planning, health marketing, memory and learning.

Daniel Korschun, PhD (*Boston University*). Associate Professor. Brand and corporate reputation management, corporate social responsibility, internal marketing, marketing strategy, relationship marketing.

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*). 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*). Associate Professor. Consumer curiosity, self-regulation and goals, sensory perception.

Supply Chain Management and Logistics

Major: Supply Chain Management and Logistics

Degree Awarded: Master of Science in Supply Chain Management and Logistics (MSSCML)

Calendar Type: Quarter

Total Credit Hours: 45.0

Classification of Instructional Programs (CIP) code: 52.0203

Standard Occupational Classification (SOC) code: 11-3071

About the Program

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.

The Drexel MS Program in Supply Chain Management and Logistics is delivered in two tracks:

- For students in the **Industry Professional Track**, we are committed to increasing their supply chain competencies and leadership abilities. We work with organizations and leaders from around the world to help shape strategies that inspire competitive advantage and business success.
- For students in the **Research Track**, we leverage industry relationships to inform the development of theory and models that advance the field. Research seminars led by our top-notch faculty prepare our MS students to enter PhD programs and become academic leaders.

Additional Information

Please contact Drexel LeBow's Graduate Admissions Office (<http://www.lebow.drexel.edu/academics/graduate/resources/admissions/admissions-standards/>) directly with any questions concerning required entrance exams (such as the GMAT), evaluation of undergraduate or graduate records (grades, scores, total years and subjects studied, etc.), and any other issues regarding application to the College.

Degree Requirements

All students will be required to take a series of foundation courses in the management of operations and the quantitative methods that support analysis and decision making for supply chain management and logistics. After the common core, the students will choose one of the following tracks:

- (1) **Industry Professional Track**: This track covers a range of topics for practical management decisions over multiple horizons for different types of supply chains and prepares the students for effective leadership in an increasingly complex, dynamic, global business environment.
- (2) **Research Track**: This track goes deeper into the theoretical foundations of decision making in supply chains and prepares students for doctoral studies in the area.

Core Courses		
POM 610	Supply Chain Management I	3.0
POM 615	Supply Chain Management II	3.0
POM 624	Management of Service Firms	3.0
POM 628	Advanced Supply Chain Management	3.0
POM 630	Transportation & Logistics Management	3.0
Quantitative Methods		
OPR 601	Managerial Decision Models and Simulation	3.0
STAT 610	Statistics for Business Analytics	3.0
Select one of the following MIS courses		3.0
MIS 630	Inter-Active Decision Support Systems	
MIS 632	Database Analysis and Design for Business	
MIS 633	Predictive Business Analytics with Relational Database Data	
MIS T680	Special Topics in MIS	
Select one of the following tracks		21.0
Industry Professional Track		
POM 770	Supply Chain Management and Logistics Capstone Project	
Select six* of the following		
BUSN 502	Essentials of Economics	
ECON 610	Microeconomics	
ECON 630	International Economics	
ECON 650	Business & Economic Strategy: Game Theory & Applications	
MIS 651	Information Systems Outsourcing Management	
MIS 661	Managing with Enterprise Application Software using SAP - Logistics	
MIS 662	Managing with Enterprise Application Software using SAP- Accounting & Analytics	
OPR 640	Decision Models for the Public Sector	
ORGB 625	Leadership and Professional Development	
or ORGB 633 Leading Effective Organizations		
ORGB 640	Negotiations for Leaders	
POM 642	Sustainable Supply Chain Management and Logistics	
POM 643	Managing Queues for Service Operations	
POM 644	Revenue Management	
STAT 634	Quality & Six-Sigma	
STAT 638	Advanced Statistical Quality Control	
Research Track**		
OPR 922	Operations Research Methods I	
POM 771	Supply Chain Management and Logistics Master's Thesis	
POM 900	Decision Processes in Operations Management	
POM 922	Inventory Models Seminar	
POM 925	Supply Chain Management Seminar	
POM 930	Scheduling Theory	
Total Credits		45.0

* Courses from a graduate minor can be substituted for courses on the list of approved electives. Other substitutions must be approved by academic advisor and department.

** The Master's Thesis (POM 771) typically entails 6 or more credits of coursework. A student on the Research Track who completes a thesis for less than 6 credits must take one or more elective courses to reach the graduation requirement of 45 credits.

Sample Plan of Study

First Year		
Fall		Credits
OPR 601	Managerial Decision Models and Simulation	3.0
POM 610	Supply Chain Management I	3.0
STAT 610	Statistics for Business Analytics	3.0
Term Credits		9.0
Winter		

POM 615	Supply Chain Management II	3.0
Track Electives		6.0
Term Credits		9.0
Spring		
POM 624	Management of Service Firms	3.0
POM 628	Advanced Supply Chain Management	3.0
Track Elective		3.0
Term Credits		9.0
Summer		
Track Elective (optionally, Experiential Learning)		3.0
Term Credits		3.0
Second Year		
Fall		
POM 770	Supply Chain Management and Logistics Capstone Project	3.0
POM 630	Transportation & Logistics Management	3.0
Track Elective		3.0
Term Credits		9.0
Winter		
Track Electives		6.0
Term Credits		6.0

Total Credit: 45.0

Facilities

Supply Chain Management Faculty

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*). Professor. Interior-point methods, Large Scale Optimization, Mathematical Programming, Nonlinear Optimization, Operations and Supply Chain Optimization, Optimization Software, Portfolio Optimization

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

Benjamin Lev, PhD (*Case Western Reserve University*). Trustee Professor. Inventory Control, Mathematical Programming, Operations Planning and Scheduling.

Chuanren Liu, PhD (*Rutgers University*). Assistant Professor.

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

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. Associate Clinical Professor. Healthcare Operations Management, Inventory Control, Production Planning and Control, Service Management, Supply Chain Management

Chaojiang Wu, PhD (*University of Cincinnati*). Assistant Professor. Computational Statistics, Data Analytics, Data Mining, Decision Models, Predictive Analytics

Certificate in Advanced Business

Certificate Level: Post-graduate

Admission Requirements: Master's degree or higher

Certificate Type: Post-Master's Certificate

Number of Credits to Completion: 12.0

Instructional Delivery: Campus, Online, Hybrid

Calendar Type: Quarter

Expected Time To Completion: 3 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 52.0201

Standard Occupational Classification (SOC) Codes: 11-1021, 13-0000

About the Program

The Drexel LeBow Advanced Business Certificate (ABC) program is available to applicants possessing an earned master's degree or doctoral degree from a fully accredited university or college. The program is designed to permit qualified candidates the opportunity to update their skills in a professional field of specialization in which they have had previous academic experience, or to acquire competence in a new business discipline.

The post-master's ABC program requires completion of a four-course sequence and may include the following specialization areas:

- business analytics
- finance
- leadership
- marketing
- or a customized certificate option

The Advanced Business Certificate program is administered by the Krall Center Corporate and Executive Education (<http://www.lebow.drexel.edu/corporate-services/corporate-and-executive-education/>) Drexel LeBow College of Business. Participants in this part-time certificate program have a three-year maximum timeframe within which to complete the certificate requirements. ABC students are enrolled in courses in Drexel LeBow MBA sections pending availability.

Upon acceptance to the ABC program, students will meet with an advisor to review program/course prerequisites (if applicable), and create a plan of study within one of the programs specializations. Sample course sequences in the specialization areas are listed below.

The ABC program leads to a Post-Master's Certificate. The credits earned in the certificate are not applicable to any current or future degree program offered by Drexel University unless all applicable entrance criteria for the anticipated program are met.

Certificate Requirements

After completing the four-course series, and receiving at least a 3.0 GPA for the certificate courses, students will receive a Post-Master's Certificate. Continuing Education Units (CEU) credits and/or Continuing Professional Educational (CPE) credits may be applicable.

Sample Sequences

All sample sequences are subject to change based on availability and individual student academic and professional background.

12.0 quarter credits

Sample Business Analytics sequence:

FIN 642	Business Conditions and Forecasting	3.0
MIS 632	Database Analysis and Design for Business	3.0
STAT 601	Business Statistics	3.0
STAT 632	Datamining for Managers	3.0

Sample Innovation sequence:

FIN 635	Entrepreneurial Finance	3.0
MGMT 650	Corporate Venturing	3.0
MGMT 652	New Venture Planning	3.0
MKTG 654	Corporate Brand & Reputation Management	3.0

Sample Finance sequence:

FIN 601	Corporate Financial Management	3.0
FIN 602	Advanced Financial Management	3.0
FIN 622	Financial Institutions & Markets	3.0
FIN 642	Business Conditions and Forecasting	3.0

Sample Leadership sequence:

BUSN T680	Special Topics in BUSN	3.0
MGMT 510	Business Problem Solving	3.0
MGMT 655	Knowledge Management	3.0
ORGB 625	Leadership and Professional Development	3.0
ORGB 631	Leading Effective Organizations	3.0

Sample Marketing sequence:

MKTG 601	Marketing Strategy & Planning	3.0
MKTG 622	Buyer Behavior Theory	3.0
MKTG 634	Integrated Marketing Communications Management	3.0
MKTG 638	New Product Planning, Strategy, and Development	3.0

Additional Information

For further information, including how to apply to the program, contact the Krall Center for Corporate and Executive Education at 215.895.1611 or email executive@drexel.edu. (executive@drexel.edu)

LeBow College of Business: School of Economics

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 continues 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.

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. A degree in economics provides students with a robust understanding of the workings of the market system, major economic institutions, economic policy, and development. The School of Economics boasts an award-winning faculty who are leading researchers and dedicated teachers. The world-renowned faculty members take a hands-on approach to teaching, research and mentoring students.

Majors

- Economics (MSECON) (p. 192)
- Economics (PhD) (p. 194)
- Economics and Computer Science (MSECCS) (<http://catalog.drexel.edu/graduate/schoolofeconomics/economicsandcomputerscience/>)

Minors

- Economic Data Analysis (<http://catalog.drexel.edu/graduate/schoolofeconomics/economicdataanalysisgminor/>)
- Economics (<http://catalog.drexel.edu/graduate/schoolofeconomics/economicsgminor/>)

Economics

Major: Economics

Degree Awarded: Master of Science in Economics (MSECON)

Calendar Type: Quarter

Total Credit Hours: 45.0

Classification of Instructional Programs (CIP) code: 45.0603

Standard Occupational Classification (SOC) code: 19-3011

About the Program

The Master of Science program in Economics at Drexel University integrates training in core economics, rigorous quantitative methods and policy analysis. It prepares students for a career in industry, the financial sector, government or international organizations. The program also provides knowledge and analytical skills necessary for students wishing to pursue a PhD degree in Economics or related areas.

Admission Requirements

The LeBow College of Business: School of Economics seeks applicants with exceptional ability and motivation. Students who hold a bachelor's degree, either in economics or another discipline, may apply to the MS program. All courses in the program expect a preparation of at least principles of economics and basic statistics. Students who lack some part

of this preparation may be considered for admission conditional on their completing the appropriate undergraduate courses as non-matriculated students during the summer term before they begin the program in the fall.

In reviewing an applicant's credentials, the faculty will consider the following factors:

- **Prior Academic Accomplishments:** The faculty will examine all course work taken prior to application, paying particular attention to the specific courses that have been completed. Applicants should have attained a minimum grade point average of 3.0 (on a 4.0 scale) for all undergraduate course work completed.
- **Graduate Record Examination (GRE) or Graduate Management Aptitude Test (GMAT):** Applicants are required to submit GRE or GMAT scores. Scores of more than five years old are not accepted.
- **Test of English as a Foreign Language (TOEFL):** Applicants whose native language is not English and who have not already received a degree from a U.S. university must also submit scores from the Test of English as a Foreign Language (TOEFL).
- **Personal Statement/Essay:** Each applicant must submit a personal statement. The personal statement should explain the applicant's educational and personal experiences that have influenced the decision to pursue an MS and should discuss the candidate's career plans and goals.
- **Letters of Recommendation:** Two letters of recommendation must be submitted in support of the application. Applicants are strongly encouraged to seek recommendations from academics or other professionals who can assess the applicant's likelihood of success in the MS program.

Admission Procedures

The MS in Economics program admits students each fall. To be considered for admission, the completed application must be received by the LeBow College of Business Office of Graduate Admissions. Admissions are considered on a rolling basis and will remain open until all available slots are filled. It is the applicant's responsibility to ensure that all transcripts, test scores and letters of recommendation, as well as the application form and the personal statement, are received by LeBow College Business, School of Economics.

Graduate Assistantships and Financial Aid

Financial assistance for the MS program may be available on a limited basis to highly qualified candidates.

Research Assistantships and Teaching Assistantships may be also be available on a limited basis for highly qualified candidates.

To obtain an application, please contact:

Graduate Admissions Office
Bennett S. LeBow College of Business
Drexel University
3141 Chestnut Street
Philadelphia, PA 19104-2875
215.895.6804
msecon@lebow.drexel.edu

Degree Requirements

Core Requirements

Select one course from each of the following sets:

ECON 540 Intro to Econometrics and Data Analysis

or STAT 610	Statistics for Business Analytics	
or STAT 931	Statistics for Economics	
ECON 548	Mathematical Economics	3.0
or ECON 902	Mathematical Economics	
ECON 550	Econometrics	3.0
or ECON 940	Econometrics I	
ECON 560	Time Series Econometrics	3.0
or ECON 941	Econometrics II	
ECON 610	Microeconomics	3.0
or ECON 910	Advanced Microeconomics I	
ECON 614	Macroeconomics	3.0
or ECON 920	Advanced Macroeconomics I	
Economics electives *		
Complete 18.0 additional credits from the following:		18.0
ECON 601	Managerial Economics	
ECON 616	Public Finance and Cost Benefit Analysis	
ECON 630	International Economics	
ECON 631	International Macroeconomics	
ECON 634	History of Economic Analysis	
ECON 639	Applied Industrial Analysis	
ECON 644	Trade Policy: Theory and Evidence	
ECON 650	Business & Economic Strategy: Game Theory & Applications	
ECON 661	Health Economics	
ECON 662	Economic Analysis of Health Systems	
ECON T680	Special Topics in ECON	
ECON 700	Economics Seminar	
ECON 902	Mathematical Economics	
ECON 910	Advanced Microeconomics I	
ECON 911	Advanced Microeconomics II	
ECON 920	Advanced Macroeconomics I	
ECON 921	Advanced Macroeconomics II	
ECON 925	Macroeconomic Dynamics	
ECON 940	Econometrics I	
ECON 941	Econometrics II	
ECON 942	Applied Microeconomics	
ECON 950	Industrial Organization I	
ECON 951	Industrial Organization II	
ECON 959	Industrial Organization Seminar	
ECON 960	International Trade	
ECON 961	Empirical International Trade	
ECON 962	Open Economy Macroeconomics	
ECON 969	International Trade Seminar	
ECON 979	Open Economy Macro Seminar	
ECON 980	Game Theory	
INTB 632	Economic Analysis of Multinational Corporations	

Business electives		
Complete 9 additional credits from the list of Economics electives or the list below:		9.0
BLAW 620	Legal Aspects of Employment	
BUSN 501	Measuring and Maximizing Financial Performance	
BUSN 615	Graduate Internship	
BUSN 715	Business Consulting Projects	
FIN 601	Corporate Financial Management	
FIN 602	Advanced Financial Management	
FIN 622	Financial Institutions & Markets	
FIN 635	Entrepreneurial Finance	
FIN 640	Mergers and Acquisitions	
FIN 648	International Financial Management	
MGMT 602	Innovation Management	
MKTG 630	Global Marketing	
OPR 601	Managerial Decision Models and Simulation	
OPR 620	Operations Research I	
OPR 622	Operations Research II	

OPR 624	Advanced Mathematical Program	
Total Credits		45.0

* Students who complete ECON 911, ECON 921 and ECON 941 may take the following courses during their second year provided they have the required prerequisites and approval from the Program Coordinator: ECON 925, ECON 942, ECON 950, ECON 951, ECON 959, ECON 960, ECON 961, ECON 962, ECON 969, ECON 979

Sample Plan of Study

Term 1		Credits
ECON 548	Mathematical Economics	3.0
ECON 610	Microeconomics	3.0
ECON 540	Intro to Econometrics and Data Analysis	3.0
Term Credits		9.0
Term 2		
ECON 550	Econometrics	3.0
ECON 650	Business & Economic Strategy: Game Theory & Applications	3.0
Elective		3.0
Term Credits		9.0
Term 3		
ECON 560	Time Series Econometrics	3.0
ECON 601	Managerial Economics	3.0
Elective		3.0
Term Credits		9.0
Term 5		
ECON 639	Applied Industrial Analysis	3.0
ECON 644	Trade Policy: Theory and Evidence	3.0
ECON 614	Macroeconomics	3.0
Term Credits		9.0
Term 6		
ECON 616	Public Finance and Cost Benefit Analysis	3.0
ECON 700	Economics Seminar	3.0
Elective		3.0
Term Credits		9.0
Total Credit: 45.0		

Centers and Facilities

This marriage of academic rigor and practical applications can also be seen in the development of the school's Centers of Excellence. Centers of Excellence are catalysts for research and innovation, think tanks for nationally significant trends and issues, and incubators for opportunities in business and integration among disciplines. LeBow's Centers of Excellence provide students with meaningful experiential learning and impact the performance of business in our region and around the world. As part of the curriculum Drexel LeBow MBA students will take courses which reside in the centers and will see firsthand how practical learning is applied.

The Centers are:

- Sovereign Institute for Strategic Leadership (<https://www.lebow.drexel.edu/academics/centers/>)
- Center for Corporate Governance (<https://www.lebow.drexel.edu/academics/centers/corporate-governance/>)
- Dana and David Dornsife Center for Experiential Learning (<https://www.lebow.drexel.edu/academics/centers/experiential-learning/>)

Facilities

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*). Associate 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.

Shawkat M. Hammoudeh, PhD (*University of Kansas*). Professor. Applied econometrics, financial economics, international economics, and natural resource economics.

Teresa Harrison, PhD (*University of Texas Austin*) *Associate Dean, Academic Affairs*. Associate Professor. 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.

Vibhas Madan, PhD (*Michigan State University*). Professor. International trade theory, applied microeconomics.

Roger A. McCain, PhD (*Louisiana State University*) *Co-director*. 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.

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; game theory

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.

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.

Economics

Major: Economics

Degree Awarded: Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 60.0 (Post-Master's degree) or 90.0 (Post-Bachelor's degree)

Classification of Instructional Programs (CIP) code: 45.0603

Standard Occupational Classification (SOC) code: 19-3011

About the Program

Drexel's PhD program in Economics prepares economists for academic research as well as careers in government or industry by providing a solid background in economic theory, quantitative analysis, and analytical tools at the advanced level. Each year a relatively small number of PhD students are accepted into the program, which allows for a collegial environment where the PhD students interact with faculty on a daily basis. Requirements for the MS in Economics program are satisfied if the coursework associated with the first and second years of the PhD program are complete.

The PhD program in Economics offers three fields of study:

- Industrial Organization
- International Trade
- Open Economy Macroeconomics

The PhD program in Economics is also particularly strong in applied microeconometrics.

Students typically complete their coursework in two years and the PhD degree in five. Students work as research and teaching assistants under the supervision of a faculty member. After their second year, students can teach independently.

Additional information can be found online at the PhD Program in Economics (<http://www.lebow.drexel.edu/Prospects/Doctorate/Econ/>) page as well as in the LeBow College of Business LeBow PhD Handbook (<https://www.lebow.drexel.edu/sites/default/files/1457548154-lebowphdhandbook2016.pdf>).

To apply and for application information please check online at the LeBow PhD Admissions (<http://www.lebow.drexel.edu/resources/admissions/phd/>) webpage.

Questions should be addressed to lebowphd@drexel.edu.

Admission Requirements

The LeBow College of Business: School of Economics seeks applicants with exceptional ability and motivation. For the PhD, the School places emphasis on applicants who can provide evidence of strong potential in a research-oriented program. In general, prior training at either the undergraduate or graduate level in economics and mathematics is strongly encouraged. All courses in the program expect a preparation of at least principles of economics and basic statistics. Students who lack some part of this preparation may be considered for admission conditional on their completing the appropriate undergraduate courses as non-matriculated students during the summer term before they begin the program in the fall.

Admission is competitive and highly selective.

In reviewing an applicant's credentials, the faculty will consider the following factors:

- **Prior Academic Accomplishments:** The faculty will examine all course work taken prior to application, paying particular attention to the specific courses that have been completed. Applicants should have attained a minimum grade point average of 3.0 (on a 4.0 scale) for all undergraduate course work completed. They also should have attained a minimum 3.3 average for any graduate-level course work taken. The faculty generally expects applicants to demonstrate a substantially higher level of accomplishment than these minimum requirements. A master's degree is not a requirement.
- **Graduate Record Examination (GRE):** Applicants are required to submit GRE scores. GRE scores are not accepted if they are more than five years old.
- **Test of English as a Foreign Language (TOEFL):** Applicants whose native language is not English and who have not already received a degree from a U.S. university must also submit scores from the Test of English as a Foreign Language (TOEFL).
- **Personal Statement/Essay:** Each applicant must submit a personal statement. The personal statement should explain the applicant's educational and personal experiences that have influenced the

decision to pursue a PhD and should discuss the candidate's career plans and goals. The faculty are especially interested in learning about an applicant's prior research experience and the commitment to future research in the applicant's area of specialization.

- **Letters of Recommendation:** Two letters of recommendation must be submitted in support of the application. Applicants are strongly encouraged to seek recommendations from academics or other professionals who can assess the applicant's likelihood of success in a research-oriented PhD program.

Admission Procedures

The PhD Programs in Economics admits students each fall. To be considered for admission, the completed application must be received by the LeBow College of Business Office of Graduate Admissions no later than **January 15th**. It is the applicant's responsibility to ensure that all transcripts, test scores and letters of recommendation, as well as the application form and the personal statement, are received by Drexel University no later than **January 15th**.

Assistantships and Financial Aid

The LeBow College of Business strives to provide graduate assistantships to all entering PhD students. Each applicant to the PhD program is automatically considered for a graduate assistantship as well as for admission into the program. First-year graduate assistants are assigned to work with a faculty member on research activities. During the second and subsequent years, graduate assistants are generally assigned a combination of teaching and research responsibilities. Assistants receive a stipend and 27.0 credits of tuition remission per academic year. Doctoral students who are making satisfactory progress toward the degree can expect to be provided with an assistantship for at least four years.

Degree Requirements

The PhD in Economics program prepares economists for careers in research, teaching, business, and government. It is designed to provide students with not only a broad understanding of modern economics, but also the opportunity to conduct high quality research in a number of specific fields of study including industrial organization, international economics, and health economics.

In the second year of study, the PhD in Economics offers three fields of specialization: industrial organization, international trade, and open economy macroeconomics. Students complete courses in two of these fields of specialization.

Curriculum

60.0 credits (Post-Master's degree)

90.0 credits (Post-Bachelor's degree)

- 27.0 credits of first year core courses
- 18.0 credits of economics field requirements
- 15.0 credits (minimum) of dissertation research
- 30.0 additional dissertation research credits for students without a Master's degree

Core Program

All PhD students pursue a common set of core courses. The following courses are all completed during the first year, with the exception of ECON 941 Econometrics II, which is completed in the second year.

Core Courses

ECON 902	Mathematical Economics	3.0
ECON 910	Advanced Microeconomics I	3.0
ECON 911	Advanced Microeconomics II	3.0
ECON 920	Advanced Macroeconomics I	3.0
ECON 921	Advanced Macroeconomics II	3.0
ECON 940	Econometrics I	3.0
ECON 941	Econometrics II	3.0
ECON 942	Applied Microeconometrics	3.0
ECON 980	Game Theory	3.0
STAT 931	Statistics for Economics	3.0
Total Credits		30.0

* Taken in the second year.

First-Year Examination

After the completion of the core coursework, students are examined on their competence in the core material and their readiness to proceed.

Fields of Specialization

Students are required to complete the coursework for at least two of the following fields/sequences.

Industrial Organization

ECON 950	Industrial Organization I
ECON 951	Industrial Organization II
ECON 959	Industrial Organization Seminar

International Trade

ECON 960	International Trade
ECON 961	Empirical International Trade
ECON 969	International Trade Seminar

Open Economy Macroeconomics

ECON 925	Macroeconomic Dynamics
ECON 962	Open Economy Macroeconomics
ECON 979	Open Economy Macro Seminar

Electives

In addition, students can take elective courses from the Economics Department, from any other departments in the College of Business, and from departments in other Colleges of Drexel University. The following is a set of sample electives:

ECON 930	Monetary Economics	3.0
ECON 952	Health Economics	3.0
ECON 955	Public Economics	3.0
ECON 964	Economic Development	3.0
ECON T980	Special Topics in ECON	0.5-9.0
Additional courses with the permission of the advisor		3.0

Dissertation Research

ECON 998	Dissertation Research in Economics	12.0
----------	------------------------------------	------

Facilities**School of Economics Faculty**

Marco Airauda, 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*). Associate 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.

Shawkat M. Hammoudeh, PhD (*University of Kansas*). Professor. Applied econometrics, financial economics, international economics, and natural resource economics.

Teresa Harrison, PhD (*University of Texas Austin*) *Associate Dean, Academic Affairs*. Associate Professor. 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.

Vibhas Madan, PhD (*Michigan State University*). Professor. International trade theory, applied microeconomics.

Roger A. McCain, PhD (*Louisiana State University*) *Co-director*. 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.

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; game theory

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.

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.

The Antoinette Westphal College of Media Arts & Design

About the College

The Antoinette Westphal College of Media Arts & Design (<http://www.drexel.edu/westphal/>) (The Westphal College) offers graduate programs in Arts Administration & Museum Leadership, Design Research, Fashion Design, Interior Architecture & Design, Digital Media, Television Management, and Urban Strategy. The programs are distinctive in content and professionally oriented.

The Westphal College is a community of learning within the areas of media, design, the fine arts, the performing arts, and the management of creative enterprise that values experiential and immersive education; it is a place where students are encouraged to give form to ideas by learning to negotiate change in an ever-changing world. Through creative, critical, and collaborative approaches, the Westphal College's diverse programs seek to foster innovation and leadership in progressively interconnected professional 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 a continual review of our curricula, processes and outcomes in order to make those improvements and refinements necessary to further enrich our students' education, and to continue to foster independent thinkers, astute leaders, and creative problem solvers.

Majors

- Arts Administration & Museum Leadership (MS) (<http://catalog.drexel.edu/graduate/collegeofmediaartsanddesign/artsadministrationandmuseumleadership/>)
- Design Research (MS) (<http://catalog.drexel.edu/graduate/collegeofmediaartsanddesign/designresearch/>)
- Digital Media (MS, PhD) (p. 199)
- Fashion Design (MS) (p. 204)
- Interior Architecture & Design (MS) (p. 206)
- Retail & Merchandising (MS) (<http://catalog.drexel.edu/graduate/collegeofmediaartsanddesign/retailmerchandising/>)
- Television and Media Management (MS, MS/MBA) (<http://catalog.drexel.edu/graduate/collegeofmediaartsanddesign/televisionandmediamanagement/>)
- Urban Strategy (MS) (<http://catalog.drexel.edu/graduate/collegeofmediaartsanddesign/urbanstrategy/>)

Minors

- Arts Administration (<http://catalog.drexel.edu/graduate/collegeofmediaartsanddesign/artsadministrationgradminor/>)
- Digital Media (<http://catalog.drexel.edu/graduate/collegeofmediaartsanddesign/digitalmediagradminor/>)

- Museum Leadership (<http://catalog.drexel.edu/graduate/collegeofmediaartsanddesign/museumleadershipgradminor/>)
- **NEW:** Retail and Merchandising

Full/Part-Time Options

- Graduate study in digital media, fashion design, interior architecture + design and design research includes two years of full-time graduate study. There are some programs that require prerequisite coursework before entering into the graduate level studies.
- Students may enroll in the Arts Administration & Museum Leadership programs on a full-time or part-time basis. Full-time arts administration students may complete the degree in five terms. The arts administration, television management and retail & merchandising graduate programs are also available as fully-online degrees through Drexel University Online (<https://online.drexel.edu/>).
- Students may enroll in the Paul F. Harron Graduate Program in Television Management program on a full-time or part-time basis. Television management students enrolled full-time in either option should plan to take two full years to complete the program.
- The Digital Media PhD program is a full-time program. The post-MS version of the PhD program is 3-4 years and 4-5 years for the post-BS version of the PhD.

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://www.drexel.edu/performingarts/about/facilities/URBN-center-black-box-theater/>) for our performing arts, a 3,500 square foot Leonard Pearlstein Gallery (<http://www.drexel.edu/pearlsteingallery/>), a Motion Capture studio, a Hybrid Making Lab (http://drexel.edu/westphal/about/overview/making_spaces/HybridMakingLab/) featuring Universal Laser Cutters and 3D printing and prototyping, the Robert and Penny Fox Historic Costume Collection (<http://www.drexel.edu/westphal/resources/FHCC/>), the Charles Evans Fashion Design Library, a multi-use screening & lecture room, Shima Seki high-tech knitting machines and offices for the College's administrative functions.

The Academic 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, digital imaging labs (http://www.drexel.edu/westphal/about/overview/making_spaces/DarkroomFacility/), 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 featuring state of the art cameras ARRIFLEX (Arri) Alexa XT Plus and the Amira Premiere 4K.

MacAlister Hall serves students in the Westphal College with: digital audio labs and recording studios for Music Industry; The Mandell Theater (<http://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://www.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.

Digital Media

Major: Digital Media

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS); 90.0 (PhD, post-bachelor's); or 45.0 (PhD, post-master's)

Co-op Option: Graduate Co-op

Classification of Instructional Programs (CIP) code: 11.0801

Standard Occupational Classification (SOC) code: 15-1134

About the Program

As a natural extension of the Animation and Visual Effects, Game Design and Production, Interactive Digital Media and Virtual Reality and Immersive Media undergraduate programs, both the Masters of Science (MS) and PhD program challenge students to push beyond what is known and into what is possible.

Students will who will excel are those that:

- have graduated with significant skills in 3D modeling and animation, game design, or interactive digital media and could immediately find a job in user experience (UX) design, game design, virtual and augmented reality (AR/VR), or animation—but want more. Students will build upon those skills and develop a critical understanding of how the industry evolves, so they can forecast the future and prepare employers for what's coming.
- are a scholar with significant knowledge in the field of digital media, and want both to advance that knowledge and to apply it to research problems across disciplines. Students can expand their universe of possibilities in areas like gaming, animation, virtual and augmented reality, or immersive media in general.

Each of the programs is STEM-designated.

Master of Science Program

In this two-year program, students will combine research with applicable skills in 21st century media applications. The curriculum offers a mix of academic coursework and project-related activities in advanced digital design, including 3D modeling, animation, interactivity, gaming and digital media history, theory and methods.

PhD Program

In this interdisciplinary doctoral program, students will focus on translational research, with emphasis on an iterative and design-based research philosophy. They will study the application of digital media towards solving research problems in disciplines such as engineering, education, cultural heritage, health and business.

Additional Information

For more information, visit Drexel's Graduate Studies in Digital Media (<http://www.drexel.edu/westphal/academics/graduate/DIGM/>) web page.

Admission Requirements

Master of Science Program

The MS in Digital Media is an advance course of study. A successful applicant for admission will have a baccalaureate degree, a minimum 3.2 undergraduate GPA and assumed production skills in 3-D modeling, animation and interactivity.

Proof of basic competencies is demonstrated by undergraduate transcript and/or portfolio review. For qualified candidates lacking production skills, we offer a series of pre-graduate classes. Satisfactory completion of the classes qualifies one to apply for graduate admission. Pre-graduate classes may include some or all for the following:

CS 171	Computer Programming I	3.0
CS 172	Computer Programming II	3.0
DIGM 100	Digital Design Tools	3.0
DIGM 505	Design and Interactivity Bootcamp	3.0
DIGM 506	Animation and Game Design Bootcamp	3.0

For additional information on requirements and how to apply, visit Graduate Admissions at Drexel University (<http://www.drexel.edu/grad/programs/westphal/>).

MS in Digital Media

Degree Requirements

Students are required to take a Digital Media History, Theory and Methods course and an advanced seminar for a total of six credits, as well as a minimum of nine courses in advanced modeling animation and interactivity.

During the first year, students also take three New Media Project courses (9.0 credits); these courses provide opportunities to work on funded and unfunded research and industry projects under the guidance of a graduate faculty member. With faculty approval, students may also work on personally designed projects relevant to problem solving in a student's specific area of interest.

In addition, students are required to take 12.0 credits (a minimum of four courses) of directed studies in support of developing knowledge in an area—outside of media and design—to which digital media skills may be applied. The set of directed studies will be determined by the students and their graduate advisors. Possible areas for this focus include, but are not limited to, computer science, information science, bio-medical technology, social science, humanities and education.

Thesis Project

During the second year of study, each student develops and produces a master's thesis project. By the third week of the fall term students submit a proposal to the Digital Media Graduate Committee. Upon approval of the proposal, the student works toward thesis completion, including:

- an oral presentation to the college
- a written statement to the committee
- a copy of the completed media work for the graduate program archive

The thesis project must demonstrate domain knowledge of the agreed upon classes. The media component of the project must demonstrate expertise in 3D modeling/animation and/or interactivity.

Prerequisite Courses

Students without adequate background in digital media are required to take the following prerequisite courses, which are offered during the fall term of the first year of enrollment. These courses do not count towards the MS in Digital Media degree requirements.

Bootcamps *		
DIGM 505	Design and Interactivity Bootcamp	3.0
DIGM 506	Animation and Game Design Bootcamp	3.0
Total Credits		6.0

* Required for students without digital media background.

Required Courses

Digital Media Core		
DIGM 501	New Media: History, Theory and Methods	3.0
DIGM 510	Designing for Interactivity	3.0
DIGM 511	Research Methods for Digital Media	3.0
Digital Media Specialization		18.0
Select 18.0 credits from the following list:		
Game Design and Development		
DIGM 530	Game Design I	
DIGM 531	Game Design II	
GMAP 545	Game Development Foundations	
GMAP 547	Serious Games	
GMAP 548	Experimental Games	
GMAP 560	Game Design from the Player's Perspective	
Animation and Immersive Media		
ANIM 588	Spatial Data Capture	
DIGM 525	Animation I	
DIGM 526	Animation II	
DIGM 547	Organic Modeling	
DIGM 560	Advanced Concepts and Applications in Interactive 3D Environments	
DIGM 616	Immersive World Building	
UX Design and Digital Cultural Heritage		
DIGM 508	Digital Cultural Heritage	
DIGM 520	Interactivity I	
DIGM 521	Interactivity II	
General Digital Media		
DIGM 591	Digital Media Skills Intensive	
DIGM I599	Independent Study in Digital Media	
DIGM I699	Independent Study in Digital Media	
DIGM T580	Special Topics in Digital Media	
DIGM T680	Special Topics in Digital Media	
New Media Project		
DIGM 540	New Media Project **	6.0
Thesis		
DIGM 680	Thesis Development	3.0
Directed Studies		9.0
Total Credits		45.0

** Course is taken 2 times.

Program Requirements Overview

Students applying for admission into the Digital Media PhD program are either post-baccalaureate or post-master's students. Those who are post-

master's are required to take a minimum of 45.0 credits toward their PhD degree (Research Core). Post-baccalaureate PhD students are required to take a minimum of 90.0 credits (45.0 credits Digital Media Core, and 45.0 credits Research Core).

Prerequisite Courses

Post-baccalaureate PhD students without adequate background in digital media are required to take the following prerequisite courses, which are offered fall term of the first year of enrollment. These courses do not count towards the Digital Media degree requirements.

Bootcamps *		
DIGM 505	Design and Interactivity Bootcamp	3.0
DIGM 506	Animation and Game Design Bootcamp	3.0
Total Credits		6.0

* Required for students without DIGM background

Digital Media Core Courses

Digital Media MS Core		
DIGM 501	New Media: History, Theory and Methods	3.0
DIGM 510	Designing for Interactivity	3.0
DIGM 511	Research Methods for Digital Media	3.0
Digital Media Specialization		18.0
Choose 18.0 credits from the following courses:		
Game Design and Development		
DIGM 530	Game Design I	
DIGM 531	Game Design II	
GMAP 545	Game Development Foundations	
GMAP 547	Serious Games	
GMAP 548	Experimental Games	
GMAP 560	Game Design from the Player's Perspective	
Animation and Immersive Media		
ANIM 588	Spatial Data Capture	
DIGM 525	Animation I	
DIGM 526	Animation II	
DIGM 547	Organic Modeling	
DIGM 560	Advanced Concepts and Applications in Interactive 3D Environments	
DIGM 616	Immersive World Building	
UX Design and Digital Cultural Heritage		
DIGM 508	Digital Cultural Heritage	
DIGM 520	Interactivity I	
DIGM 521	Interactivity II	
General Digital Media		
DIGM 591	Digital Media Skills Intensive	
DIGM I599	Independent Study in Digital Media	
DIGM I699	Independent Study in Digital Media	
DIGM T580	Special Topics in Digital Media	
DIGM T680	Special Topics in Digital Media	
New Media Project **		6.0
DIGM 540	New Media Project	
Thesis Development		3.0
DIGM 680	Thesis Development	
Directed Study		9.0
Total Credits		45.0

** Course is taken 2 times.

Research Core Courses

Digital Media Research Core

DIGM 701	Advanced New Media Topics	3.0
DIGM 710	Digital Media Research Methods I	3.0
DIGM 711	Digital Media Research Methods II	3.0
DIGM 810	Advanced Topics in Digital Media Research	3.0
DIGM 850	Public Venue Seminar	3.0
DIGM 851	Publication and Presentation	3.0
Dissertation		9.0
DIGM 998	Digital Media Ph.D. Seminar	
Directed Research		18.0
DIGM 999	Digital Media Research	
DIGM I699	Independent Study in Digital Media	
DIGM I799	Independent Study in Digital Media	
DIGM I899	Independent Study in Digital Media	
DIGM I999	Independent Study in Digital Media	
DIGM T680	Special Topics in Digital Media	
DIGM T780	Special Topics in Digital Media	
DIGM T880	Special Topics in Digital Media	
DIGM T980	Special Topics in Digital Media	
Total Credits		45.0

In addition to the course requirements, PhD students must progress through a series of steps leading to the PhD dissertation:

1. Doctoral candidacy exam
2. Dissertation proposal
3. Written dissertation and public dissertation defense

Dissertation Advisor

Every PhD student has to identify a dissertation advisor no later than the second term in the program. Post-master's students are expected to identify an advisor as soon as possible after joining the program or even before they are formally in the program. The expectation is that post-master's students are academically mature and have already focused on a research area and contacted potential advisors prior to their arrival. Dissertation advisors are not restricted to digital media faculty, but have to be approved by the Department of Digital Media under observation of college and university rules and regulations.

Directed Research Electives

Digital Media PhD students are required to take 18.0 PhD level credits of directed research electives, which have to be approved in advance by the dissertation advisor. It is expected that students take at least 9.0 of these elective credits from other Drexel colleges outside the Antoinette Westphal College of Media Arts in Design in areas closely related to their respective dissertation projects. No more than 12.0 of the elective research credits can be independent study credits.

Doctoral Candidacy Committee

The Department of Digital Media has to establish a Doctoral Candidacy Committee conforming to established university and college rules for dissertation/candidacy committee membership. The purpose of this committee is to conduct and evaluate doctoral candidacy examinations.

Doctoral Candidacy Exam

The Doctoral Candidacy Exam consists of a preliminary proposal prepared by the student outlining the dissertation research plan with an oral defense before the Doctoral Candidacy Committee. A student may schedule the preliminary proposal portion whenever she/he and her/his

advisor decide they are ready but no later than the end of the fall term of second year of study.

To be considered a doctoral candidate by the university, a student must have both passed the Doctoral Candidacy Exam and completed all 45.0 credits of master level coursework post-baccalaureate or 15.0 credits coursework post-master. Once the student has reached doctoral candidate status, the Department of Digital Media will review her/his progress annually.

Dissertation Committee

Within six months of successful completion of the Doctoral Candidacy Examination the Department of Digital Media has to appoint the student's Dissertation Committee based on a proposal submitted by the student and the dissertation advisor. The committee has to conform to established university and college rules for dissertation/candidacy committee membership. The committee must have at least five members, three of whom must be tenure-track faculty at Drexel. At least one member must be from outside the Antoinette Westphal College of Media Arts and Design. In addition, at least three members must be Digital Media core faculty. The chair of the committee must be a Digital Media core faculty member who is not also the dissertation advisor of the student.

Once the Dissertation Committee is established, it will continue on throughout the student's progress toward the PhD degree. The committee's function is to guide the research and to determine the student's general knowledge of the area, as well as the student's breadth and depth of the specific topic. The committee will also consider the scientific feasibility of the proposed research.

Dissertation Proposal

The Dissertation Proposal consists of a written proposal of the dissertation research, a public presentation, and oral proposal defense before the Dissertation Committee. To ensure that students are progressing towards completion of the PhD in a timely fashion, the proposal defense must take place no later than the end of the second year of study. A formal request for an extension of this deadline must be approved following a review of the student's progress.

The purpose of the Dissertation Proposal is to determine if the PhD student is able to initiate, organize, write and defend a scientific idea, which will lead to a PhD dissertation. The presentation will be based on the formal written proposal submitted to the Dissertation Committee at least three weeks before the presentation.

Students who elect to complete the MS in Digital Media alongside the Digital Media PhD degree can submit a revised version of the Dissertation Proposal as a Master Thesis for the partial fulfillment of the MS in Digital Media degree.

Dissertation Defense

The written dissertation will be submitted with the dissertation advisor's approval to the Dissertation Committee. A title and abstract of the dissertation must also be provided to the Digital Media office at least three weeks prior to the defense to allow the time and place of the defense to be publicized. The PhD candidate's public defense consists of his or her presentation of dissertation research followed by an examination by the Dissertation Committee.

Sample Plan of Study

Students without adequate background in digital media must complete two prerequisite courses, which are offered during the fall term of the first year of enrollment: DIGM 505 *Design and Interactivity* and DIGM 506 *Animation and Game Design*.

First Year		Credits
Fall		
DIGM 501	New Media: History, Theory and Methods	3.0
DIGM 505	Design and Interactivity Bootcamp	3.0
DIGM 506	Animation and Game Design Bootcamp	3.0
Term Credits		9.0
Winter		
DIGM 510	Designing for Interactivity	3.0
DIGM 540	New Media Project	3.0
Digital Media Specialization		3.0
Term Credits		9.0
Spring		
DIGM 511	Research Methods for Digital Media	3.0
DIGM 540	New Media Project	3.0
Digital Media Specialization		3.0
Term Credits		9.0
Summer		
Digital Media Specialization		3.0
Term Credits		3.0
Second Year		
Fall		
DIGM 680	Thesis Development	1.0
Digital Media Specialization		3.0
Directed Elective		3.0
Term Credits		7.0
Winter		
DIGM 680	Thesis Development	1.0
Digital Media Specialization		3.0
Directed Elective		3.0
Term Credits		7.0
Spring		
DIGM 680	Thesis Development	1.0
Digital Media Specialization		3.0
Directed Elective		3.0
Term Credits		7.0

Total Credit: 51.0

Sample Plan of Study

Post-Baccalaureate PhD Students

Students without adequate background in digital media must complete two prerequisite courses, which are offered during the fall term of the first year of enrollment: DIGM 505 *Design and Interactivity* and DIGM 506 *Animation and Game Design*.

First Year		Credits
Fall		
DIGM 501	New Media: History, Theory and Methods	3.0
DIGM 505	Design and Interactivity Bootcamp	3.0
DIGM 506	Animation and Game Design Bootcamp	3.0
Term Credits		9.0
Winter		
DIGM 510	Designing for Interactivity	3.0
DIGM 540	New Media Project	3.0

Digital Media Specialization		3.0
Term Credits		9.0
Spring		
DIGM 511	Research Methods for Digital Media	3.0
DIGM 540	New Media Project	3.0
Digital Media Specialization		3.0
Term Credits		9.0
Summer		
DIGM 850	Public Venue Seminar	3.0
Directed Elective		6.0
Term Credits		9.0
Second Year		
Fall		
DIGM 680	Thesis Development	1.0
DIGM 710	Digital Media Research Methods I	3.0
Digital Media Specialization		5.0
Term Credits		9.0
Winter		
DIGM 680	Thesis Development	1.0
DIGM 711	Digital Media Research Methods II	3.0
Digital Media Specialization		4.0
Term Credits		8.0
Spring		
DIGM 680	Thesis Development	1.0
Directed Elective		3.0
Term Credits		4.0
Summer		
DIGM 701	Advanced New Media Topics	3.0
DIGM 998	Digital Media Ph.D. Seminar	1.0
Digital Media Specialization		3.0
Term Credits		7.0
Third Year		
Fall		
DIGM 998	Digital Media Ph.D. Seminar	1.0
Directed Research Elective		3.0
Term Credits		4.0
Winter		
DIGM 998	Digital Media Ph.D. Seminar	1.0
Directed Research Elective		3.0
Term Credits		4.0
Spring		
DIGM 851	Publication and Presentation	3.0
DIGM 998	Digital Media Ph.D. Seminar	1.0
Directed Research Elective		3.0
Term Credits		7.0
Summer		
DIGM 998	Digital Media Ph.D. Seminar	1.0
Directed Research Elective		3.0
Term Credits		4.0
Fourth Year		
Fall		
DIGM 810	Advanced Topics in Digital Media Research	3.0
DIGM 998	Digital Media Ph.D. Seminar	1.0
Term Credits		4.0
Winter		
DIGM 998	Digital Media Ph.D. Seminar	1.0
Directed Research Elective		3.0
Term Credits		4.0
Spring		
DIGM 998	Digital Media Ph.D. Seminar	1.0

Directed Research Elective	3.0
Term Credits	4.0
Summer	
DIGM 998 Digital Media Ph.D. Seminar	1.0
Term Credits	1.0
Total Credit: 96.0	

Sample Plan of Study for Post-Master Ph.D. Students

First Year	
Fall	
DIGM 710 Digital Media Research Methods I	3.0
DIGM 998 Digital Media Ph.D. Seminar	1.0
Term Credits	4.0
Winter	
DIGM 711 Digital Media Research Methods II	3.0
DIGM 998 Digital Media Ph.D. Seminar	1.0
Term Credits	4.0
Spring	
DIGM 998 Digital Media Ph.D. Seminar	1.0
Directed Research Elective	3.0
Term Credits	4.0
Summer	
DIGM 701 Advanced New Media Topics	3.0
Term Credits	3.0
Second Year	
Fall	
DIGM 998 Digital Media Ph.D. Seminar	1.0
Directed Research Elective	3.0
Term Credits	4.0
Winter	
DIGM 998 Digital Media Ph.D. Seminar	1.0
Directed Research Elective	3.0
Term Credits	4.0
Spring	
DIGM 851 Publication and Presentation	3.0
DIGM 998 Digital Media Ph.D. Seminar	1.0
Directed Research Elective	3.0
Term Credits	7.0
Summer	
DIGM 850 Public Venue Seminar	3.0
Directed Research Elective	3.0
Term Credits	6.0
Third Year	
Fall	
DIGM 810 Advanced Topics in Digital Media Research	3.0
DIGM 998 Digital Media Ph.D. Seminar	1.0
Term Credits	4.0
Winter	
DIGM 998 Digital Media Ph.D. Seminar	1.0
Directed Research Elective	3.0
Term Credits	4.0
Spring	
DIGM 998 Digital Media Ph.D. Seminar	1.0
Term Credits	1.0
Total Credit: 45.0	

Facilities

The Digital Media Program operates several labs including a state of the art combined green screen/motion capture studio as well as 2.5 ton 3-degree-of-freedom motion platform. All labs and classrooms are equipped with powerful Dell and Boxx Technologies Workstations running Windows and Unix operating systems and Mac computers running OS X. Software includes a host of Adobe products and Autodesk 3ds Max and Combustion; Alias Maya; Softimage XSI and Behavior, Pixar RenderMan Pro Server along with RenderMan Artist Tools for Maya and RenderMan for Maya; Pixologic Z-Brush; Apple Shake; MotionBuilder; GarageGames; NextLimit RealFlow, and SideEffect's Houdini.

Digital Media Faculty

Paul Diefenbach, PhD (*University of Pennsylvania*). Associate Professor. Game development, real-time rendering.

Troy Finamore, MS (*Drexel University*) Program Director, *Interactive Digital Media*. Associate Teaching Professor. Advertising, design and interactivity.

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).

Nick Jushchyshyn, MFA (*Academy of Art University*) Program Director, *VR & Immersive Media*. Associate Professor. Visual effects, digital media and animation.

Frank J. Lee, PhD (*Carnegie Mellon University*). Professor. Human-computer interaction; cognitive engineering and science; intelligent software agents for games and education.

Robert Lloyd, MFA (*Temple University*) Program Director, *Game Design & Production*. Associate 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.

Santiago Ontañón, PhD (*University of Barcelona*). Assistant Professor. Game AI, computer games, artificial intelligence, machine learning, case-based reasoning

Stefan Rank, PhD (*Vienna University of Technology*). Associate Professor. Artificial intelligence, game design and human-computer interaction.

Jervis Thompson, BS (*Drexel University*). 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*). Associate 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.

Emeritus Faculty

Theo Artz, BFA (*Tyler School of Art, Temple University*). Associate Professor. Digital media.

Fashion Design

Major: Fashion Design

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 63.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 50.0407

Standard Occupational Classification (SOC) code: 27-1022

About the Program

The MS in Fashion Design is a full-time program that stresses the development of the aesthetic and philosophical concepts of fashion design and the technical skills to support research and experimentation in these concepts. A typical graduate sequence may consist of seven terms of graduate courses and five terms of prerequisite coursework, beginning with the summer term accelerated design and drawing courses.

The goal of the MS program in fashion design is to integrate the understanding of design with the construction of clothing so that the final products answer physical, aesthetic, psychological, and social needs within the context of contemporary fashion and industrial limitations. The curriculum is structured so that studio, laboratory, and classroom work give the graduate student a directed experience in the study of aesthetics, criticism, and contemporary art concepts; contemporary and historic art and design; traditional and current fashion technology; the discipline of drawing; and the making of art. A required industry internship affords the graduate student direct experience in a workplace of their choice. This comprehensive approach provides the basis for a broad range of employment in the fashion industry and in education. Other professional opportunities lie in merchandising, costume design, curatorial work, and computer-aided design.

The faculty of the Department of Design includes art historians, CAD specialists, designers, fiber artists, merchandising specialists, new materials and processes researchers, painters, and sculptors. The department also draws on practicing professionals as adjunct professors for specialized coursework and for critique of student work.

A limited number of graduate assistantships are available to students after completing the first year.

The Fashion and Design & Merchandising programs produce a professionally juried annual fashion show which provides competitive fashion industry and department awards and excellent exposure for the graduate students' design thesis. Drexel students can participate in the activities of the Fashion Group of Philadelphia, the local chapter of an international fashion industry organization. The Fox Historic Costume Collection, a rich resource of inspiration, is located in the URBN Center. Philadelphia has many fine museums and galleries and is an affordable bus ride to New York City. Students are encouraged to attend local and regional fashion events.

The 63.0 graduate quarter credits does not include any of the required prerequisite coursework. See the Admission Requirements for a list of

courses students are expected to have completed prior to beginning their graduate study.

Additional Information

For more information about this program, please contact the Program Director:

Kathi Martin

martink@drexel.edu

Admission Requirements

Students enter the program from diverse backgrounds, including liberal arts, fine arts, and business. A personal interview is required. The admission criteria for the graduate program consist of the requirements of the University for graduate admission plus satisfaction of undergraduate coursework in basic fashion design skills and concepts. These prerequisites comprise 24.0 credits in design, drawing, and art history in addition to 20.0 credits in specific undergraduate fashion design professional courses, or their equivalent.

Prerequisite Undergraduate Coursework

ARTH 101	History of Art I: Ancient to Medieval	3.0
ARTH 102	History of Art II: Renaissance to Romanticism	3.0
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 341	Flat Pattern Design	4.0
VSST 104	Accelerated Design I *	2.0
VSST 105	Accelerated Design II *	2.0
VSST 106	Accelerated Design III *	2.0
VSST 110	Introductory Drawing *	3.0
VSST 111	Figure Drawing I *	3.0
Total Credits		44.0

* Or VSST 101, VSST 102, VSST 103 VSST 110, VSST 111 (18.0 credits).

Beginning in the summer term, the department offers a four-term prerequisite year to prepare candidates for the graduate coursework. A portfolio review and departmental evaluation determine what prerequisites have been satisfied. Contact the graduate advisor for specific information about prerequisites or to make an appointment for evaluation.

For additional information on requirements and how to apply, visit Graduate Admissions at Drexel University (<http://www.drexel.edu/grad/programs/westphal/>).

Degree Requirements

The two years of full-time graduate coursework combine four terms of faculty-directed studio work in fashion design and two terms of student-directed independent studio work with required courses in design, aesthetics, and the art process. Elective coursework in fashion or specific topics; advanced studies in art, computer-aided design, art history, and fashion design; and independent studies allow individual flexibility in curriculum design.

Collection I and Collection II (FASH 685 and FASH 686) emphasize the development of an original statement of design intent, allowing students to

synthesize their academic experiences and prepare for the marketplace. Each graduate student develops his or her personal collection which is then produced and presented in a professional fashion show.

Professional Portfolio (FASH 664) is a capstone course in which students create a professional quality collection of drawings geared to their market preferences.

Students are required to participate in at least three national and international fashion design competitions (FASH 699). These competitions provide awareness of world-wide design sensibilities and the overall level of competition in various facets of the marketplace.

The fashion industry internship (FASH 600) promotes spirit of entrepreneurship and provides perspective on success in the fashion industry. A full-time ten week position in industry is required and provides experience in design and production processes.

Required Courses

Fashion Design Studios		
ARTH 530	History of Modern Design	3.0
FASH 504	Materials Exploration	3.0
FASH 510	Presentation Techniques	3.0
FASH 511	Textile Design	3.0
FASH 514	Fashion Presentation	3.0
FASH 515	Computer Aided Design for Patternmaking	3.0
FASH 516	Computer Aided Design for Fashion Design	3.0
FASH 528	Draping Design	3.0
FASH 529	Fashion Design I	3.0
FASH 530	Fashion Design II	3.0
FASH 531	Fashion Design III	3.0
FASH 532	Fashion Drawing for Industry	3.0
FASH 543	Tailoring	3.0
FASH 550	Fashion Design IV	3.0
FASH 600	Fashion Industry Internship	0.0
FASH 633	Couture Techniques	3.0
FASH 666	Business of Fashion	3.0
FASH 664	Professional Portfolio	3.0
FASH 685	Collection I	3.0
FASH 686	Collection II	3.0
FASH 699	Comprehensive Examination in Fashion Design	0.0
Select two of the following:		6.0
FASH 517	Technical Design	
FASH 650	Machine Knitting	
FASH 651	Accessory Design	
FASH 752	Millinery Design	
FASH 767	Style and the Media	
FASH I599	Independent Study in Fashion Design	
FASH I699	Independent Study in Fashion Design	
FASH I799	Independent Study in Fashion Design	
FASH T580	Special Topics in Fashion Design	
FASH T680	Special Topics in Fashion Design	
FASH T780	Special Topics in Fashion Design	
Total Credits		63.0

Sample Plan of Study

Term	Credits	
Term 1		
FASH 504	Materials Exploration	3.0
Term Credits		3.0
Term 2		
FASH 510	Presentation Techniques	3.0

FASH 528	Draping Design	3.0
Term Credits		6.0
Term 3		
FASH 529	Fashion Design I	3.0
Term Credits		3.0
Term 4		
FASH 530	Fashion Design II	3.0
FASH 532	Fashion Drawing for Industry	3.0
Elective		3.0
Term Credits		9.0
Term 5		
FASH 511	Textile Design	3.0
FASH 543	Tailoring	3.0
FASH 514	Fashion Presentation	3.0
Term Credits		9.0
Term 6		
ARTH 530	History of Modern Design	3.0
FASH 516	Computer Aided Design for Fashion Design	3.0
FASH 531	Fashion Design III	3.0
Term Credits		9.0
Term 7		
FASH 550	Fashion Design IV	3.0
FASH 664	Professional Portfolio	3.0
FASH 666	Business of Fashion	3.0
Term Credits		9.0
Term 8		
FASH 515	Computer Aided Design for Patternmaking	3.0
FASH 633	Couture Techniques	3.0
FASH 685	Collection I	3.0
Term Credits		9.0
Term 9		
FASH 686	Collection II	3.0
FASH 699	Comprehensive Examination in Fashion Design	0.0
Elective		3.0
Term Credits		6.0

Total Credit: 63.0

Facilities

The open design of the URBN Center studio spaces fosters collaboration across our diverse design, media and art disciplines. It provides spaces where students can see what their classmates are creating; where making labs can be shared by students from many majors; and where creative connections can be made.

All majors in the college integrate use of discipline-specific and general use software in the 35 computer labs at Drexel's Westphal College of Media Arts & Design which house over 550 computers (Apple iMacs, Apple MacPros, BoxxTech, Dell, and HP). Also available within our college are five premier Music Industry recording studios and a motion capture/green screen compositing space. The Hybrid Lab contains traditional metal and woodworking machines as well as a rapid prototyper, a laser cutter, and access to a 3D router for multi-disciplinary design and product making. In The Shima Seiki Haute Technology Laboratory students experiment with production methods that advance the field of wearable technology using sixteen SDS-ONE APEX3 workstations, three state-of-the-art knitting machines. The CAD Fashion lab is equipped with digital fashion design and proprietary print design software

The Robert and Penny Fox Historic Costume Collection (<http://www.drexel.edu/westphal/resources/FHCC/>) (FHCC), one of the finest teaching collections in the United States, is an educational resource for

the students of Drexel University. Our mission as a University-based collection is to educate and inspire, while providing a significant resource for an ever-expanding community of historians, scholars, artists, and designers. Westphal College's new URBN Center facility has greatly improved the accessibility and visibility of the FHCC and allowed us to honor A. J. Drexel's original educational intent in taking a leadership role in research and scholarship, while preserving the collection for future generations. The Charles Evans Library contains books, periodicals, DVDs and other sources of inspiration for the fashion student.

The fourth floor of the Academic Building is occupied by a 10,000-square-foot photography lab, lighting studios, and two digital imaging labs. It offers professional-quality equipment in a comfortable working environment.

Film and video facilities include two fully equipped television studios; digital editing facilities; video-editing suites; film editors; and specially outfitted multimedia rooms for all courses. Loan equipment available to students includes digital video cameras; Bolex, Gizmo and Arriflex film cameras; and field lighting and audio equipment. Additionally, the college operates a cable television station reaching over 400,000 households.

The music industry major's digital audio labs and recording studios in MacAlister Hall and University Crossings offer opportunities for the creation, modification, analysis, and recording of sound and music using analog and digital media.

The Mandell Theater (<http://drexel.edu/performingarts/about/facilities/mandell-theater/>) provides a 420-seat proscenium theater with scene shop, dressing rooms, and costume shop. Costume is taught with primary source material from Drexel's 7,000-piece Historic Costume Collection (<http://www.drexel.edu/westphal/resources/FHCC/>).

The Ellen Forman Memorial Dance Studio, adjacent to the Mandell Theater is the primary studio for the Dance major.

In University Crossings, a 25,000 square foot space houses offices for film, video, screenwriting, and playwriting faculty as well as two state-of-the-art digital editing facilities, a shooting and motion capture studio with special effects capability, two screening rooms, several multimedia classrooms, a laboratory for game development and research, laboratories for other digital media purposes and for music industry, and a well-stocked equipment room.

Fashion Design Faculty

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, Center for Functional Fabrics*. Associate Professor. Industrial designer, wearable artist, new materials technology research.

Ann Gerondelis, AIA, IDSA (*Georgia Institute of Technology*) *Design Department Head*. Teaching Professor. Embodied perception and its relationship to the design of human experiences, from the scale of the built environment to objects that surround us.

Liz Goldberg, MFA (*Pratt Institute*). Adjunct Professor. Artist, painter and animator

Cynthia Golebuski, MS (*Drexel University*) *Associate Program Director, Fashion Design*. Teaching Professor. Fashion designer, illustrator, computer aided design.

Lisa Hayes, BFA (*Syracuse University*) *Program Director, Fashion Design*. Associate Professor. Fashion designer, product designer, pattern design, sustainability specialist.

Jaeyoon Jeong, MS (*Drexel University*). Assistant Teaching Professor. Owner/Designer Jaeyoon Jeong Collection, 3D garment simulation and patternmaking.

Autumn Kietpongler, MS (*Drexel University*). Adjunct Professor. Designer at Autumnlin Atelier. Creative technologies specialist.

Jackie Kilmartin, MS (*University of the Sciences*). Assistant Professor. Owner/designer Lillian Jackson Textiles, bio-medical textile engineer, Shima Seiki Knitwear Specialist

Hyun-Ah Kim, BS (*Drexel University*). Adjunct Professor. Designer and design consultant, CAD pattern maker and design consultant

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*. Professor. Fashion and textile designer; textile artist; CAD and 3D garment simulation, 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. Merchandising operations, product development, sourcing, omni-channel strategies.

Elizabeth Quinn, MS (*Drexel University*). Adjunct Professor. Fashion designer. Sustainability specialist.

Clare Sauro, MA (*Fashion Institute of Technology*) *Curator, Historic Costume Collection*. Associate Teaching Professor. Costume history.

Giulia Sebring, Masters (*Instituto Marangoni*). Adjunct Professor. Designer.

Domenica Vinci, BS (*Philadelphia University*). Adjunct Professor. Designer at Off da Wall Graffiti

Emeritus Faculty

Roberta Gruber, MS (*Drexel University*). Associate Professor Emeritus. Fashion designer and illustrator; wearable artist, merchandiser, special events.

Interior Architecture and Design

Major: Interior Architecture and Design
Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 69.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 04.0501

Standard Occupational Classification (SOC) code: 27-1025

About the Program

The graduate program in Interior Architecture & Design offers a first professional Master of Science degree that prepares students of diverse undergraduate backgrounds to become leaders in the field of interior design. We are consistently ranked among the top programs in the country, and in the survey by Design Intelligence of "America's Best Design Schools." As one of the few CIDA accredited graduate programs in the country, our students are on the fast-track to licensure and are highly prepared to enter the professional world of interior architecture and design. Our coursework teaches conceptual, technical, and hands-on approaches in designing a range of spaces. Student work includes public, commercial, residential, and institutional projects in which students learn to transform environments to address aesthetic, social, physical and psychological needs. In conjunction with our integrated studio approach, the program emphasizes independent research culminating in a master's thesis.

Comprised of 69.0 graduate credits, most students complete the MS Interior Architecture & Design program in two to three years, depending upon individual student backgrounds and the completion of all necessary prerequisites.

Student Background

MS Interior Architecture & Design students come to the program with undergraduate degrees in a wide variety of fields, bringing rich experiences and enthusiasm. The majority of applicants have backgrounds in non-design fields, and approximately 25% are international students. Our students are characterized by their open-mindedness, with a desire and commitment to acquire knowledge through rigorous study and training.

Professional Opportunities

Alumni are principals of their own interior design firms, hold a range of positions at major design and architectural firms, and work as facilities managers, consultants, teaching faculty, or in related industry areas. About one-third of the students obtain entry-level employment *before* graduation from the program; our students have little difficulty finding employment following graduation, and many reach senior positions within five years.

Professional exposure occurs in exchanges with practitioners through professional jurying of all major student projects and in one-on-one thesis advising. As part of the graduate comprehensive exam, students are required to gain professional experience through paid employment, service to the profession, or other professional engagement.

For more information, visit Drexel's Graduate Studies in Interior Architecture & Design (<http://www.drexel.edu/westphal/academics/graduate/interiordesign/>) web page.

Admission Requirements

Admission criteria for the graduate program consists of the requirements of the University for graduate admission, plus satisfaction of basic interior design undergraduate coursework. These prerequisites include courses in design, drawing, and art history. For applicants with a background and education in design, many or all of these prerequisites may be waived. For applicants with no background in design, we offer up to 38.0 credits of prerequisite coursework in conjunction with the graduate curriculum.

The prerequisite program typically begins in the summer term with an accelerated sequence of foundational coursework and includes two

quarters of undergraduate interior design courses to prepare candidates for the graduate coursework.

A portfolio review or evaluation by the Associate Director of the Interior Architecture & Design program determines what prerequisites have been satisfied. Contact Graduate Studies in Interior Architecture & Design (<http://www.drexel.edu/westphal/academics/graduate/INTR/>) for specific information about prerequisites or to make an appointment for review and evaluation.

Degree Requirements

The full-time graduate coursework combines seven terms of faculty-directed coursework in interior design, including a student-initiated thesis.

The 69.0 credits that make up the graduate requirement include a visual studies sequence as well as elective coursework in the following areas: interior design seminars on specific topics; advanced studies in art, art history, and interior design; and independent studies. This allows individual flexibility in curriculum design.

Required Courses		
Studios		
INTR 722	Graduate Studio A	4.0
INTR 723	Studio A Seminar	2.0
INTR 732	Graduate Studio B	4.0
INTR 733	Studio B Seminar	2.0
INTR 742	Graduate Studio C	4.0
INTR 743	Studio C Seminar	2.0
INTR 752	Graduate Studio D	4.0
INTR 753	Studio D Seminar	2.0
INTR 762	Graduate Studio E	4.0
INTR 763	Studio E Seminar	2.0
Visual Studies		
VSST 501	Contemporary Art Issues	3.0
VSST 502	Space/Time I	3.0
IAD Seminars		
INTR 861	Advanced Visual Methods	3.0
INTR 862	Interior Systems I	3.0
INTR 863	Advanced Digital Methods	3.0
INTR 864	Material Investigations	3.0
INTR 865	Interior Systems II	3.0
Electives		
		9.0
Thesis		
INTR 894	Thesis Programming	3.0
INTR 897	Thesis - Development	3.0
INTR 898	Thesis - Documentation	3.0
Comprehensive Exam		
INTR 899	Comp Exam for Interior Design	0.0
Graduate Review		
Total Credits		69.0

* INTR 899 consists of two components: a series of sketch problems and design competitions that must be completed during the two + graduate years and a faculty review of a portfolio presentation of a body of student-selected work.

Sample Plan of Study

Term 1		Credits
VSST 104	Accelerated Design I	
VSST 105	Accelerated Design II	
VSST 106	Accelerated Design III	

VSST 110	Introductory Drawing	
INTR 160	Visualization I: Computer Imaging	
INTR 305 [WI]	Visual Culture: Furniture	
Term Credits		0.0
Term 2		
INTR 200	History of Modern Architecture and Interiors	
INTR 220	Visualization II: Orthographic	
INTR 231	Structure	
VSST 501	Contemporary Art Issues	3.0
Term Credits		3.0
Term 3		
INTR 232	Interior Studio I	
INTR 241	Visualization III: Digital	
INTR 300 [WI]	Visual Culture: Interiors	
VSST 502	Space/Time I	3.0
Term Credits		3.0
Term 4		
INTR 722	Graduate Studio A	4.0
INTR 723	Studio A Seminar	2.0
INTR 861	Advanced Visual Methods	3.0
INTR 864	Material Investigations	3.0
Term Credits		12.0
Term 5		
INTR 732	Graduate Studio B	4.0
INTR 733	Studio B Seminar	2.0
INTR 862	Interior Systems I	3.0
Term Credits		9.0
Term 6		
INTR 742	Graduate Studio C	4.0
INTR 743	Studio C Seminar	2.0
INTR 863	Advanced Digital Methods	3.0
INTR Elective		3.0
Term Credits		12.0
Term 7		
INTR 752	Graduate Studio D	4.0
INTR 753	Studio D Seminar	2.0
INTR 865	Interior Systems II	3.0
Term Credits		9.0
Term 8		
INTR 762	Graduate Studio E	4.0
INTR 763	Studio E Seminar	2.0
INTR 894	Thesis Programming	3.0
Term Credits		9.0
Term 9		
INTR 897	Thesis - Development	3.0
INTR Elective		3.0
Term Credits		6.0
Term 10		
INTR 898	Thesis - Documentation	3.0
INTR 899	Comp Exam for Interior Design	0.0
INTR Elective		3.0
Term Credits		6.0
Total Credit: 69.0		

Facilities

The Interior Architecture program is housed in URBN Center, an original Venturi Scott Brown building enhanced by an award-winning retrofit by MS&R Design, including a skylight covered atrium, exposed beams and open spaces. There is a dedicated 24-hour graduate student studio, with storage space, computers, and a small lounge area. We have a materials library that is continually updated with samples from major manufacturers

and local design offices and showrooms; two computer labs and in-house printing for the use of our students; a Hybrid Making Lab (http://drexel.edu/westphal/about/overview/making_spaces/HybridMakingLab/) with laser cutters, 3D printers, a CNC router and small-scale power tools for student use; and a larger shop facility which offers larger wood, metal, casting, CNC, and fabrication equipment.

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 Academic Building 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.

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*). Associate 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*). 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, PhD (*Virginia Polytechnic Institute and State University*). Associate Professor. Natural and electric light sources and effects on biological rhythms and health outcomes; ecological strategies for smart, sustainable buildings of the nexus of health, energy and technology.

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 (*Rensselaer Polytechnic Institute*) *Department Head, Architecture, Design & Urbanism*. Distinguished Teaching Professor. Urban planning, economic development, urban governance

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, Los Angeles*) *Director, Design Futures Lab*. Associate Professor. Researching possibilities for architecture and design through the use of unexpected and innovative interdisciplinary models; computational design, digital fabrication, contemporary form making, design research, philosophy and theory of design, speculative design

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*) *Director of MS Design Research, Coordinator, Sustainability in the Built Environment Minor*. Assistant Professor. Coordinator, Sustainability in the Built Environment Researching Health in residential urban environment and interprofessional collaboration

Jacklynn Niemiec, LEED BD+C, MArch (*University of Pennsylvania*). Assistant Teaching Professor. Graphic representation

James Rowe, AIA, MArch (*University of Pennsylvania*). Adjunct Associate Professor. Principal, Studio Agoos Lovera; institutional, recreation, corporate, civic and residential design.

Debra Ruben, NCIDQ, IDEC, LEED AP, MS (*Drexel University*) *Academic Associate Dean; Interim Associate Dean, Graduate Studies*. Associate Professor. Interior design

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.

Frances Temple West, AIA, NCARB, LEED GA, MArch (*Virginia Tech*). Assistant Teaching Professor. Principal, Frances Temple-West Architect; Retail, Corporate/Commercial, and Residential design

Frances Temple-West, AIA, NCARB, LEED GA, MArch (*Virginia Tech*). Assistant Teaching Professor. Principal, Frances Temple-West Architect; retail, corporate/commercial, and residential design

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, IDEC, IIDA, MS (*Drexel University*) *Director, BS Interior Design*. Teaching Professor. President, a d a Design Associates, Inc.; educational and 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.

The College of Arts and Sciences

About the College

By pursuing excellence in research and scholarship, we train our graduate students to become ethical professionals with expertise in particular areas of inquiry and an appreciation for the fundamental interactions among disciplines in a fast-changing, challenging and diverse world.

Drexel University's College of Arts and Sciences (<http://www.drexel.edu/coas/>) (CoAS) stands unafraid in the face of change. We recognize that our ever-evolving, fast-paced culture required a new approach to education, one that understands the world is malleable and can be molded by minds inspired to lead society's evolution.

But innovation requires more than an ambitious personality. It requires versatility -- we must not only be experts in our field, but also agile enough to engage in the cross-disciplinary work needed to address modern problems resourcefully. That's why our faculty challenge students to see past their own perspectives and establish a deeper understanding of humanity's needs. It's why our co-op program inserts students within a professional culture, introducing them to the expectations of the job while offering hands-on practical application of coursework. And it's why, starting as early as early as freshman year, students team with faculty members as peers, conducting research that affects the world now.

Here at CoAS, we are committed to implementing in-the-moment change, not for personal glory, but because it's what the world needs.

Majors

- Biological Sciences (MS, PhD) (p. 210)
- Chemistry (MS, PhD) (p. 214)
- Communication (MS) (p. 217)
- Communication, Culture and Media (MS, PhD) (p. 220)
- Creative Writing (MFA) (<http://catalog.drexel.edu/graduate/collegeofartsandsciences/creativewriting/>)
- Environmental Policy (MSEP) (p. 222)
- Environmental Science (MSES, PhD) (p. 224)
- Mathematics (MS, PhD) (p. 227)
- Physics (MS, PhD) (p. 229)
- Psychology (MS) (p. 234)
- Psychology: Applied Cognitive and Brain Sciences (PhD) (<http://catalog.drexel.edu/graduate/collegeofartsandsciences/psychology-acbsphd/>)
- Psychology: Clinical Psychology (PhD) (<http://catalog.drexel.edu/graduate/collegeofartsandsciences/psychology-clinicalphd/>)
- Psychology-Law (PhD/JD) (p. 226)
- Public Policy (MS) (p. 236)
- Publishing (MA) (p. 237)
- Science, Technology and Society (MS) (p. 238)

Minors

- Communication (<http://catalog.drexel.edu/graduate/collegeofartsandsciences/communicationgminor/>)

- Communication, Culture, and Media (<http://catalog.drexel.edu/graduate/collegeofartsandsciences/communicationcultureandmediagminor/>)

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 language of STEM (Science Technology Engineering and Math), Language of Media and Design, Global Business English program (GLOBE), English for academic purposes, TOEFL and IELTS preparation, ESL Teaching enhancement programs, and other subjects.

Many graduate students begin their studies at Drexel in the English Language Center and the Graduate Preparation summer program 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 US classroom. All Drexel international students have access to tutoring and other academic skills workshops throughout the academic year.

Some graduate programs within the College of Arts and Sciences may accept who are academically admissible but need further English language study.

For more information, see the ELC website (<http://www.drexel.edu/elc/>) 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
Drexel.edu/elc

Biological Sciences

Major: Biological Sciences
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS) or 90.0 (post-bachelor's) or 45.0 (post-master's)
Co-op Option: Available for full-time on-campus master's-level students
Classification of Instructional Programs (CIP) code: 26.0101
Standard Occupational Classification (SOC) code: 19-1029

About the Program

The Department of Biology (<http://drexel.edu/coas/academics/departments-centers/biology/>) offers graduate programs in biological sciences leading to the doctorate degree and to the thesis or non-thesis master of science degree. The curricula and research programs are designed to help students achieve success in their degree programs and pursue positions of leadership in their respective fields of research.

The intellectual life of the department relies heavily on the participation, creativity and the energy of graduate students; therefore the department

expects students to be vigorously involved in courses, seminars, journal clubs, research, informal discussions, and departmental functions.

Additional Information

Contact the Department of Biology (<https://drexel.edu/coas/academics/departments-centers/biology/>) at 215-895-2624 for more information.

MS in Biological Sciences

Degree Requirements

Soon after matriculation the student completes a plan of study with the advisor, outlining his or her specific program. Both thesis and non-thesis options are available. Conducting formal research necessary for the thesis is dependent upon the student finding a faculty member whom will serve as their faculty advisor and supervise a mutually agreed upon research project.

Students registering for an MS with graduate co-op will gain 6 months of work experience in the summer/fall term (year 1/year 2). The Steinbright Career Development Center (<http://drexel.edu/scdc/>) will provide students with an overview of professionalism, resume writing, and the job search process. Students will not earn academic credit for the co-op but will earn 9.0 non-academic co-op units per term.

Students wishing to pursue PhD candidacy are encouraged to elect the MS with thesis. After all other requirements are completed, the research MS student defends the thesis at a final oral examination. Alternatively, all non-thesis students must pass a comprehensive examination as a condition of their degree completion.

Requirements for the MS Curriculum with Thesis

BIO 500	Biochemistry I	3.0
BIO 540	Readings in Molecular and Cellular Bioscience and Biotechnology	3.0
BIO 601	Research Methods	3.0
BIO 632	Advanced Cell Biology	3.0
BIO 635	Advanced Genetics and Molecular Biology	3.0
BIO 997	Research in Bioscience	12.0
ENVS 506	Biostatistics	3.0
GRAD 600	An Introduction to the Responsible Conduct of Research (RCR): A Short Course for Investigators	1.0
Bioscience electives		14.0
Total Credits		45.0

Requirements for the Non-Thesis MS with Graduate Co-op

BIO 500	Biochemistry I	3.0
BIO 632	Advanced Cell Biology	3.0
BIO 635	Advanced Genetics and Molecular Biology	3.0
COOP 500	Career Management and Professional Development for Master's Degree Students	1.0
ENVS 506	Biostatistics	3.0
Bioscience electives*		32.0
Total Credits		45.0

Requirements for the Non-thesis MS Curriculum

BIO 500	Biochemistry I	3.0
BIO 632	Advanced Cell Biology	3.0
BIO 635	Advanced Genetics and Molecular Biology	3.0
ENVS 506	Biostatistics	3.0
Bioscience electives *		33.0
Total Credits		45.0

* *Non-thesis students may elect to take up to 4.0 credits of BIO 997 Research in Bioscience.

Bioscience Electives Include:

BIO 534	Bioinformatics I	3.0
BIO 535	Bioinformatics II	3.0
BIO 610	Biochemistry of Metabolism	3.0
BIO 613	Genomics	3.0
BIO 614	Behavioral Genetics	3.0
BIO 615	Proteins	3.0
BIO 616	Biochemistry of Major Diseases	3.0
BIO 620	Biomembranes	3.0
BIO 630	Cell Biology of Disease	3.0
BIO 644	Human Genetics	3.0
BIO 646	Stem Cell Research	3.0
BIO 650	Virology	3.0
BIO 661	Neurobiology of Autism Disorders	3.0
BIO 662	Biology of Neuron Function	3.0
BIO 663	Molecular Mechanisms of Neurodegeneration	3.0
BIO 664	Neurobiology of Disease	3.0

PhD in Biological Sciences

The Doctor of Philosophy in Biological Sciences is conferred in recognition of breadth of scholarship and scientific attainment plus demonstrated ability to complete original research.

The following general requirements must be satisfied in order to complete the PhD program in Biological Sciences:

- 90.0 (post-bac) or 45.0 (post-MS) credit hours total
- establishing a plan of study
- 7 core courses
- additional courses dependent on advisor or committee recommendations
- candidacy exam/approval of dissertation proposal
- dissertation/thesis
- defense of dissertation/thesis
- a graduate research seminar presentation once a year for students in their third year and beyond.

Thesis Advisor/Plan of Study

For students admitted without an identified thesis advisor, the thesis advisor must be selected by the end of winter term in the first year. All students are asked to submit a plan of study by the end of the winter quarter first year. It is anticipated that the graduate coursework will be completed during the first two years or less. Students should check with the department for a list of available electives.

Cell Molecular Genetics Track

Core Requirement Courses

BIO 540	Readings in Molecular and Cellular Bioscience and Biotechnology	3.0
BIO 601	Research Methods	3.0
RCRG 600	An Introduction to the Responsible Conduct of Research	0.0

Distribution Required Courses: Must take all 3

BIO 500	Biochemistry I	3.0
BIO 632	Advanced Cell Biology	3.0
BIO 635	Advanced Genetics and Molecular Biology	3.0

Statistics Requirement Course

ENVS 506	Biostatistics *	3.0
----------	-----------------	-----

Required Elective Courses: Must take 1

3.0

Research and Research Seminars **		69.0
BIO 864	Graduate Research Seminar	
BIO 997	Research in Bioscience	
Total Credits		90.0

* Or approved substitute course.

** BIO 864 and BIO 997 are taken multiple times to reach 90.0 credits.

Ecology Evolution Track

Core Requirement Courses		
BIO 540	Readings in Molecular and Cellular Bioscience and Biotechnology	3.0
BIO 601	Research Methods	3.0
RCRG 600	An Introduction to the Responsible Conduct of Research	0.0
Distribution Required Courses: Must take 2		9.0-10.0
BIO 636	Population Genetics *	
ENVS 526	Molecular Ecology *	
ENVS 528	Conservation Biology	
Statistics Requirement Course		
ENVS 506	Biostatistics **	3.0
Required Elective Courses: Must take 2		6.0
Research and Research Seminars ***		66.0
BIO 864	Graduate Research Seminar	
BIO 997	Research in Bioscience	
Total Credits		90.0-91.0

* Offered every other year.

** Or approved substitute course.

*** BIO 864 and BIO 997 are taken multiple times to reach 90.0 credits.

Sample Plan of Study (MS)

Thesis - MS Sample Plan of Study

Term 1		Credits
BIO 500	Biochemistry I	3.0
BIO 540	Readings in Molecular and Cellular Bioscience and Biotechnology	3.0
Bioscience elective		3.0
Term Credits		9.0
Term 2		
BIO 635	Advanced Genetics and Molecular Biology	3.0
BIO 997	Research in Bioscience (OR Bioscience electives)	5.0
GRAD 600	An Introduction to the Responsible Conduct of Research (RCR): A Short Course for Investigators	1.0
Term Credits		9.0
Term 3		
BIO 632	Advanced Cell Biology	3.0
ENVS 506	Biostatistics	3.0
Bioscience elective or Research		3.0
Term Credits		9.0
Term 4		
BIO 601	Research Methods	3.0
BIO 997	Research in Bioscience	3.0
Bioscience electives		3.0
Term Credits		9.0
Term 5		
BIO 997	Research in Bioscience	3.0
Bioscience electives		6.0
Term Credits		9.0
Total Credit:		45.0

Non-Thesis with Graduate Co-op - MS Sample Plan of Study

Term 1		Credits
COOP 500	Career Management and Professional Development for Master's Degree Students	1.0
BIO 500	Biochemistry I	3.0
Bioscience electives		6.0
Term Credits		10.0
Term 2		
BIO 635	Advanced Genetics and Molecular Biology	3.0
Bioscience electives		6.0
Term Credits		9.0
Term 3		
BIO 632	Advanced Cell Biology	3.0
ENVS 506	Biostatistics	3.0
Bioscience elective		3.0
Term Credits		9.0
Term 4		
Bioscience electives		9.0
Term Credits		9.0
Term 5		
Bioscience electives		9.0
Term Credits		9.0
Total Credit:		46.0

Non-Thesis - MS Sample Plan of Study

Term 1		Credits
BIO 500	Biochemistry I	3.0
Bioscience electives		6.0
Term Credits		9.0
Term 2		
BIO 635	Advanced Genetics and Molecular Biology	3.0
Bioscience electives		6.0
Term Credits		9.0
Term 3		
BIO 632	Advanced Cell Biology	3.0
ENVS 506	Biostatistics	3.0
Bioscience elective		3.0
Term Credits		9.0
Term 4		
Bioscience electives		9.0
Term Credits		9.0
Term 5		
Bioscience electives		9.0
Term Credits		9.0
Total Credit:		45.0

Additional Information

Contact the Department of Biology (<http://www.drexel.edu/biology/>) at 215-895-2624 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*) *Interim Vice Provost for Undergraduate Education*. Associate Professor. Microbial

genetics, in particular the analysis of light-regulated signal transduction pathways and the regulation of gene expression in photosynthesizing organisms.

John R. Bethea, PhD (*University of Alabama at Birmingham*). 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 Elefant, PhD (*Temple University*) Director of the Biology Graduate Program. Professor. Understanding the roles of two classes of chromatin regulatory proteins termed histone acetyltransferases (HATs) and histone de-methylases.

Roman Fischer, PhD (*University of Stuttgart, Germany*). Research Assistant Professor. Regenerative and anti-inflammatory therapies to treat autoimmune and neurodegenerative diseases.

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

Tali Gidalevitz, PhD (*University of Chicago*). Associate 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. 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)*). Associate Teaching Professor. Evolutionary genetics (human and equids); stem cell biology; forensic science

Meshagae Hunte-Brown, PhD (*Drexel University*). 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.

Kari Lenhart, PhD (*Princeton University*). Assistant Professor. Coordination of stem cell behavior and regulation of stem cell cytokinesis in the young and aged niche.

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*). Associate Professor. Developmental neurobiology and behavior; CHARGE syndrome; Pitt-Hopkins syndrome; Alzheimer's disease.

Donna Murasko, PhD (*Penn State Hershey Medical Center*) Dean Emeritus. 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*). 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.

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*). 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. 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*). Associate 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.

Khakhina Svetlana, PhD (*Rowan University, GSBS*). Assistant Teaching Professor. Host-pathogen interactions. Exploring the diversity of bacteriophages and antibiotic-production bacteria to use it as tolls provided by nature to treat antibiotic-resistant bacterial infections.

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

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

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: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS); 90.0 (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 40.0501

Standard Occupational Classification (SOC) code: 19-2031

About the Program

The Department of Chemistry (<http://drexel.edu/coas/academics/departments-centers/chemistry/>) offers graduate programs in analytical chemistry, atmospheric chemistry, inorganic chemistry, organic chemistry, materials chemistry, physical chemistry, educational chemistry, and polymer chemistry. The curriculum is designed to prepare students for the research and practical application of chemistry to challenges facing mankind. The department also encourages interdisciplinary activities. Faculty members are active participants in the environmental engineering and science and biomedical science and engineering programs; others work with physicists and biologists in areas such as atmospheric science, biochemistry, and biophysical chemistry.

The chemistry faculty wants graduate students to understand the purpose of, and need for, fundamental research while working on problems of practical interest and application to the challenges facing mankind in the modern world. Areas of research include the use of digital electronic methods to analyze trace constituents of air and water, a study of the molecules of living systems, the effects of toxic chemicals and carcinogens, synthesis and characterization of compounds of medicinal and industrial interest, methods for studying macromolecules, and characterization of transient species using lasers.

The Department of Chemistry strives to maintain a community of research scholars (faculty, postdoctoral fellows, and graduate and undergraduate students) that is large enough to provide a variety of experiences within chemistry, yet small enough to give each student individual attention. Both full- and part-time study are available.

Admission/Financial Assistance Requirements for Admission

For admission to graduate study, the department requires a BS in chemistry or the equivalent. This requirement applies to full-time and part-time students working toward either the MS or PhD. Generally, in order to be considered for admission, a successful applicant should have taken two semester courses of Organic, Analytical and Physical Chemistry with corresponding laboratory courses. In addition, he/she should have taken an upper level Inorganic Chemistry course. All entering MS and PhD students are required to take a series of two-hour exams in analytical, inorganic, organic, and physical chemistry to help assess their preparation for graduate work in chemistry. The scores obtained on these exams are used as a basis for course selection.

Applicants for admission to PhD level graduate studies must submit Graduate Record Examination (GRE) results with their application. GRE scores are helpful to the Chemistry Department and the Office of Admissions, and are required for those students requesting financial

support, i.e., a teaching assistantship (TA) and/or would like to be considered for a Dean's Scholarship or a Provost's Fellowship. Applicants for admission to MS level graduate studies are also encouraged to submit their GRE results with their application.

Financial Assistance

Graduate students at Drexel can obtain two main types of financial support: teaching assistantships and research assistantships. Teaching assistantships are available on a competitive basis to incoming students and are normally renewable for several years. All those requesting financial assistance must submit GRE scores.

Forms, details about requirements, and information about application deadlines are all available on the Chemistry (<http://www.drexel.edu/grad/programs/coas/chemistry/>) page of Drexel's Graduate Admissions website.

Master of Science in Chemistry

Degree Requirements

The MS degree is awarded after satisfactory completion of a minimum of 45.0 credit hours in chemistry and related fields, at least 30.0 credits of which must be taken at Drexel. Both thesis and nonthesis options are available.

Course Requirements

The course requirements for both thesis and non-thesis options are one complete sequence in the major area of interest; one of the sequence courses from each of analytical, organic, polymer, and inorganic chemistry; and two courses in physical chemistry. The remaining credits may be chosen from graduate courses within the department or from other departments offering courses related to the student's major areas.

Major Sequence		9.0
Select one of the following sequences:		
Inorganic Chemistry		
CHEM 521	Inorganic Chemistry I	
CHEM 522	Inorganic Chemistry II	
CHEM 523	Inorganic Chemistry III	
Analytical Chemistry		
CHEM 530	Analytical Chemistry I	
CHEM 531	Analytical Chemistry II	
CHEM 755	Mass Spectrometry	
Organic Chemistry		
CHEM 541	Organic Chemistry I	
CHEM 542	Organic Chemistry II	
CHEM 543	Organic Chemistry III	
Physical Chemistry		
CHEM 557	Physical Chemistry I	
CHEM 558	Physical Chemistry II	
CHEM 555	Quantum Chemistry Of Molecules I	
Polymer Chemistry		
CHEM 561	Polymer Chemistry I	
CHEM 562	Polymer Chemistry II	
CHEM 563	Polymer Chemistry III	
Additional Sequence Courses **		15.0
Electives		21.0
Total Credits		45.0

- * Each of these courses can be replaced by CHEM 554 or CHEM 752.
- ** One of which must be chosen from CHEM 554, CHEM 555, CHEM 557, CHEM 558 or CHEM 752.

Thesis Option

Up to nine credits of CHEM 997 *Graduate Research* may be counted towards a master's thesis. No later than the spring term of the first year of coursework, a student should choose a research advisor with whom to work in carrying out an original investigation in chemistry. The results will be written up in thesis form and submitted to an MS thesis committee consisting of the research advisor and two other departmental faculty appointed by the advisor. The acceptance by this committee of the MS thesis completes the thesis option requirements for the MS degree. Students in the MS program receiving financial aid from the department must elect the thesis option if they do not pursue the PhD program at Drexel.

PhD in Chemistry

Degree Requirements

The PhD degree is awarded in any of eight main areas of chemistry: analytical, atmospheric, inorganic, organic, materials, physical, educational or polymer chemistry. The degree recipient must demonstrate scholastic breadth in chemistry and contribute significantly to scientific advancement in a chosen major area. Requirements of the program include coursework, candidacy examinations, a chemical information retrieval or technical writing course, and successful completion of a publishable PhD thesis.

Course Requirements

Ninety credits of graduate-level work must be completed for the PhD degree. The Chemistry Department requires 30.0 credits of coursework in chemistry (outlined in the Course Requirements (p. 214) section of the MS program). The balance can be made up of advanced special topics courses and research credits.

Candidacy Requirements

To become a candidate for the PhD in chemistry at Drexel, a student must pass a prescribed set of cumulative examinations.

Cumulative Examinations

Written examinations designed to test a student's background in his or her major area are given monthly during the academic year and occasionally during the summer at the discretion of the faculty. Students should begin taking these examinations after having completed three courses in the major area (usually the main sequence courses), though beginning these exams earlier is possible for well-prepared students. Students normally begin taking these examinations in the fall term of their second year.

Research Seminar

The thesis proposal seminar is designed to help the student conduct his/her research more efficiently by (i) promoting a greater fundamental understanding about the student's own specific research project and (ii) providing context and perspective about previous accomplishments in the field by other research groups as well as her/his own. The subject of the seminar will be a literature review and a description/defense of the student's research project including results of experiments and investigations already conducted as well as future work. The examination at which the thesis proposal is defended is held no later than the end

of the *winter* term of the *second* year for *full-time* students or the end of the *spring* term of the *second* year for *part-time* students. A written report is submitted to the committee no later than two weeks before the examination. A passing grade on this examination is required for continuation in the PhD program.

Thesis

A PhD thesis — the heart of the PhD degree — must be written, accepted by the research supervisor, presented to a PhD Thesis Examining Committee, and defended orally to the satisfaction of the Examining Committee. It is the responsibility of the student, not the research supervisor, to submit an acceptable thesis. It is expected that the student will have at least one peer-reviewed research article accepted for publication by the time of the thesis defense.

Facilities

There are seven undergraduate teaching laboratories in the department: three freshman Chemistry Laboratories, two advanced Organic Chemistry Laboratories, a Physical Chemistry Laboratory, an Analytical Instrumentation Laboratory and a combined Analytical/Inorganic Chemistry Laboratory.

Mass Spectrometry Laboratory

A Waters Autospec M high resolution mass spectrometer, a Sciex API triple quadrupole mass spectrometer, and a Bruker Autoflex III MALDI Time-of-Flight mass spectrometer.

Magnetic Resonance Laboratory

Varian INNOVA 300 MHz superconducting FT-NMR spectrometer, Varian INNOVA 500 MHz superconducting FT-NMR spectrometer, and a Varian X-band 12" EPR spectrometer.

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 BioAnalytical Systems Epsilon Electrochemistry System equipped with a rotating disk electrode, 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 MS detector, 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.

Atomic Force Microscopy

The department has a Veeco multimode Atomic force microscopy (AFM) for research and education. AFM, also called scanning force microscopy (SFM), is one of the foremost tools for imaging, measuring, and manipulating matter at the nanoscale. It is when a fine tip is scanned across a surface the tip-surface force is measured to provide topographic, frictional, and adhesion information of a surface. With the ability to perform non-invasive, high-resolution surface imaging and force measurement, AFM has become an essential characterization

tool in multiple disciplines in life science, biomedical engineering, nanoengineering, chemistry, materials science, and other related fields.

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 620 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. Additional full-time support includes an instrument specialist (for NMR and MS), a glassblower (Chemistry Department), two electronics specialists (College of Arts & Sciences Electronics Shop), and four machinists (Drexel University Machine Shop).

Chemistry Faculty

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

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

Joe P. Foley, PhD (*University of Florida*). 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*). Associate Teaching Professor. Bioorganic chemistry and chemical biology; bioinorganic chemistry and biochemistry.

Haifeng Frank Ji, PhD (*Chinese Academy of Sciences*). Professor. 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.

Dionicio Martinez-Solario, PhD (*University of Alabama*). Assistant Professor. Total synthesis of complex biologically active natural products serving as inspirational platforms for the discovery and development of new reactions and synthetic methods.

Craig McClure, PhD (*University of Michigan*). Associate Teaching Professor. Promotion of quantitative literacy in introductory courses;

development of guided inquiry activities for introductory chemistry; outreach programs in STEM fields.

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).

Susan A. Rutkowsky, PhD (*Drexel University*) *Associate Department Head*. Associate Teaching Professor. Development of labs and lecture demonstrations for general and organic chemistry courses; STEM outreach programs.

Jeremiah Scepaniak, PhD (*New Mexico State University*). Assistant Professor. Design transition metal-based contrast agents for MRI & synthesis of bimetallic complexes to activate small molecules.

Reinhard Schweitzer-Stenner, PhD (*Universität 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. Computational and theoretical materials-related chemistry: (1) complex catalytic materials; (2) mechanical and electrical molecular devices.

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

Ezra Wood Associate Professor. Radical chemistry and formation of secondary pollutants in urban and forest environments, impacts of biomass burning on air pollution and climate change, pollutant emissions, and design and deployment of novel instrumentation for field studies.

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

Anthony W. Addison, PhD (*University of Kent at Canterbury, England*). Professor Emeritus. 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.

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

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

Communication

Major: Communication

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 09.0900

Standard Occupational Classification (SOC) code: 11-2011; 11-2031; 25-1122

About the Program

Drexel's Master of Science in Communication program prepares students for careers in a wide range of professional activities. The program specializes in three areas:

- public communication
- technical communication
- science and health communication

Public Communication

Public Communication has much to offer those looking to work in journalism, public relations and nonprofit organizations. Students can choose from courses such as Strategic Social Media Communication, Event Planning, Sports Journalism, Public Relations Writing, and Nonprofit Communication.

Technical Communication

Technical Communication provides skills in technical writing, computer documentation and training to prepare students for careers in a wide range of industries, from social networking to publishing to health insurance. Students choose from courses such as Technical Writing, Digital Publishing, Technical & Science Editing, and Technical Documentation & Software.

Science and Health Communication

Science and Health Communication leads to careers in medical, science and pharmaceutical communication. Students can choose from courses such as Science Writing, Medical Journalism, and Campaigns in Health & Environment.

In addition, the program provides a strong foundation in ethics and theoretical approaches to communication. This theoretical basis is designed to ensure that, as the field changes, students will continue to

have an intellectual framework for evaluating and implementing new technology and changing media.

The program emphasizes flexibility, encouraging each student, in consultation with a faculty advisor, to craft a particular course of study. Throughout the curriculum students may use electives to increase communication skills or to further develop areas of specialization.

Students can attend classes on campus or online, full-time or part-time, they can begin the program in any academic quarter, and they can complete all required coursework in the evening. The degree requires 45.0 credits of graduate coursework, and can be completed part-time in approximately three years or full-time in five quarters (just over a year).

The program accommodates students from widely varying educational backgrounds; many have backgrounds in science and mathematics, and an equal number come from humanities-related disciplines. Some students pursue their degrees while already working in demanding jobs.

For additional information, visit the MS in Communication (<http://drexel.edu/coas/academics/graduate-programs/communication/>) web page.

Admission Requirements

Applicants must meet the general requirements for admission to graduate studies. Prospective students must also submit:

- A 750-1,000 word statement explaining why they want to enter the program. The statement will be reviewed to evaluate each applicant's writing skills and sense of purpose.
- Two letters of recommendation from professional or academic references
- Transcripts of all college-level coursework
- A current resume

GRE scores are not required, but are recommended for applicants with an undergraduate GPA of less than 3.0.

For international students where English is not the official language, a TOEFL score of 100 (iBT) or equivalent IELTS score is required. For more information regarding international application, please see the International Students Admissions Information (<http://drexel.edu/grad/resources/international/>) page.

Visit the Graduate Admissions (<http://drexel.edu/grad/>) website for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements

The MS degree requires 45.0 credits of coursework and six months of internship for those who lack significant experience in communication related fields.

Internship

An internship is required and may be completed at any time during the student's tenure at Drexel. Students who already have the equivalent of six months of professional experience may waive this requirement at the discretion of the Department's Graduate Director.

Required Courses

COM 500	Reading & Res Communication	3.0
COM 610	Theories of Communication and Persuasion	3.0
COM 698	Creating and Managing Communication Professional Identities	3.0
Electives *		21.0

Required Concentration Courses 15.0

Students must select and complete one of the following concentration options:

Technical Communication

COM 612	Ethics for Technical, Science and Health Communication	
Choose four of the following:		
COM 510	Technical Writing	
COM 525	Document Design and Usability	
COM 535	Digital Publishing	
COM 567	Technical Documentation and Software	
COM 570	Technical, Science and Health Editing	
INFO 532	Software Development	

Science and Health Communication

CHP 672	Theory and Practice in Health Communication	
COM 520	Science Writing	
COM 570	Technical, Science and Health Editing	
COM 612	Ethics for Technical, Science and Health Communication	
COM 670	Medical Writing	
	or COM 673: Medical Journalism	

Public Communication

COM 613	Ethics for Public Communication	
Choose four of the following:		
COM 535	Digital Publishing	
COM 536	Strategic Social Media Communication	
COM 541	Foundations of Public Relations	
COM 542	Public Relations Writing **	
COM 543	Public Relations Planning **	
COM 563	Event Planning	
COM 575	Grant Writing	
COM 576	Nonprofit Communications	
COM 650	Telecommunications Regulation and Policy	
COM 660	Investigative Journalism	

Total Credits 45.0

* Any appropriate graduate course offered in the University can serve as an elective if the student has sufficient background to take the course. In addition, the program offers its own elective courses including special topics (COM T680 (p. 220)). Qualified students may also pursue independent study for elective credit in special cases.

** To enroll in this class you must first earn a grade of "B" or better in COM 541 *Foundations of Public Relations* or get permission from the MS COM advisor to waive this requirement.

Sample Plan of Study

Public Communication

Term 1		Credits
COM 500	Reading & Res Communication	3.0
COM 563	Event Planning	3.0
COM 650	Telecommunications Regulation and Policy	3.0
	Term Credits	9.0
Term 2		
COM 610	Theories of Communication and Persuasion	3.0
COM 613	Ethics for Public Communication	3.0
Elective		3.0
	Term Credits	9.0

Term 3

COM 535	Digital Publishing	3.0
COM 543	Public Relations Planning	3.0
Elective		3.0
	Term Credits	9.0

Term 4

Internship		
	Term Credits	0.0

Term 5

Internship		
	Term Credits	0.0

Term 6

COM 698	Creating and Managing Communication Professional Identities	3.0
Electives		6.0
	Term Credits	9.0

Term 7

Electives		9.0
	Term Credits	9.0

Total Credit: 45.0

Science and Health Communication

Term 1		Credits
COM 500	Reading & Res Communication	3.0
COM 612	Ethics for Technical, Science and Health Communication	3.0
Elective		3.0
	Term Credits	9.0
Term 2		
COM 610	Theories of Communication and Persuasion	3.0
COM 670	Medical Writing	3.0
or 673	Medical Journalism	
Elective		3.0
	Term Credits	9.0
Term 3		
COM 520	Science Writing	3.0
CHP 672	Theory and Practice in Health Communication	3.0
COM 570	Technical, Science and Health Editing	3.0
	Term Credits	9.0

Term 4

Internship		
	Term Credits	0.0

Term 5

Internship		
	Term Credits	0.0

Term 6

COM 698	Creating and Managing Communication Professional Identities	3.0
Electives		6.0
	Term Credits	9.0

Term 7

Electives		9.0
	Term Credits	9.0

Total Credit: 45.0

Technical Communication

Term 1		Credits
COM 500	Reading & Res Communication	3.0
COM 612	Ethics for Technical, Science and Health Communication	3.0
Elective		3.0
	Term Credits	9.0
Term 2		
COM 510	Technical Writing	3.0

COM 610	Theories of Communication and Persuasion	3.0
Elective		3.0
Term Credits		9.0
Term 3		
COM 525	Document Design and Usability	3.0
COM 535	Digital Publishing	3.0
COM 570	Technical, Science and Health Editing	3.0
Term Credits		9.0
Term 4		
Internship		
Term Credits		0.0
Term 5		
Internship		
Term Credits		0.0
Term 6		
COM 698	Creating and Managing Communication Professional Identities	3.0
Electives		6.0
Term Credits		9.0
Term 7		
Electives		
Term Credits		9.0
Total Credit: 45.0		

Communication Faculty

Ronald Bishop, III, PhD (*Temple University*) *Director, Undergraduate Programs in Communication*. 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*). Assistant Teaching Professor. Publishing, electronic publishing, publishing and communications, publishing and mass-media.

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

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

Alexander Friedlander, PhD (*Carnegie Mellon University*) *Associate Dean for Undergraduate Education, College of Arts and Sciences; Interim Co-Director, Judaic Studies Program*. Associate Professor. Rhetorical theory and practice, document design, writing and technology.

Ernest A. Hakanen, PhD (*Temple University*) *Director, Graduate Programs in Communication, Culture & Media*. Professor. Telecommunications policy, adolescent media use, communication theory and history, global media, and semiotics.

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

Alexander Jenkins, PhD (*Drexel University*). Assistant Teaching Professor. Digital games, video games, emotion, morality, online fan communities, emerging media, convergence.

Hyunmin Lee, PhD (*University of Missouri*) *Director, Undergraduate Programs in Communication*. Associate Professor. Social media strategies for relationship and reputation management in public relations;

media messages of public health issues and its psychological and behavioral effects on the public.

Susan Magee, MFA *Director Online Teaching*. Instructor. Digital Publishing, Content reation, Blogging, Strategic Social Media, Public Relations, Business and Technical Communication

Julia May, PhD (*Drexel University*) *Director, Professional MS Communication Programs*. 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.

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

Rakhmiel Peltz, PhD (*University of Pennsylvania*). Professor. Judaic studies, Yiddish culture and linguistics, ethnography of communication, immigrant cultural studies.

Douglas V. Porpora, PhD (*Temple University*). Professor. War, genocide, torture, and human rights; macro-moral reasoning in public sphere debate; contemporary social theory moral and political communication; religion.

Rachel R. Reynolds, PhD (*University of Illinois*). Associate Professor. Sociolinguistics, ethnography of communication and discourse analysis; violence against women in mass media; political economy of migration; semiotics including the textual, the visual and multimodal.

Rosemary Rys, MA (*Rowan University*). Assistant Teaching Professor. Public relations and marketing.

Wesley Shumar, PhD (*University of Pennsylvania*). Professor. Digital media and learning; culture of higher education; entrepreneurship education; craft culture; semiotic of consumer culture.

Lawrence Souder, PhD (*Temple University*) *Director, Drexel Edits*. 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*). Associate Teaching Professor. Science, environmental, and health communication

Scott Tattar, BA (*York College of Pennsylvania*) *Faculty Advisor, Drexel PRSSA, Communication Department Recruitment Liason*. Instructor. Public relations

Hilde Van den Bulck, PhD (*Katholieke Universiteit Leuven*) *Department Head of Communication*. Professor. Political economy of media structures; media policies for digitized media ecologies; stakeholders and coalitions in media policies; digitization; convergence and legacy media; public (service) media; celebrity culture and industry; fandom and anti-fandom.

Asta Zelenkauskaite, PhD (*Indiana University*). Associate 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.

Communication, Culture and Media

Major: Communication, Culture and Media

Degrees Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (Masters); 90.0 (PhD Post-Bachelors) or 45.0 (PhD Post-Masters)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 09.0102

Standard Occupational Classification (SOC) code: 25-1122

About the Program

MS in Communication, Culture & Media

The Master's Program (MS) in Communication, Culture & Media is a great choice for academically oriented students who wish to learn the basics of research and theory in communication and media studies, possibly to test the waters for further study, or to explore a personal fascination with mass media, mediated communication, cultural studies, social change and media. The program also encourages interdisciplinary approaches to the study of communication and media through faculty strengths in anthropology, communication, linguistics and sociology.

The MS degree requires 45.0 credits of graduate level coursework and the review by two faculty members of a major research or critical paper that has come out of the student's work while in the program.

The program can be completed part time in approximately three years, or full time in five terms (just under a year and a half).

PhD in Communication, Culture & Media

The PhD program in Communication, Culture & Media develops innovative scholar-teachers who know how to impart theories and studies on the interaction of social forces and communication. Our graduates are trained as committed researchers in quantitative and qualitative approaches to communication study. The program also encourages interdisciplinary approaches to the study of communication and media through faculty strengths in anthropology, communication, linguistics and sociology.

Click here for more information about the Graduate Programs in Communication, Culture and Media (<http://drexel.edu/coas/academics/graduate-programs/communication-culture-media/>).

Admission Requirements

MS program admission requirements

Applicants to the MS program will be evaluated based on:

- A 1,000 word statement of purpose
- Two letters of recommendation
- Transcripts of all college-level coursework
- GRE scores are recommended (especially for students whose GPAs are below 3.2)
- For international students where English is not the official language, a TOEFL score of 100 (iBT) or equivalent score in IELTS, or Cambridge CPE.

PhD program admission requirements

Applicants to the PhD program will be evaluated by the Department's Graduate Committee for admission to the program. Prospective students must submit with their application:

- a 1,500 word statement of purpose
- three letters of recommendation
- transcripts of all college-level coursework
- GRE scores
- for international students where English is not the official language, TOEFL or other English language proficiency scores are also required. For more information regarding international applicant requirements, view the International Students Admissions Information (<http://drexel.edu/grad/resources/international/>) page.

Minimum criteria include:

- Completion of a BA or BS degree in an appropriate field
- GPA of 3.0 or higher (preferred GPA 3.5 for courses in the major)
- For international students, a TOEFL score of 100 (iBT) or equivalent score in IELTS, or Cambridge CPE.

Students entering the program with a Master's degree or with some graduate credit will be evaluated by the Graduate Committee as to how many of their courses could possibly be counted toward the PhD. Students entering with an MS in an appropriate field are required by the university to take a minimum of 15 credit hours in the PhD program before being eligible to take qualifying exams.

For additional information on how to apply, visit the Drexel University Requirements for Admissions (<http://www.drexel.edu/grad/programs/coas/>) page.

Degree Requirements

Core Requirements

COM 610	Theories of Communication and Persuasion	3.0
CCM 704	Research Methods in Communication, Culture and Media	3.0

Required Electives. Choose three of the following: 9.0

CCM 710	Mass Communication and American Social Thought	
CCM 715	Media, Advocacy and Public Spaces	
CCM 725	Political Communication	
CCM 740	Consumer Culture	
CCM 745	Digital Subjectivities	
CCM 750	Political Economy of Media	

Additional Electives *

Three courses from the CCM rubric at 500 level or above	9.0
---	-----

Free Electives **

Seven Additional Graduate Level Electives	21.0
Total Credits	45.0

* There are several possible electives in CCM, including special seminars at the 800 level.

** Any appropriate graduate course offered in the University can serve as an elective if the student has sufficient background to take the course. Suggested courses for free electives might also include: CCM, COM, STS, PLCY, AADM, TVMN, and ENVP.

Degree Requirements

The PhD requires a minimum of 90.0 credits beyond a Bachelor's degree, including 45.0 credit hours of coursework prior to taking qualifying exams,

15.0 credit hours of coursework after exams, and 30.0 hours of research credits.

The PhD coursework is structured around a set of required core courses, a set of required seminars with rotating topics, and electives in graduate communication lecture courses, independent study work, and dissertation credit.

All students in the program take five common core courses. They then take no less than five courses chosen from CCM 800 level seminar offerings. Students are encouraged to take additional seminars after meeting that requirement, since seminar courses enable collaborative relationships with professors and introduce students to the scholarly community. In addition to course work, students will be assigned required teaching and research duties, in the fall, winter and spring terms.

After completing the core requirements and a sequence of seminars, students are expected to take a minimum of 10 additional courses from existing graduate level lecture courses (depending on their interests and research needs). Students may take up to two graduate courses (six credits) outside the department. Additional credits to meet the 90.0 credit requirements will come from independent study and dissertation credits.

Student advising will include appointments with both graduate director and an assigned mentor during the first two weeks of fall courses, where an individualized plan of study (University form D1) will be completed and approved by the program director.

Core Courses

CCM 701	Contemporary Social Theory	3.0
CCM 702	Communication Theory I: Persuasion and Media Effects	3.0
CCM 703	Communication Theory II: Discourse and Semiotics	3.0
CCM 704	Research Methods in Communication, Culture and Media	3.0
CCM 705	Data Analysis in Communication	3.0

Seminars

Students select 15 credits from the five categories of seminars * 15.0

CCM 801	Seminar in Contemporary Theory	
CCM 802	Seminar in Discourse and Semiotics	
CCM 803	Seminar in Structural and Cultural Dynamics	
CCM 804	Seminar in Research Methodology	
CCM 805	Seminar in Communication Ethics	

Communication, Culture & Media Electives 30.0

Ten courses are required, for a total of 30.0 credit hours of electives. These may be chosen from CCM 500 to CCM 800 level courses, including 800 level seminars that are a different topic from earlier courses taken.

Dissertation Credits/Additional Electives ** 30.0

CCM 998	PhD Dissertation Research in Communication, Culture & Media	1.0-12.0
---------	---	----------

For the dissertation, students work with a principal advisor, one of the Communication, Culture and Media Program grad faculty, and no less than two additional faculty from within the department. Students must find one additional outside reader, and students may bring in up to two outside readers.

Total Credits	91.0-102.0
---------------	------------

* There are five categories of seminar: one in which students learn advanced work and influences on a specific theorist or theoretical school; one in which students learn about theories of language, discourse and the sign; one that teaches the paradigm of structural dynamics central to social sciences theory and research; one in which students study a research methods approach; and one that deals with approaches to research ethics. Students must take a seminar in each area (CCM 801, CCM 802, CCM 803, CCM 804, CCM 805). Seminars can be repeated, with a maximum of three courses taken in each area, as long as the subject covered is different each time.

** Students may take up to six graduate-level courses outside of the Communication, Culture and Media program rubric.

Qualifying Examinations

After students have completed 45.0 credits, which will usually be at the end of their 6th term, they will be required to take a qualifying examination. The qualifying exam includes of three parts: theory, methods and a content area. Students will be given the grade of fail, pass or high pass on the exam. A grade of pass in all three sections of the exam will be required to qualify for the PhD. Students who do not pass one out of three sections of the exam on the first attempt may retake the section that they failed one time to qualify for the PhD. If they do not pass the second time they take the failed section of the exam they will be dismissed from the program. When a student passes all three sections of the exam, the proper paperwork will be filed with the university graduate office and they will be advanced to candidacy.

Dissertation Defense

Students should defend the dissertation and graduate towards the end of their fourth or fifth year, depending on whether they entered the program with a Masters degree.

Visit the Graduate programs in Communication, Culture, and Media (<http://www.drexel.edu/coas/academics/graduate-programs/communication-culture-media/>) website for more information.

Sample Plan of Study

Term 1		Credits
CCM 704	Research Methods in Communication, Culture and Media	3.0
CCM 745	Digital Subjectivities	3.0
Graduate Level Elective		3.0
Term Credits		9.0
Term 2		
COM 610	Theories of Communication and Persuasion	3.0
CCM 750	Political Economy of Media	3.0
Graduate Level CCM Elective		3.0
Term Credits		9.0
Term 3		
CCM 740	Consumer Culture	3.0
Graduate Level CCM Electives		6.0
Term Credits		9.0
Term 4		
Graduate Level Electives		9.0
Term Credits		9.0
Term 5		
Graduate Level Electives		9.0
Term Credits		9.0
Total Credit: 45.0		

Sample Plan of Study

Term 1		Credits
CCM 701	Contemporary Social Theory	3.0
COM 704	Research Methods in Communication	3.0
CCM 777	Communication Network Analysis	3.0
Term Credits		9.0
Term 2		
CCM 702	Communication Theory I: Persuasion and Media Effects	3.0
CCM 705	Data Analysis in Communication	3.0

CCM 725	Political Communication	3.0
	Term Credits	9.0
Term 3		
CCM 703	Communication Theory II: Discourse and Semiotics	3.0
CCM 715	Media, Advocacy and Public Spaces	3.0
CCM 805	Seminar in Communication Ethics	3.0
	Term Credits	9.0
Term 4		
CCM 735	Material Culture	3.0
CCM 803	Seminar in Structural and Cultural Dynamics	3.0
	Graduate Level Elective outside CCM	3.0
	Term Credits	9.0
Term 5		
COM 625	Cultural Significance of Fame	3.0
CCM 710	Mass Communication and American Social Thought	3.0
CCM 801	Seminar in Contemporary Theory	3.0
	Term Credits	9.0
Term 6		
COM 650	Telecommunications Regulation and Policy	3.0
CCM 804	Seminar in Research Methodology	3.0
CCM I899	Independent Study in Communication, Culture & Media	3.0
	Term Credits	9.0
Term 7		
CCM 801	Seminar in Contemporary Theory	3.0
CCM I899	Independent Study in Communication, Culture & Media	6.0
	Term Credits	9.0
Term 8		
CCM 998	PhD Dissertation Research in Communication, Culture & Media	9.0
	Term Credits	9.0
Term 9		
CCM 998	PhD Dissertation Research in Communication, Culture & Media	9.0
	Term Credits	9.0
Term 10		
CCM 998	PhD Dissertation Research in Communication, Culture & Media	9.0
	Term Credits	9.0

Total Credit: 90.0

Communication, Culture and Media Faculty

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.

Ernest A. Hakanen, PhD (*Temple University*) Director, *Graduate Programs in Communication, Culture & Media*. Professor. Telecommunications policy, adolescent media use, communication theory and history, global media, and semiotics.

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

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

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.

Hyunmin Lee, PhD (*University of Missouri*) Director, *Undergraduate Programs in Communication*. Associate Professor. Social media strategies for relationship and reputation management in public relations; media messages of public health issues and its psychological and behavioral effects on the public.

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.

Rakhmiel Peltz, PhD (*University of Pennsylvania*). Professor. Judaic studies, Yiddish culture and linguistics, ethnography of communication, immigrant cultural studies.

Douglas V. Porpora, PhD (*Temple University*). Professor. War, genocide, torture, and human rights; macro-moral reasoning in public sphere debate; contemporary social theory moral and political communication; religion.

Rachel R. Reynolds, PhD (*University of Illinois*). Associate Professor. Sociolinguistics, ethnography of communication and discourse analysis; violence against women in mass media; political economy of migration; semiotics including the textual, the visual and multimodal.

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.

Wesley Shumar, PhD (*University of Pennsylvania*). Professor. Digital media and learning; culture of higher education; entrepreneurship education; craft culture; semiotic of consumer culture.

Asta Zelenkauskaitė, PhD (*Indiana University*). Associate 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.

Environmental Policy

Major: Environmental Policy

Degree Awarded: Master of Science in Environmental Policy (MSEP)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 44.0599

Standard Occupational Classification (SOC) code: 19-1031

About the Program

The Master of Science in Environmental Policy spans the disciplines of law, political science, economics, engineering, business, public health and more. Students in this program take core courses in Public Policy, Environmental Policy and Economics and tracked courses in Environmental Science, Environmental and Occupational Health, or Environmental Engineering. Students can conduct real-world research writing through a case study thesis, select elective courses tailored to

their interests, or complete their degree with research experience. MS in Environmental Policy candidates receive personalized advising, which helps students find the classes and opportunities that will best serve their professional goals.

For more information about this program, visit the MS in Environmental Policy (<http://drexel.edu/coas/academics/graduate-programs/environmental-policy/>) page.

Admission Requirements

Applications are accepted year-round, and applicants can expect a decision within one month. Entering students may begin study fall, winter, or spring quarter. Full-time students can complete the program in two years. Part-time students can complete the degree at their own pace.

For additional information on how to apply, visit Drexel's Admissions page for Environmental Policy (<http://www.drexel.edu/grad/programs/coas/environmental-policy/>).

Degree Requirements

Students take 27.0 credits of core classes made up of four Public Policy courses, three Environmental Core courses, and two Economics Core courses. They also take either an Environmental Science, Occupational Health, or Environmental Engineering Track (2 three-credit classes). Students may use the remaining 12.0 credits to complete approved electives or research experience. Students wishing to delve deeper into a subject can choose to complete a 9.0 credit case study, as part of their 45.0 required credits, which they should begin in the first or second quarter.

Public Policy Core Courses * 12.0

PLCY 503	Theory and Practice of Policy Analysis
PLCY 504	Methods of Policy Analysis
PLCY 506	Institutional Dynamics of the Policy Process
PLCY 507	Nonprofit Organizations

Environmental Core Courses 9.0

ENVP 572	Environmental Policy
ENVP 522	Environmental Law (Environmental Law)
ENVS 506	Biostatistics

Environmental Science or Environmental and Occupational Health Track 6.0

Environmental Science Track- 2 of the following courses:

ENVS 501	Chemistry of the Environment
ENVS 528	Conservation Biology
ENVS 538	Biodiversity

Environmental and Occupational Health Track- EOH 510 and one of the following 600-level EOH courses:

EOH 510	Principles and Practice of Environmental and Occupational Health
EOH 605	Evidence Evaluation for Identification of Environmental Hazards
EOH 610	Environmental and Occupational Toxicology
EOH 615	Environmental and Occupational Health Policy
EOH 620	Environmental Hazard Assessment
EOH 630	Environmental Health Risk and Impact Assessment
EOH 665	Quantitative Risk Analysis for Environmental Health

Economics Core 6.0

BUSN 502	Essentials of Economics
ECON 616	Public Finance and Cost Benefit Analysis

Research Experience and/or Approved Courses in Environmental Policy 12.0

Case Study Sequence 9 Credit Elective

PLCY 510	Introduction to Case Study Research
PLCY 511	Case Study Literature Review

PLCY 512	Case Study Document Review
PLCY 513	Case Study Interviews
PLCY 515	Case Study Colloquium
PLCY 516	Case Study Research II
PLCY 517	Case Study Final Project

Or three approved courses (3-12 credits) to be selected with an advisor.

Total Credits 45.0

* Within the first quarter of study, a student must meet with an assigned advisor and work out a plan of study.

Sample Plan of Study

First Year

Fall		Credits
ENVP 572	Environmental Policy	3.0
EOH 510	Principles and Practice of Environmental and Occupational Health	3.0
PLCY 504	Methods of Policy Analysis	3.0
Term Credits		9.0

Winter

BUSN 502	Essentials of Economics	3.0
ENVP 522	Environmental Law (Environmental Law)	3.0
PLCY 503	Theory and Practice of Policy Analysis	3.0
Term Credits		9.0

Spring

ENVS 506	Biostatistics	3.0
EOH 615	Environmental and Occupational Health Policy	3.0
PLCY 507	Nonprofit Organizations	3.0
Term Credits		9.0

Second Year

Fall

ECON 616	Public Finance and Cost Benefit Analysis	3.0
EOH 665	Quantitative Risk Analysis for Environmental Health	3.0
PLCY 506	Institutional Dynamics of the Policy Process	3.0
Term Credits		9.0

Winter

ENVP 552	Political Economy of Climate Change	3.0
ENVP 875	Environmental Justice	3.0
EOH 605	Evidence Evaluation for Identification of Environmental Hazards	3.0
Term Credits		9.0

Total Credit: 45.0

Environmental Policy Faculty

Richardson Dilworth, PhD (*Johns Hopkins University*) Director, Center for Public Policy. Professor. American political development, urban politics, public policy.

Christian Hunold, PhD (*University of Pittsburgh*). Professor. Environmental policy; comparative politics; urban wildlife; political theory.

Alison Kenner, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Science, technology, and health; environmental health problems; cities and place; feminist theory; medical anthropology; digital humanities

Gwen Ottinger, PhD (*University of California, Berkeley*). Associate Professor. Social studies of science and technology, environmental justice, science and engineering ethics, citizen science, environmental ethics.

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.

Chloe Silverman, PhD (*University of Pennsylvania*) Director, Center for Science, Technology & Society. Associate Professor. Parent advocacy for autism, neurodiversity, and pollinator health research.

Emeritus Faculty

Robert J. Brulle, PhD (*George Washington University*). Professor Emeritus. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

Environmental Science

Major: Environmental Science

Degree Awarded: Master of Science in Environmental Science (MSES) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MSES); 90.0 (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 03.0104

Standard Occupational Classification (SOC) code: 19-2041

About the Program

Environmental science is a multidisciplinary field in which we try to understand environmental problems and find solutions to them. This field requires understanding of a number of disciplines.

The program's areas of focus include: ecology, biodiversity, conservation, environmental chemistry and assessment, and paleoecology-geology. A student may alternatively craft a specialized plan of study outside of these strength areas under the guidance of an academic advisor.

The master's degree may be completed with either a thesis or non-thesis option. Those choosing to prepare a thesis must complete 45.0 credits (up to 12.0 credits may be research). Students choosing the non-thesis option must complete coursework totaling 45.0 credits (6.0 of which may be research). Most courses carry three credits.

Part-time Study

The MS degree may be completed on a part-time basis. Most courses are scheduled in the late afternoon and evening, usually on a rotating basis from year to year. Part-time students should plan to take courses in the appropriate sequence to comply with the necessary prerequisites. Scheduling of course is dependent on student demand and faculty resources; however, most prescribed courses are offered at least once every other year (schedules are published each term). Required courses should be taken at the first opportunity.

Additional Information

For more information, visit the Department of Biodiversity, Earth & Environmental Science (<http://drexel.edu/coas/academics/departments-centers/bees/>) website.

Susan Cole is the Graduate Coordinator for Environmental Science. Susan Cole can be reached by telephone at 215.895.2905 or e-mail at coless@drexel.edu.

Admission Requirements

In addition to the general entrance requirements for all applicants, entrance to the MS Program in Environmental Science requires a bachelor of science degree in science, mathematics, or engineering. Minimally, students must have completed a year each of general biology and general chemistry, and one semester of calculus. Organic chemistry and physics preferred depending on student interest.

PhD Program

Applicants to the doctoral program are judged on the basis of academic excellence and the alignment of their research interests with those of the faculty in the department. Prospective PhD students are welcome to contact the program to discuss their research interests.

Additional information about how to apply is available on the Graduate Admissions at Drexel University (<http://www.drexel.edu/grad/programs/coas/environmental-science/>) website.

Degree Requirements: MS in Environmental Science

The Master of Science in Environmental Science (MSES) program requires three core courses that form the basis for further specialization. Students choose to complete the remainder of the program with elective courses based on interest. 45.0 total credits are required for program completion.

Core Courses

ENVS 501	Chemistry of the Environment	3.0
ENVS 506	Biostatistics	3.0
ENVS 511	Evolutionary Ecology	3.0
ENVS electives		36.0
Total Credits		45.0

Elective Areas

Please see Course Descriptions for a list of Environmental Science (ENVS) electives. Students may also take Environmental Policy (ENVP) and Environmental Engineering (ENVE) courses with prerequisites. Other departmental courses with approval.

Degree Requirements: PhD in Environmental Science

The following general requirements must be satisfied in order to complete the PhD program in Environmental Science:

- 90.0 (post-bachelor's) or 45.0 (post-master's) quarter credits
- qualifying exam
- establishing a plan of study
- 3 core courses recommended, not required

- additional courses dependent on advisor or committee recommendations
- candidacy exam/approval of dissertation proposal
- dissertation/thesis
- defense of dissertation/thesis
- a graduate research seminar presentation once a year for second, third, and fourth-year students.

Thesis Advisor/Plan of Study

For students admitted without an identified Thesis Advisor, the Thesis Advisor must be selected by the end of Winter term in the first year. All students are asked to submit a Plan of Study (that has been agreed upon by Thesis Advisor and student) by the end of Winter term first year. It is anticipated that the graduate coursework will be completed during the first two years or less. Generally there is no prescribed coursework -- students must take courses needed to complete their research under guidance of an faculty advisor.

Curriculum

The following courses are *recommended*, but not required:

ENVS 501 Chemistry of the Environment
 ENVS 506 Biostatistics
 ENVS 511 Evolutionary Ecology

Candidacy Examination

The function of the Candidacy Examination is to test the breadth and the depth of the student's capabilities in their chosen area of study. The graduate student becomes a PhD *candidate* only after successfully completing the Candidacy Examination and completing 15 or 45 credits (for post-master's or post-bachelor's degree students, respectively). The candidacy exam is comprised of three parts whose order will be determined by the Candidacy Committee: written examination (or qualifying exam), dissertation research proposal, and oral examination.

Students entering the program with a master's degree are expected to complete the candidacy examination by the end of the summer quarter of their first year. Students entering the PhD program with a bachelor's degree are expected to complete this examination by the end of the summer quarter of their second year.

Thesis/Dissertation and Defense of Thesis/Dissertation

The student will finalize their dissertation only after approval to write is granted by the Dissertation Research Committee. Approval is based upon an evaluation of the breadth and depth of original research being conducted by the student. The dissertation must follow the format specifications set forth in the Drexel's Office of Research and Graduate College of Drexel University (<http://drexel.edu/graduatecollege/>). Research conducted for the dissertation must be presented in a lecture open to the public and then defended, privately, before the student's Dissertation Research Committee.

Facilities

Facilities include fully equipped research laboratories in microbiology, ecology, hydrology, and chemistry. Field ecology research augments lab facilities with field-specific equipment, including two boats (14- and 25-foot) and vans with towing capacity. A full range of sampling equipment exists in the department from seine nets, sediment dredges

and coring devices, water sampling bottles, flow meters and acoustic tracking devices. Some additional research facilities in environmental biotechnology, chemistry and atmospheric engineering are located in other locations on Drexel's campus.

Among the equipment available for student research are atomic absorption spectrophotometers, UV-visible spectrophotometers, gas-liquid chromatographs, ion chromatograph, ICP-Mass Spectrometer, GC-Mass Spectrometer, high performance liquid chromatographs, total organic carbon analyzer, elemental analyzer for carbon and nitrogen, stable isotope mass spectrometer, high-speed refrigerated centrifuge, nutrient analyzers, and UV photochemical reactor. In addition, the department and university have various microscopes including a scanning electron microscope (SEM). Within the department and in the Department of Biology there is a large capacity for genomics including preparatory equipment for DNA extraction and enhancement.

Drexel University is a national leader in the use of computers for educational and research functions. Several facilities on campus are available for student use.

Environmental Science Faculty

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.

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.

Danielle Kreeger, PhD (*Oregon State University*). Research Associate Professor. Trophic interactions in aquatic ecosystems.

Stefanie Kroll, PhD (*SUNY College of Environmental Science and Forestry*) Project Science Director, Academy of Natural Sciences. Assistant Research Professor. Aquatic macroinvertebrate ecology, bioindicators of human stressors on aquatic ecosystems, monitoring the effects of watershed conversation, management and restoration.

Marie J. Kurz, PhD (*University of Florida*) Biogeochemistry Section Leader, Academy of Natural Sciences. Assistant Research Professor. Interactions between geochemical, ecological & hydrologic processes in freshwater systems. Availability, transport and cycling of stream solutes; Stream ecosystem structure & function; Groundwater-surface water interactions; Adaptive management & restoration of water resources & 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.

Amanda Lough, PhD (*Washington University in St. Louis*). Assistant Professor. Volcanic seismicity and the relation to magma plumbing systems; glacial seismicity and the seismicity of Antarctica; intraplate seismicity.

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*). 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*). Professor. Microbiomes and metagenomics; ecology and evolution of symbiosis.

Alexis Schulman, PhD (*Massachusetts Institute of Technology*) *Director of the Environmental Studies and Sustainability Program.* Associate Research Professor. Environmental policy and politics, Urban planning Sustainability and resilience transitions, Policy implementation, Local knowledge and community science

Jocelyn A. Sessa, PhD (*Penn State University*) *Assistant Curator of Invertebrate Paleontology: Academy of Natural Sciences.* Assistant Professor. Paleoecology; paleobiology; extinction recovery dynamics; climate change; isotope geochemistry; fossil and modern mollusks

Loyc Vanderkluisen, PhD (*University of Hawaii*). Associate Professor. The cyclicality 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.

Dane Ward, PhD (*Drexel University*). Assistant Teaching Professor. Urban agriculture and sustainability both in Philadelphia and Cienfuegos, Cuba, as well as insect community structure and population ecology of reptiles and amphibians in the New Jersey Pine Barrens.

Elizabeth B. Watson, PhD (*University of California, Berkeley*). Associate 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.

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

Susan S. Kilham, PhD (*Duke University*). Professor Emeritus. Aquatic ecology: phytoplankton; physiological ecology, especially of diatoms in freshwater and marine systems; large lakes; food webs; biogeochemistry.

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).

James R. Spotila, PhD (*University of Arkansas*) *L. D. Betz Chair Professor.* Professor Emeritus. Physiological and biophysical ecology, thermoregulation of aquatic vertebrates, biology of sea turtles.

Joint JD/PhD Law-Psychology Program

Major: Law and Psychology

Degree Awarded: Juris Doctor (JD) and Doctor of Philosophy (PhD)

Calendar Type: Semester and Quarter

Total Credit Hours: 85.0 Semester (JD) and 91.0 Quarter (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 22.0208

Standard Occupational Classification (SOC) code: 11-9199; 23-1011

About the Program

The Kline School of Law (<http://drexel.edu/law/>) and the Department of Psychology (<http://drexel.edu/coas/academics/departments-centers/psychology/>) in the College of Arts and Sciences offer a joint and integrated JD/PhD Program in Law and Psychology. The program melds two already ongoing successful endeavors, the JD degree in the School of Law and the PhD in clinical psychology in the Department of Psychology. See the JD-PhD Program webpage (<http://drexel.edu/coas/academics/graduate-programs/psychology/doctorate-juris-doctorate/>) for more information.

Students in the program complete all 85.0 semester credits required for graduation from the law school and all 91.0 quarter credits required to complete the doctorate. The program allows those students who wish to pursue professional degrees in both law and psychology a more efficient plan of study. The program is designed to be completed in seven (7) years, including required psychology practica, a year's internship in an American Psychological Association accredited predoctoral mental health/forensic setting, a master's thesis, a doctoral dissertation, and 20 hours per week of cooperative training and 50 hours of pro bono service in law.

Students who are accepted into the JD/PhD program will receive full tuition remission for all psychology coursework, plus a guaranteed annual stipend that is currently at least \$17,000 per year for all six years they are at the university prior to completing the clinical internship. Students with outstanding LSAT scores are eligible for full tuition remission from the School of Law.

For information on the Admissions process, visit the JD/PhD Application Instructions (<http://drexel.edu/coas/academics/graduate-programs/psychology/doctorate-juris-doctorate/application-instructions/>) page.

Philosophy

The program bridges the gap between legal and psychological training. By and large, lawyers and social scientists come from different cultures, with different interests, different cognitive approaches to solving problems, different research methodologies, and different attitudes toward confrontation and argument. Each profession arrives at the “truth” in different ways, and its members are exposed to different styles of education during their post-baccalaureate training. Legal education develops an understanding of case analysis, statutory interpretation, the evolution of legal traditions, and methods for resolving disputes. Education in psychology develops research and clinical skills and understanding of behavioral theories, techniques, and statistical methods. Law, which has special rules concerning evidence and proof, relies heavily on precedent and the application of legal principles to specific facts toward the goal of settling conflicts that need immediate resolution. By contrast, psychology looks at problems through an empirical lens, using psychometrically-based tools and techniques to systematically evaluate questions, but rarely reaching a “final verdict.” Because the limits of evidence and the meaning of “proof” in psychological research may differ sharply from the limits of evidence and proof in law, conflict may result when the two disciplines interact.

Goals

Within the broad framework of the program’s philosophy, the JD/PhD Program in Law & Psychology has three specific goals:

- Develop scientist-practitioners who will produce legally sophisticated social science research to aid the legal system to make better empirically-based decisions;
- Produce lawyer-psychologists who will participate in the development of more empirically and theoretically sophisticated mental health policy by legislatures, administrative tribunals, and the courts; and
- Educate highly trained clinicians who can contribute to the advancement of forensic psychology in such areas as criminal law, domestic relations, and civil commitment.

In fulfilling these goals, the program trains students in an integrated and conceptually unified curriculum so they acquire a mature understanding of the interaction between the two disciplines.

Degree Requirements

Students attend the School of Law and the Department of Psychology simultaneously for six years, integrating course work in both disciplines each year. Students maintain continuous contact with the faculties of both schools and the developments in both disciplines over the course of each year.

In the seventh year, after obtaining the JD, students undertake a year-long supervised internship and complete their doctoral dissertation. They are awarded the PhD at the end of their seventh year.

Training consists of seven elements:

- The required existing core program in law and psychology at both schools;

- Interdisciplinary courses; e.g., Mental Health Law, Behavioral Sciences and the Law, Expert Witnesses, Law and the Mind Sciences;
- Supervised psycholegal research experience on teams of students’ faculty mentors;
- Legal clinics and psychology practica and internships that combine knowledge from both fields in a practical setting;
- Electives in both fields, e.g., bioethics, education law, health law, health psychology, employment discrimination, neuropsychology;
- Cooperative experience and pro bono service in legal settings; and
- Employment for at least one summer in a legal setting, e.g., public interest law firm, governmental agency, private law firm, nonprofit association.

Mathematics

Major: Mathematics

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS) or 90.0 (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 27.0101

Standard Occupational Classification (SOC) code: 15-2021; 15-2041

About the Program

The Department of Mathematics is a broadly based academic unit offering instructional programs and carrying on research activities in mathematics. Doctor of Philosophy and Master of Science degrees are offered.

Areas of research specialty among the faculty include applied mathematics, algebraic combinatorics, biomathematics, discrete mathematics, optics, analysis, number theory, numerical analysis, probability and statistics, matrix and operator theory, fluid mechanics, and partial differential equations.

Additional Information

For more information about these graduate programs, visit Department of Mathematics (<http://drexel.edu/coas/academics/graduate-programs/mathematics/>) webpage.

Admission Requirements

Applicants should hold a BS degree in mathematics or the equivalent and meet the University’s graduate admission standards. In particular, the student should have had intensive exposure to proof oriented courses, such as real analysis and abstract algebra. Students requesting financial aid are required to take the Graduate Record Examination General Test. Because many of the core courses are two- or three-term sequences beginning in the fall, new students are typically admitted to the programs only in the fall term. Admissions standards for the MS and PhD programs are equivalent.

For additional information on how to apply, visit Drexel University’s Graduate Admissions (<http://www.drexel.edu/grad/programs/coas/mathematics/>) website.

Master of Science in Mathematics

Students must complete a minimum of 45.0 graduate credits for the MS degree. Of these 15 courses, the following six are required:

Required Courses

MATH 504	Linear Algebra & Matrix Analysis	3.0
MATH 505	Principles of Analysis I	3.0
MATH 506	Principles of Analysis II	3.0
MATH 533	Abstract Algebra I	3.0
MATH 630	Complex Variables I	3.0
MATH 633	Real Variables I	3.0

The remaining 9 courses may be any graduate mathematics courses. In some cases, course substitutions may be made with courses from other departments. Elective courses taken outside the department must receive prior departmental approval in order to be counted toward the degree.

There are no thesis, language, or special examination requirements for the master's degree.

Students seeking a dual MS must satisfy core requirements for both degree programs.

Students should note that some departmental courses, such as Advanced Engineering Mathematics, are foundation courses and do not contribute to the departmental requirements for the degree. They do count toward the University requirements for a degree.

PhD in Mathematics

Students must complete a minimum of 45 graduate credits for the PhD degree, in addition to the 45.0 required by the MS program for a total of 90.0 credits. Of the 45.0 credits of MS program courses, the following six are required:

Required Courses

MATH 504	Linear Algebra & Matrix Analysis	3.0
MATH 505	Principles of Analysis I	3.0
MATH 506	Principles of Analysis II	3.0
MATH 533	Abstract Algebra I	3.0
MATH 630	Complex Variables I	3.0
MATH 633	Real Variables I	3.0

The remaining 27.0 credits, comprising the MS segment of the PhD program, may be any graduate mathematics courses. In some cases, course substitutions may be made with courses from other departments. Elective courses taken outside the department must receive prior departmental approval in order to be counted toward the degree.

The student must pass a written qualifying exam. The student is allowed two attempts. Students must take exam at the end of their first year, and have a second opportunity in September of their second year.

Students must take a PhD candidacy exam at the end of their second year. Additional coursework to reach the 90.0 credits required for the PhD will be agreed upon with the student's Graduate Advisor. Students should note that some departmental courses, such as MATH 544 *Advanced Engineering Mathematics*, are foundation courses and do not contribute to the departmental requirements for the degree. They do count toward the University requirements for a degree.

Facilities

The computing resources of the Mathematics Department include servers dedicated to administrative, research and computation functions. The research server has 4 VCPS's with 8 GB RAM and 40 GB disk space; the computational server pi has the CPU 2.6 GHZ (16 core) AMD Operon with 32 GB RAM and 500 GB disk.

Graduate students and faculty have access to the main Drexel high-performance cluster: Proteus. The university block is available for general purpose computing. Overall, the facility has 2496 computer cores, 9.8 TB RAM (4 GB RAM per core).

In addition to the primary university library, the department itself has a small collection of texts and research books. It is housed in a comfortable room that lends itself to informal research meetings.

Mathematics Faculty

David M. Ambrose, PhD (*Duke University*) Associate Department Head, *Mathematics*. Professor. Applied analysis and computing for systems of nonlinear partial differential equations, especially free-surface problems in fluid dynamics.

Jason Aran, MS (*Drexel University*). Associate Teaching Professor.

Jonah D. Blasiak, PhD (*University of California at Berkeley*). Associate Professor. Algebraic combinatorics, representation theory, and complexity theory.

Yasmine Boolakee-Pant, MS (*University of Freiburg*). Instructor.

Robert P. Boyer, PhD (*University of Pennsylvania*). Professor. Functional analysis, C^* -algebras and the theory of group.

Fernando Carreon, PhD (*University of Texas at Austin*). Teaching Professor.

Patrick Clarke, PhD (*University of Miami*). Associate Professor. Homological mirror symmetry, Landau-Ginzburg models, algebraic geometry, symplectic geometry.

Daryl Falco, MS (*Drexel University*). Associate Teaching Professor. Discrete mathematics and automata theory.

Raymond Favocci, MS (*Drexel University*). Associate Teaching Professor.

Darij Grinberg, PhD (*Massachusetts Institute of Technology*). Assistant Professor. Algebraic Combinatorics, Noncommutative Algebra, Symmetric Functions, Hopf Algebras, Enumerative Combinatorics, Invariant Theory

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*). Associate 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.

Jeffrey LaComb, PhD (*Duke University*). Assistant Teaching Professor. Rare Event Simulation, Dynamical Systems, Numerical Analysis and Mathematical Biology

Georgi S. Medvedev, PhD (*Boston University*). Professor. Ordinary and partial differential equations, mathematical neuroscience.

Cecilia Mondaini, PhD (*Federal University of Rio de Janeiro*). Assistant Professor. Analysis of Partial Differential Equations, Fluid Dynamics, Stochastic Processes

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.

Oksana P. Odintsova, PhD (*Omsk State University*). Teaching Professor. Math education; geometrical modeling.

Dimitrios Papadopoulos, MS (*Drexel University*). Assistant Teaching Professor.

Joel Pereira, PhD (*University of North Carolina*). Assistant Teaching Professor. Commutative Algebra

Ronald K. Perline, PhD (*University of California at Berkeley*) *Undergraduate Adviser*. 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*). Associate Professor. Partial differential equations, scientific computing and applied mathematics.

Xiaoming Song, PhD (*University of Kansas*). Associate Professor. Stochastic Calculus, Large Deviation Theory, Theoretical Statistics, Data Network Modeling and Numerical Analysis.

Jeanne M. Steuber, MS (*Boston University*). Associate Teaching Professor.

Kenneth P. Swartz, PhD (*Harvard University*). Assistant Teaching Professor. Applied statistics, data analysis, calculus, discrete mathematics, biostatistics.

K. Shwetketu Virbhadra, PhD (*Physical Research Laboratory*). 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*) *Associate Department Head*. Professor. Partial differential equations, specifically nonlinear waves and their interactions.

Dennis G. Yang, PhD (*Cornell University*). Associate 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.

Matthew Ziemke, PhD (*University of South Carolina*). Assistant Teaching Professor. Functional Analysis, Operator Algebras, Semigroups, Mathematical Physics

Emeritus Faculty

Howard Anton, PhD (*Polytechnic Institute of Brooklyn*). Professor Emeritus.

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.

Patricia Henry Russell, MS (*Drexel University*). Teaching Professor Emerita.

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.

Justin R. Smith, PhD (*Courant Institute, New York University*). Professor Emeritus. Homotopy theory, operad theory, quantum mechanics, quantum computing.

Jet Wimp, PhD (*University of Edinburgh*). Professor Emeritus. Applied mathematics, special factors, approximation theory, numerical techniques, asymptotic analysis.

Physics

Major: Physics

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS); 90.0 (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 40.0801

Standard Occupational Classification (SOC) code: 19-2010; 19-2012;

11-9121; 25-1054; 25-2031

About the Program

The Department of Physics offers opportunities for students to study with leading researchers in astrophysics, biophysics, condensed matter, particle physics, and physics education research, as well as to participate in international collaborations. Coursework for the MS and PhD degrees includes advanced training in core areas of physics and in topics of current research. PhD students begin research early in the program, commencing thesis work in their second year of study.

To learn more about the graduate program in physics visit the Department of Physics (<http://drexel.edu/coas/academics/graduate-programs/physics/>) webpage.

Admission Requirements

For admission to the graduate programs, a bachelor's degree in an approved program is required with a minimum undergraduate GPA of 3.0/4.0.

The GRE general exam is required from all applicants (minimum scores 150 Verbal, 150 Quantitative, 3.5 Analytic Writing). The GRE Physics Subject Test is required for PhD applicants to be considered for assistantships (no minimum score).

TOEFL scores are required for international applicants or applicants who earned a degree outside the US (minimum score 100). IELTS scores may be submitted in lieu of TOEFL scores. The minimum IELTS band score is 7.0. TOEFL or IELTS scores below these levels may be considered, but may require an interview.

Visit the Graduate Admissions (<http://www.drexel.edu/grad/programs/coas/physics/>) website for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements (MS)

The Department of Physics offers a Master of Science degree that provides advanced training in core areas of fundamental physics and exposure to the application of physics in areas of current research.

This program is suitable as both a means for professional development and preparation for further graduate study. Students who wish to complete only the MS degree are welcomed, and will find that the learning environment will allow them to broaden their professional understanding by exploring current topics and trends of physics in an interdisciplinary setting.

Students who intend to pursue the Physics PhD degree should apply directly to that program. The requirements for the Physics PhD include the coursework required for the MS degree, thus PhD students can earn the MS degree during their PhD study. Students should apply to the program that best aligns with their goals. MS students who wish to continue study toward the PhD degree must apply for the PhD program on a competitive basis.

Satisfactory completion of a minimum of 45.0 credits of approved physics courses is required. The student must maintain a cumulative GPA average for all courses of at least 3.0.

There are no thesis, language, or special examination requirements for the master's degree.

Core Courses

PHYS 501	Mathematical Physics I	3.0
----------	------------------------	-----

PHYS 506	Dynamics I	3.0
PHYS 511	Electromagnetic Theory I	3.0
PHYS 512	Electromagnetic Theory II	3.0
PHYS 516	Quantum Mechanics I	3.0
PHYS 517	Quantum Mechanics II	3.0
PHYS 521	Statistical Mechanics I	3.0
PHYS 522	Statistical Mechanics II	3.0
Topics Courses		21.0
PHYS 502	Mathematical Physics II	
PHYS 518	Quantum Mechanics III	
PHYS 531	Galactic Astrophysics	
PHYS 532	Cosmology	
PHYS 553	Nanoscience	
PHYS 561	Biophysics	
PHYS 562	Computational Biophysics	
PHYS 576	Introduction to Particle Physics	
PHYS 626	Solid State Physics I	
PHYS 627	Solid State Physics II	
PHYS 631	Relativity Theory I	
PHYS T780	Special Topics in Physics	
Total Credits		45.0

Degree Requirements (PhD)

90.0 quarter credits

The Department of Physics offers opportunities for students to study with leading researchers in astrophysics, biophysics, condensed matter, particle physics, and physics education research, as well as to participate in international collaborations. Coursework for the PhD degree includes advanced training in core areas of physics and topics of current research. PhD students begin research early in the program, commencing thesis work in their second year of study.

The usual schedule for physics graduate students consists of two years of coursework, qualifying exams, and research training, followed by dissertation research. All PhD students follow a common set of eight core courses during their first two years of study. In addition to these core courses, students also take at least four topics courses.

PhD students Admitted with Post-Master's Status

Students who are admitted for PhD study with "post-masters" status must take 15.0 credits of graduate coursework with a minimum GPA of 3.0 to become doctoral candidates. Courses are to be chosen in consultation with the Graduate Academic Committee. Post-masters students are expected to pass the oral qualifying exam by the end of the Spring quarter of their first year of study. To be prepared for the oral exam, post-masters students should begin research as soon as possible.

Program Requirements

Doctoral candidates are required to complete a minimum of 45.0 credits of coursework and research work beyond the master's requirement of 45.0 credits while maintaining a minimum of 3.0 GPA. Advancement to doctoral candidacy requires a minimum GPA in core courses of 3.0, with no more than 2 grades below B-.

Core Courses

PHYS 501	Mathematical Physics I	3.0
PHYS 506	Dynamics I	3.0
PHYS 511	Electromagnetic Theory I	3.0
PHYS 512	Electromagnetic Theory II	3.0

PHYS 516	Quantum Mechanics I	3.0
PHYS 517	Quantum Mechanics II	3.0
PHYS 521	Statistical Mechanics I	3.0
PHYS 522	Statistical Mechanics II	3.0
Research		
PHYS 997	Research	9.0
Topics Courses		
Select four including a minimum of two outside research specialty:		12.0
PHYS 502	Mathematical Physics II	
PHYS 518	Quantum Mechanics III	
PHYS 531	Galactic Astrophysics	
PHYS 532	Cosmology	
PHYS 553	Nanoscience	
PHYS 561	Biophysics	
PHYS 562	Computational Biophysics	
PHYS 576	Introduction to Particle Physics	
PHYS 626	Solid State Physics I	
PHYS 627	Solid State Physics II	
PHYS 631	Relativity Theory I	
PHYS T780	Special Topics in Physics	
Total Credits		45.0

Research Training

Students begin research in the spring and summer terms of their first year. The spring project culminates in a poster presented to the department. A two-page proposal for their summer research is also due at the end of the spring term. At the end of the summer, students are required to submit an in-depth written report and give an oral presentation of their summer project. Research during the second year is toward the candidacy exam, described below.

Candidacy Examination

The candidacy exam is based on original research performed by the student, which consists of an oral presentation and a written report of no less than 15 pages, submitted to the examination committee and the Associate Department Head for Graduate Studies at least one week prior to the exam. Immediately after the public presentation, the Examination Committee will privately conduct an oral examination. This exam must be passed by the end of the second year of study.

Dissertation Defense

This dissertation defense includes a final public presentation and defense of the dissertation. The dissertation must be submitted to the Examination Committee at least two weeks prior to the oral defense. The oral presentation involves a public 45-60 minute presentation by the candidate followed by an unspecified period during which the Examination Committee will ask questions. All doctoral dissertations, in addition to originality and scholarly content, must conform to University format requirements.

Sample Plan of Study (MS)

Term 1		Credits
PHYS 501	Mathematical Physics I	3.0
PHYS 506	Dynamics I	3.0
Topics Course		3.0
Term Credits		9.0
Term 2		
PHYS 511 or 521	Electromagnetic Theory I Statistical Mechanics I	3.0
PHYS 516	Quantum Mechanics I	3.0

Topics Course		3.0
Term Credits		9.0
Term 3		
PHYS 512 or 522	Electromagnetic Theory II Statistical Mechanics II	3.0
PHYS 517	Quantum Mechanics II	3.0
Topics Course		3.0
Term Credits		9.0
Term 4		
Topics Courses		6.0
Term Credits		6.0
Term 5		
PHYS 521 or 511	Statistical Mechanics I Electromagnetic Theory I	3.0
Topics Course		3.0
Term Credits		6.0
Term 6		
PHYS 522 or 512	Statistical Mechanics II Electromagnetic Theory II	3.0
Topics Course		3.0
Term Credits		6.0

Total Credit: 45.0

Sample Plan of Study (PhD)

The sample plan of study below lists required courses and electives for the first two years of the full-time PhD program, for a minimum of 45.0 credits. During the third year and thereafter, PhD program students must take a minimum of 45.0 additional credits of research (PHYS 998 Dissertation Research).

The following is a sample plan of study that includes all required courses for the first two academic years for full-time PhD students entering without a previous Master's degree. Post-master's students should consult the Graduate Academic Committee. Summer terms may be subject to change.

First Year		
Fall		Credits
PHYS 501	Mathematical Physics I	3.0
PHYS 506	Dynamics I	3.0
Topics Course**		3.0
Term Credits		9.0
Winter		
PHYS 516	Quantum Mechanics I	3.0
PHYS 511 or 521*	Electromagnetic Theory I Statistical Mechanics I	3.0
Topics Course**		3.0
Term Credits		9.0
Spring		
PHYS 517	Quantum Mechanics II	3.0
PHYS 512 or 522*	Electromagnetic Theory II Statistical Mechanics II	3.0
PHYS 997***	Research	3.0
Term Credits		9.0
Summer		
PHYS 997	Research	1.0-9.0
Term Credits		1.0-9.0
Second Year		
Fall		
Topics Course**		3.0
PHYS 997	Research	6.0
Term Credits		9.0

Winter			
PHYS 521 or 511	Statistical Mechanics I Electromagnetic Theory I		3.0
Topics Course**			3.0
PHYS 997	Research		3.0
	Term Credits		9.0
Spring			
PHYS 522 or 512*	Statistical Mechanics II Electromagnetic Theory II		3.0
PHYS 997	Research		6.0
	Term Credits		9.0
Summer			
PHYS 998	Ph.D. Dissertation		1.0-9.0
	Term Credits		1.0-9.0
Total Credit: 56.0-72.0			

* Core Course sequences PHYS 511 / PHYS 512 and PHYS 521 / PHYS 522 are offered in alternate years.

** Topics courses are an introduction to current topics of experimental and theoretical interest. They are offered in alternate years.

*** 3.0 credits of PHYS 997: *Research* must be taken by Spring of the first year.

Additional information for graduate students is available at the Department of Physics (<http://drexel.edu/coas/academics/departments-centers/physics/>).

Facilities

Astrophysics Facilities:

- The Numerical Astrophysics Facility emphasizes theoretical and numerical studies of stars, star formation, planetary systems, star clusters, galaxy distributions, cosmological modeling, gravitational lensing, and the early universe. The facility employs a high-performance Graphics Processing Unit (GPU) compute cluster, each node containing two 6-core, 2.7 GHz Intel Xeon CPUs and 96 Gbytes of RAM, accelerated by 4–6 Nvidia Fermi/Titan GPUs, and connected by QDR infiniband, affording computational speeds of up to 50 trillion floating point operations per second.
- The Joseph R. Lynch Observatory houses a 16-inch Meade Schmidt-Cassegrain telescope equipped with an SBIG CCD camera.
- Drexel was a member of the original Sloan Digital Sky Survey (SDSS) collaboration; faculty and students remain active in analyzing data from the SDSS. Drexel is an institutional member of the Large Synoptic Survey Telescope (LSST), currently under construction in Chile; faculty and students are developing LSST-related machine learning tools and analyzing simulated LSST data to prepare for "first light" in 2022.

Biophysics Facilities:

- Bio-manipulation and microscopy laboratories. Four optical tables and six research grade microscopes are configured to perform microscopic spectroscopy and manipulation on solutions and individual cells. A spatial light modulator allows spatial patterns to be encoded on samples and explored; all microscopes are temperature controlled with state of the art cameras, including a 2,000 frame per second high speed system. Each optical table is also equipped with high power lasers for photolysis or fluorescence spectroscopy. Microfluidic attachments are present on one table, and in an adjacent laboratory, a small microfluidic fabrication facility has been established.

- Experimental biophysics lab for studies of proteins and biomimetic lipids, including a fluorescence spectrometer.
- The Computational Biophysics facility also includes: (i) a Beowulf cluster with 46 dual Quad-core hyperthreaded Xeon CPU (736 cores) and 12Gb of RAM nodes plus a master with 1Tb of storage and 24Gb of RAM, (ii) a Beowulf cluster with 44 dual-core Xeon CPU (344 cores), (iii) a dual Quad-core hyperthreaded Xeon CPU workstation with 24Gb RAM and 3Tb disk with two Tesla C2050 GPU CUDA-accelerated graphics card, (iv) a dual Quad-core hyperthreaded Xeon CPU workstation with 8Gb RAM and 4Tb disk with an NVIDIA N280 GPU CUDA-accelerated graphics card, (v) a quad 8-core hyperthreaded Xeon CPU workstation with 128Gb RAM and 16Tb total disk, (vi) a 72Tb file server with 12Gb RAM, (vii) a 96Tb quad 6-core file server with 64Gb RAM, (viii) and several Linux workstations connected through a gigabit network.

Condensed Matter Physics Research Facilities:

- The Energy Materials Research Laboratory is devoted to atomic scale investigations of materials for energy. As the size of the system shrinks, conventional bulk thermodynamics becomes irrelevant and we enter the realm of mesoscopic physics. The equilibrium behavior of small systems is governed by the prevailing number of surface atoms that behave differently from the bulk ones. The electronic properties are also subject to reduced number of available electronic states. We take advantage of different scanning probe microscopy and spectroscopy techniques to elucidate the local electronic properties of materials that are relevant to solving energy problems. The laboratory research is funded by grants from NSF and DOE.
- The Ultrafast Electron Diffraction Laboratory investigates structural dynamics in nanoscale materials at timescales that are fundamental to materials science and condensed matter physics. The techniques are based on exciting matter with light and probing the response of the lattice with electrons. The research interests of the lab are in a range of phenomena and systems including phase transformations induced by strong laser excitation, phase transformations in strongly correlated systems, generation and detection of coherent lattice vibrations, and characterization of materials properties of graphene, few-layer-graphene, ultra-thin graphite & nanocrystalline diamond.
- The Ultra-low Temperature Laboratory includes a dilution refrigerator, 3He and 4He cryostats and microwave sources to study quantum phenomena in nano and microscale devices, superconducting qubits, nanostructures and quantum fluids and solids.
- The Mesoscale Materials Laboratory investigates light-matter interactions and the extent and effects of ordering of lattice, charge and spin degrees of freedom on electronic phases and functional properties in solids, with an emphasis on bulk and epitaxial film complex oxides. Facilities include instrumentation for pulsed laser deposition of epitaxial complex oxide films, atomic layer deposition, variable-temperature characterization of carrier transport (DC to 20 GHz), and a laser spectroscopy lab enabling high-resolution Raman scattering spectroscopy at temperatures to 1.5 K and under magnetic field to 7 T.

Particle Physics Facilities:

- The Drexel Particle Physics Group researches fundamental neutrino properties with the DUNE long baseline experiment hosted by Fermilab and the PROSPECT short baseline reactor experiment

located at Oak Ridge National Laboratory, as well as the planned nEXO neutrinoless double beta decay experiment.

- We are also active in the IceCube neutrino telescope located at the geographic South Pole.
- The Bubble Chamber Laboratory develops superheated-liquid detectors for rare-interaction searches, including the PICO dark matter experiment located at SNOLAB in Canada.

Laboratory for High-Performance Computational Physics:

- In addition to the department computing cluster (15 linux workstations), high-performance computing resources include a dual-processor server with two Xeon E5-2650 processors (16 cores), 128 GB of RAM, and two Xeon Phi P5110 co-processor cards (480 cores). Department researchers also have access to a cluster of 18 Dell PowerEdge C6145 servers (AMD Opteron 6378 Piledriver CPU's, 64 cores/server, 256 GB RAM/server) with a total of 1152 cores and 4.5TB RAM.

Physics Faculty

Alexey Aprelev, PhD (*St Petersburg State University*). Assistant Teaching Professor. Experimental biophysics.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

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*). Professor. Physics education research, surface physics, condensed matter physics, materials science.

Michelle Dolinski, PhD (*University of California, Berkeley*) Associate Dean of Graduate Education. Associate 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.

David M. Goldberg, PhD (*Princeton University*) Associate Department Head for Undergraduate Studies. Professor. Theoretical and computational cosmology, extragalactic astrophysics, gravitational lensing.

Goran Karapetrov, PhD (*Oregon State University*). 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.

Christina Love, PhD (*Temple University*). Associate 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*). Associate Professor. Neutrino physics, high energy astro-particle physics.

Russell Neilson, PhD (*Stanford University*). Associate 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*) Department Head, *Mechanical Engineering and Mechanics*. Professor. Light-matter interactions in electronic materials, including ferroelectric semiconductors, complex oxide thin film science; laser spectroscopy, including Raman scattering.

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 Department Head for Graduate Studies. 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.

Jörn Venderbos, PhD (*Leiden University*). Assistant Professor. Theory of quantum materials: topological insulators, topological semimetals, materials prediction and design, strongly correlated electron materials, complex electronic ordering phenomena, unconventional superconductors

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.

Emeritus Faculty

Shyamalendu Bose, PhD (*University of Maryland*). Professor Emeritus.

Leonard D. Cohen, PhD (*University of Pennsylvania*). Professor Emeritus.

Leonard X. Finegold, PhD (*University of London*). Professor Emeritus.

Robert Gilmore, PhD (*Massachusetts Institute of Technology*). Professor Emeritus.

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.

Teck-Kah Lim, PhD (*University of Adelaide*). Professor Emeritus.

Arthur E. Lord, PhD (*Columbia University*). Professor Emeritus.

James McCray, PhD (*California Institute of Technology*). Professor Emeritus.

Richard I Steinberg, PhD (*Yale University*). Professor Emeritus.

T. S. Venkataraman, PhD (*Worcester Polytechnic Institute*). Professor Emeritus.

Psychology MS

Major: Psychology

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 42.0101

Standard Occupational Classification (SOC) code: 19-3031; 19-3032; 19-3039

About the Program

The master of science degree in the Department of Psychology, College of Arts & Sciences, is ideal for students interested in pursuing graduate education in scientific psychology and research methods. It is designed for students interested in advanced education in scientific psychology in order to obtain further educational or career opportunities.

The program is an opportunity for students to take their first step into graduate education, and to begin a path toward further educational and career opportunities. These opportunities may include further graduate-level training leading to a PhD, a career in research, or other educational and administrative opportunities. The curriculum is focused on training in a range of research experience in neurocognitive and behavioral sciences. In addition to required coursework, students are required to complete a minimum of eight hours per week with a research mentor in laboratory activities. These activities culminate with the successful completion of a thesis project.

For more information, visit the Department of Psychology (<http://drexel.edu/coas/academics/departments-centers/psychology/>) website.

Admission Requirements

Applicants must meet the general University requirements for admission, including a minimum 3.0 GPA (on a 4.0 scale) for the last two years of undergraduate study. Applicants to the graduate program in psychology are also required to submit scores from the Graduate Record Examination (GRE) general tests. Only applications for full-time status are considered.

Various factors are considered in choosing students. These include background in psychology, undergraduate (and, if applicable, graduate) GPA, GRE scores, a personal essay, and letters of recommendation. The minimum expected combined GRE score is 302, with scores 150 on each section (verbal, quantitative) of the GRE.

For additional information on how to apply, visit Drexel's Admissions Requirements for Psychology (<http://www.drexel.edu/grad/programs/coas/psychology/>) page.

Degree Requirements

The general requirements for earning the MS degree in psychology are as follows:

- Completion of all required coursework with a minimum grade point average of 3.0, with no grade lower than a B in any required (non-elective) course and no more than two course grades of C or lower.
- Successful completion of a minimum of 45.0 course credits. Students take required courses and select additional electives.
- Successful completion of required research laboratory hours (8 hours per week for 2 years).
- Completion of a thesis.

Program Requirements

PSY 510	Research Methods I	3.0
PSY 511	Research Methods II	3.0
PSY 512	Cognitive Psychology	3.0
PSY 610	Data Analysis in Psychology	3.0
PSY 624	Behavior Analysis	3.0
PSY 710	Data Analysis II	3.0
PSY 898	Master's Thesis in Psychology	0.0-3.0
PSY 898	Master's Thesis in Psychology	0.0-3.0
PSY 898	Master's Thesis in Psychology	0.0-3.0
Additional Electives		18.0
Total Credits		36.0-45.0

Additional Information

For more information on specific requirements, consult the Master's of Science in Psychology (<http://drexel.edu/coas/academics/graduate-programs/psychology/>) website.

Facilities

Computers

Computer resources for student use include more than 20 personal computers (IBM, Macintosh) available in the library and 10 IBM PCs available in the computer laboratory. Both facilities are near the department. In both locations, word processing and biostatistics software is available.

By using computers from their homes or in the library, students have free access to e-mail and a wide array of online services (e.g., the Internet, World Wide Web, and literature databases such as PsychLit and Medline).

Library

Psychology books and journals are located at the Moore Campus Library on Henry Avenue, Queen Lane Library on the Queen Lane Campus, and the W. W. Hagerty Library on the University City Campus. The combined holdings represent one of the best psychology libraries on the East Coast.

Equipment

Testing equipment for classroom instruction is available to psychology graduate students. The program also has videotape and audiotape equipment available for classroom instruction and research activities.

Psychology Faculty

Meghan Butryn, PhD (*Drexel University*). Associate Professor. Treatment and prevention of obesity and eating disorders, behavioral treatment, acceptance and commitment therapy.

Dorothy Charbonnier, PhD (*State University of New York at Stony Brook*). Associate Teaching Professor. The nature of the creative process and writing.

Evangelia Chrysikou, PhD (*Temple University*). Associate Professor. Cognitive neuroscience, neuropsychology, neural basis of language, memory, and executive functions, neurocognitive processes associated with problem solving and flexible thought

Douglas L. Chute, PhD (*University of Missouri*) *Louis and Bessie Stein Fellow*. Professor. Neuropsychology and rehabilitation; technological applications for the cognitively compromised and those with acquired brain injuries.

Brian Daly, PhD (*Loyola University, Chicago*) *Interim Department Head*. Associate Professor. Pediatric neuropsychology, intervention with at-risk youth.

David DeMatteo, PhD, JD (*MCP Hahnemann University; Villanova University School of Law*) *Director of the JD-PhD Program in Law and Psychology*. Professor. Psychopathy, forensic mental health assessment, drug policy; offender diversion.

Evan M. Forman, PhD (*University of Rochester*) *Director WELL Center*. 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.

Pamela Geller, PhD (*Kent State University*) *Director, Clinical Training*. 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*). 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*. 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*). Professor. Forensic psychology, juvenile and adult criminality, violence risk assessment, forensic psychological assessment, treatment of mentally disordered offenders, academic-sports mentoring.

Adrienne Juarascio, PhD (*Drexel University*) *Director, Practicum Training*. Assistant 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*). 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.

David Kutzik, PhD (*Temple University*). Professor. Social and cultural theory, political economy, gerontology, materialisms, activity theory, reflection theories, communities of practice and labor theories of culture.

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.

John Medaglia, PhD (*The Pennsylvania State University*). Assistant Professor. Applying models and methods developed in neuropsychology, cognitive neuroscience and graph theory to understand and treat brain dysfunction and enhance healthy functioning

Megan Meyer, PhD (*Temple University*). Assistant Teaching Professor. Influences on preferred body type; changes in body image, self-esteem, and self-efficacy in females as a function of strength training; Sensation and Perception

Danette Morrison, PhD (*University of Maryland - College Park*). Assistant Teaching Professor. Social and academic motivation within school context; Social relationships and identity development; Educational attainment of ethnic minorities

Arthur Nezu, PhD, DHLL, ABPP (*State University of New York at Stony Brook*). Distinguished University Professor of Psychology, Professor of Medicine, Professor of Community Health and Prevention. 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 of Psychology, Professor of Medicine. 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*). Associate Teaching Professor. The application of advanced neuroimaging to the study of human brain function and anatomy.

Nancy Raitano Lee, PhD (*University of Denver*) *Director of MS and BS/MS Programs*. Associate 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*) *Interim Director, AJ Drexel Autism Institute*. Professor. Autism screening, early detection of autism

Ludo Scheffer, PhD (*University of Pennsylvania*) *Director of Undergraduate Studies*. 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*) *Vice Provost of Research, Office of Research and Innovation*. 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. Teaching Professor. Adult psychopathology; evidence-based clinical practice; competency-based training; competency-based clinical supervision.

Julia Sluzenski, PhD (*Temple University*). Assistant Teaching Professor. Spatial and episodic memory, memory loss across the lifespan, developmental psychology.

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*). Associate 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.

James Calkins, PhD. Professor Emeritus.

Thomas 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.

Mary Spiers, PhD (*University of Alabama at Birmingham*). Professor Emeritus. Clinical neuropsychology and medical psychology; memory and practical applications for memory disorders in the elderly; cognitive health of women.

Public Policy

Major: Public Policy

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 44.0501

Standard Occupational Classification (SOC) code: 11-1031

About the Program

Drexel's MS in Public Policy is similar in its core curriculum to a Master of Public Administration (MPA) and a Master of Public Policy (MPP) program, as it is designed for people who work, or who would like to work, for government or a nonprofit organization. It is innovative and distinct in

at least two key respects: focus on case study research and distinct track of specialization.

Case Study Research: The program has a required core curriculum of nine courses, specifically designed for students to:

- develop an understanding of the social, political and ethical context of policy research, and how this understanding can be applied to an applied practice of policy analysis;
- conceptualize, design and conduct social research for policy purposes, as well as comprehensively analyze existing social research data;
- recognize the history of public policy institutions in America and the management and governance of nonprofit organizations; and
- understand the concept of sustainability as it relates to policy planning, design, and implementation.

In addition to the core courses, the program has a focus on case study research as a unifying element of the curriculum. The curriculum reinforces coursework with a series of accompanying 1-credit, online, Case Study Research co-requisites. Students are required to choose a specific case study topic that they will work on for the duration of their time in the program. In each subsequent Case Study Research course, students continue further research and writing on their chosen case study topic. Thus by the end of the program students will have produced a polished, in-depth analysis of a specific case that they can use to demonstrate expertise in a given policy area.

Specialization Tracks: With the approval and support of the program director, students can craft a specialized course of study with their three electives, or they can take courses in the following:

- Economic Policy
- Education Policy
- Environmental Policy
- Information Policy
- Science and Technology Policy

For additional information, view the Center for Public Policy (<http://drexel.edu/coas/academics/departments-centers/public-policy/>) page on the College of Arts and Sciences' website. Current Drexel Thomas Kline School of Law students, please see the page on joint JD-MS Public Policy degrees (<http://drexel.edu/law/academics/jointDegrees/JD-MSPP/>) for more information.

Admission Requirements

Acceptance for graduate study at Drexel University requires a four-year bachelor's degree from an accredited institution in the United States or an equivalent international institution. There is no pre-requisite undergraduate major or specific coursework. Although admission requirements vary by program, regular acceptance typically requires a minimum grade point average (GPA) of 3.0 for the last two years of undergraduate work. The GPA for any graduate work must be at least 3.0.

The admission committee evaluates all credentials submitted by applicants to determine a student's ability and potential to succeed in graduate study. Applicants to this program should also include their intended area of focus (see the admissions page for the essay prompt) and are often contacted for an information interview. The committee is interested in the applicant's ability to contribute to his/her program of study and to the University community as a whole.

Drexel is extending the same scholarship opportunities to Master of Science in Public Policy students who enroll in 8.0 credits that are usually only available for full-time programs (minimum enrollment of nine credits for full-time status).

Visit the Graduate Admissions (<http://www.drexel.edu/grad/programs/coas/>) website for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements

Students take required courses for the MS in Public Policy from multiple schools within Drexel University, including the Center for Public Policy in the College of Arts and Sciences, the LeBow College of Business, and the College of Computing and Informatics.

Students are required to receive a grade of "B" or better in all core coursework in order to fulfill the requirements of the MS in Public Policy degree and be eligible for graduation. This policy is in addition to the Drexel University Graduate College policy that requires all graduate students to maintain a minimum cumulative 3.0 GPA per term as well as an overall 3.0 GPA for graduation purposes.

Required Courses

BUSN 502	Essentials of Economics	3.0
ECON 616	Public Finance and Cost Benefit Analysis	3.0
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
URBS 530	Quantitative Methods & Reasoning for Urban Strategists	3.0

Statistics - Choose 1

CCM 705	Data Analysis in Communication	3.0
ECON 540	Intro to Econometrics and Data Analysis	3.0
ECON 550	Econometrics	3.0
STAT 601	Business Statistics	3.0
STAT 610	Statistics for Business Analytics	3.0

Case Study Courses

The curriculum reinforces coursework with a series of accompanying 1-credit, online, Case Study Research courses. In the first, students are introduced to case study methodology and practice, and required to choose a specific case that they will work on for the duration of the core curriculum. In each subsequent Case Study Research course, students continue further research and writing on their chosen case study topic. Thus by the end of the program students have produced a polished, in-depth analysis of a specific case that they can use to demonstrate expertise in a given policy area.

PLCY 510	Introduction to Case Study Research	3.0
PLCY 516	Case Study Research II (1-credit course taken 3 times)	3.0
PLCY 517	Case Study Final Project	3.0

Approved Public Policy Elective Courses*

Total Credits		45.0
---------------	--	------

* Elective courses are taught under the PLCY T580 Special Topics in Public Policy, or one of the participating departments. Students are required to take three 3-credit graduate level courses to fulfill the electives requirement. Public Policy students are able to select any graduate level courses (pending department approval) to create an electives "track" based on their own interests. Students have taken this opportunity to explore areas such as Education Policy, Environmental Policy and Urban Systems.

Sample Plan of Study

Term	Courses	Credits
Term 1	PLCY 506 Institutional Dynamics of the Policy Process	3.0
	PLCY 504 Methods of Policy Analysis	3.0
	PLCY 510 Introduction to Case Study Research	3.0
	Term Credits	9.0
Term 2	BUSN 502 Essentials of Economics	3.0
	INFO 680 US Government Information	3.0
	PLCY 516 Case Study Research II	3.0
	Term Credits	9.0
Term 3	ECON 616 Public Finance and Cost Benefit Analysis	3.0
	PLCY 507 Nonprofit Organizations	3.0
	PLCY 503 Theory and Practice of Policy Analysis	3.0
	Term Credits	9.0
Term 5	URBS 530 Quantitative Methods & Reasoning for Urban Strategists	3.0
	Statistics (Choose one from the list)	3.0
	PLCY 517 Case Study Final Project	3.0
	Term Credits	9.0
Term 6	Approved Elective	3.0
	Approved Elective	3.0
	Approved Elective	3.0
	Term Credits	9.0

Total Credit: 45.0

Public Policy Faculty

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

Richardson Dilworth, PhD (*Johns Hopkins University*) Director, Center for Public Policy. Professor. American political development, urban politics, public policy.

Christian Hunold, PhD (*University of Pittsburgh*). Professor. Environmental policy; comparative politics; urban wildlife; political theory.

Franco Montalto, PhD (*Cornell University*). Professor. Effects of built infrastructure on societal water needs, ecohydrologic patterns and processes, ecological restoration, green design, and water interventions.

Gwen Ottinger, PhD (*University of California, Berkeley*). Associate Professor. Social studies of science and technology, environmental justice, science and engineering ethics, citizen science, environmental ethics.

Mark Stehr, PhD (*University of California at Berkeley*) Assistant Director School of Economics. Associate Professor. Health economics, health behaviors, public finance, public policy.

Publishing

Major: Publishing
 Degree Awarded: Master of Arts (MA)
 Calendar Type: Quarter
 Total Credit Hours: 45.0
 Co-op Option: None
 Classification of Instructional Programs (CIP) code: 09.1001

Standard Occupational Classification (SOC) code: 27-3041

NOTE: This program is no longer accepting applications.

About the Program

Students are given a broad scope view of the Publishing Industry via courses taught by publishing professionals and experts in their fields. In addition to the ten required courses, students will take an additional five courses in the aspect of publishing that best suits their interests. Courses will be taught in traditional classrooms, as well as online in both synchronized and asynchronous sessions; special projects can occur in day and evening hours.

The required course list contains seven courses specific to the Publishing program, and three by other disciplines (Law, Business, and Digital Design). The elective list contains three courses specific to the program, and then a wide-range of courses from Communication, Visual Arts and Design, Business, and Law.

Independent Projects are encouraged and are limited only by the student's imagination or area of interest. Opportunities abound at Drexel itself, as well as many other area publishers with whom we've built relationships.

Degree Requirements

Required courses

LAW 603S	Media Law	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
AADM 620	Legal and Ethical Issues in the Arts	
AADM 751	Management Techniques In the Arts	
COM 500	Reading & Res Communication	
COM 510	Technical Writing	
COM 520	Science Writing	
COM 525	Document Design and Usability	
COM 530	Techniques and Science of Photography	
COM 540	Technical and Science Graphics	
COM 570	Technical, Science and Health Editing	
COM 610	Theories of Communication and Persuasion	
COM 670	Medical Writing	
COM T680	Special Topics in 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 701	Independent Project in Publishing	
PUB I599	Independent Study in PUB	
PUB T680	Special Topics in Publishing	

Total Credits 45.0

Sample Plan of Study

Term 1		Credits
PUB 530	The Publishing Environment	3.0
PUB 631	Publication Design: Print and Digital	3.0
Term Credits		6.0
Term 2		
MKTG 601	Marketing Strategy & Planning	3.0
PUB 635	Periodicals Publishing	3.0
PUB 730	Book Publishing	3.0
Term Credits		9.0
Term 3		
PUB 750	Small Press Development	3.0
PUB T680	Special Topics in Publishing	3.0
Term Credits		6.0
Term 4		
PUB 504	Drexel Publishing Group Special Projects	3.0
Elective		3.0
Term Credits		6.0
Term 5		
LAW 603S	Media Law	3.0
WEST 500	Introduction to Digital Design Tools	3.0
Elective		3.0
Term Credits		9.0
Term 6		
PUB 720	The Ebook and Online Magazines	3.0
PUB 701	Independent Project in Publishing	3.0
PUB I599	Independent Study in PUB	3.0
Term Credits		9.0

Total Credit: 45.0

Science, Technology, and Society

Major: Science, Technology, and Society

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 30.1501

Standard Occupational Classification (SOC) code: 11-9121

NOTE: This program is no longer accepting applications.

About the Program

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 social theory, 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 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 college graduates in engineering, the humanities, social sciences, and natural sciences; professionals in businesses, city and state government offices, and area hospitals; and middle and high school teachers. Students can attend full or part time and complete all coursework in the evening.

Admission Requirements

NOTE: This program is no longer accepting applications.

Applicants to the program must meet the general requirements for admission to graduate studies at Drexel University.

Prospective students must also submit a 500-word essay explaining why they want to enter the program and some of the issues related to science, technology and society that they would like to study. These statements are read carefully by the faculty screening committee to evaluate each applicant’s sense of purpose. Entering students typically begin during the fall quarter. Students are able, though, to start the program during any quarter.

Visit the Graduate Admissions (<http://www.drexel.edu/grad/programs/coas/science-technology-society/>) website for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements

The program requires 45.0 credits of coursework. Required courses total 24.0 credits. Remaining credits are chosen from a list of 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

Select two of the following:

CHP 807	Public Health Ethics	
INFO 679	Information Ethics	
SCTS 575	Digital Power and Resistance	
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 & Capitalism	

Science and Technology Policy 3.0

Select one of the following:

COM 650	Telecommunications Regulation and Policy	
INFO 725	Information Policy and Ethics	
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
Select one of the following:		
SCTS 550	Special Topics in STS Lab	
SCTS 561	Mobilities Lab	
SCTS 562	Identity and Intersectionality Lab	
SCTS 563	Philadelphia in a Changing Climate Lab	
Thesis and Electives*		21.0
SCTS 798	Master's Research	
Suggested Electives**		
CHP 516	History of Public Health	
CCM 701	Contemporary Social Theory	
CCM 704	Research Methods in Communication, Culture and Media	
CCM 801	Seminar in Contemporary Theory	
COM 650	Telecommunications Regulation and Policy	
MGMT 602	Innovation Management	
PLCY 504	Methods of Policy Analysis	
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 T780	Special Topics in Science Technology and Society	
SCTS I799	Independent Study in SCTS	
Total Credits		45.0

* Students who elect to pursue the Thesis option should complete 9.0 credits of SCTS 798 - Master's Thesis and select 12.0 credits from the list of suggested electives.

** Additional electives may be taken from other schools and colleges in the University with approval from the Director of the MS in Science, Technology & Society program.

Sample Plan of Study

Term 1		Credits	
SCTS 501	Introduction to Science, Technology and Society	3.0	
SCTS 502	Research Methods	3.0	
SCTS 504	Science, Technology & Society Theories	3.0	
Term Credits		9.0	
Term 2	Science & Technology Policy course	3.0	
Two Ethics, Values, Identities, & Culture courses		6.0	
Term Credits		9.0	
Term 3	SCTS 503	Advanced Research Methods	3.0
Science, Technology, & Society Lab course		3.0	
STS Elective		3.0	
Term Credits		9.0	
Term 4	Three STS Electives		9.0
Term Credits		9.0	
Term 5	Three STS Electives		9.0
Term Credits		9.0	
Total Credit: 45.0			

Science, Technology and Society Faculty

Lloyd Ackert, PhD (*Johns Hopkins University*). Teaching Professor. History of science and technology; ecology; Russian science.

Peter Amato, PhD (*Fordham University*) *Director, Philosophy*. Teaching Professor. Ethics, Marxism, Continental philosophy.

Jesse Ballenger, PhD (*Case Western Reserve University*). Associate Teaching Professor. Healthcare, medicine and ethics; aging and neurodegenerative diseases; Science and Technology Studies.

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.

Christian Hunold, PhD (*University of Pittsburgh*). Professor. Environmental policy; comparative politics; urban wildlife; political theory.

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.

Alison Kenner, PhD (*Rensselaer Polytechnic Institute*). Associate Professor. Science, technology, and health; environmental health problems; cities and place; feminist theory; medical anthropology; digital humanities

Scott G. Knowles, PhD (*Johns Hopkins University*) *Department Head, History*. Professor. Urban history, Philadelphia history, history of technology, history of disasters, modern history.

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.

Jonson Miller, PhD (*Virginia Tech*). Teaching Professor. Science and technology, American history, military history.

Gwen Ottinger, PhD (*University of California, Berkeley*). Associate Professor. Social studies of science and technology, environmental justice, science and engineering ethics, citizen science, environmental ethics.

Flavia Padovani, PhD (*University of Geneva*). Associate Professor. History and philosophy of science, epistemology, logic.

Jody A. Roberts, PhD (*Virginia Polytechnic Institute and State University*) *Director, Center for Contemporary History and Policy, Chemical Heritage Foundation*. Assistant Professor. Intersections of emerging molecular sciences and public policy and the ways in which tensions brought about between the two get resolved.

Tiago Saraiva, PhD (*Universidad Autónoma de Madrid*). Associate Professor. History of science and technology; transnational history; environmental history

Jonathan Seitz, PhD (*University of Wisconsin*) *Assistant Department Head, History*. Teaching Professor. History of religion, science, medicine, witchcraft, early modern Europe, Italy.

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.

Chloe Silverman, PhD (*University of Pennsylvania*) *Director, Center for Science, Technology & Society*. Associate Professor. Parent advocacy for autism, neurodiversity, and pollinator health research.

Amy Slaton, PhD (*University of Pennsylvania*). Professor. History of science and technology; history of standards and metrology; intersectionality, race, labor.

Andrew Smith, PhD (*SUNY, Stony Brook*). Associate Professor. Philosophy, social and political philosophy, American philosophy.

Kathryn Steen, PhD (*University of Delaware*). Associate Professor. History of technology, history of industry and business, and comparative history.

Michael Yudell, MPH, PhD (*Columbia University*) *Chair, Department of Community Health*. Associate Professor. Department of Community Health and Prevention. Public health ethics; history of public health; race and racism; autism.

Emeritus Faculty

Robert J. Brulle, PhD (*George Washington University*). Professor Emeritus. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

The College of Engineering

About the College

The College of Engineering prepares a new generation of engineers dedicated to discovery and the application of technology to promote economic development and improve quality of life.

Drexel University's College of Engineering is guided by five core values that shape the curriculum and experience for all students: excellence in academics and research; personal, intellectual and professional development; diversity; innovation and exploration; internal and external collaborations and partnerships. We provide a research agenda for our PhD students that addresses society's most pressing challenges regionally, nationally and globally. Our Master of Science students are trained in strategic leadership and entrepreneurial risk-taking to address the opportunities and challenges of a rapidly changing industry.

The graduate programs at Drexel College of Engineering integrate evolving engineering science with the growing fields of engineering applications and processes. As Drexel moves through the 21st century, the College of Engineering will continue to offer students a diverse academic learning and research environment, while continuing to build on its national reputation for excellence in engineering and research.

Majors

- Architectural Engineering (MSAE, PhD) (p. 241)
- Chemical Engineering (MS, PhD) (p. 245)
- Civil Engineering (MSCE, PhD) (p. 250)
- Computer Engineering (MS, PhD) (p. 255)
- Construction Management (MS) (p. 260)
- Cybersecurity (MS) (p. 261)
- Electrical Engineering (MS, PhD) (p. 265)
- Electrical/Telecommunications Engineering (MS) (p. 271)
- Engineering (ME) (p. 276)
- Engineering Management (MS) (p. 276)
- Engineering Technology (MS) (p. 279)
- Environmental Engineering (MS, PhD) (p. 280)
- Materials Science and Engineering (MS, PhD) (p. 283)
- Mechanical Engineering and Mechanics (MS, PhD) (p. 286)
- Nanomaterials (MS) (<http://catalog.drexel.edu/graduate/collegeofengineering/nanomaterials/>)
- Peace Engineering (MS) (<http://catalog.drexel.edu/graduate/collegeofengineering/peaceengineering/>)
- Project Management (MS, PhD) (p. 290)
- **NEW:** Robotics and Autonomy (MS)
- Systems Engineering (MS) (p. 294)

Minors

- Computational Engineering (<http://catalog.drexel.edu/graduate/collegeofengineering/computationengineeringminor/>)
- Project Management (<http://catalog.drexel.edu/graduate/collegeofengineering/projectmanagementgminor/>)

Certificates

- Construction Management (p. 297)
- Engineering Management (<http://catalog.drexel.edu/graduate/collegeofengineering/engineeringmanagementpbc/>)
- **NEW:** Naval Engineering
- **NEW:** Peace Engineering
- Pharmaceutical and Medical Device Manufacturing (<http://catalog.drexel.edu/graduate/collegeofengineering/pharmaceuticalanddevicemanufacturingpbc/>)
- Project Management (p. 297)
- Real Estate (p. 298)
- Sustainability and Green Construction (p. 298)
- Systems Design and Development (p. 299)
- Systems Engineering (<http://catalog.drexel.edu/graduate/collegeofengineering/systemsengineering/systemsengineeringcert/>)
- Systems Engineering Analysis (p. 299)
- Systems Engineering Integrated Logistics (p. 300)
- Systems Reliability Engineering (p. 300)

About Graduate Co-op

Drexel University's long tradition in the field of experiential learning has now been extended into many of its master's programs in science, business, and engineering.

This option, called the Graduate Co-op Program (<http://www.drexel.edu/scdc/co-op/graduate/>) (GCP), provides students with the opportunity to gain work experience directly related to their career goals. Employment typically lasts six months. It is important to note that the GCP program does not guarantee a job. It is a market-driven process for the candidates as well as employers. GCP provides the tools and contacts; the student must qualify for the job on the basis of merit, qualifications, and skills.

Further information on the GCP program is available at the Drexel Steinbright Career Development Center. (<http://www.drexel.edu/scdc/>)

Architectural Engineering

Major: Architectural Engineering

Degree Awarded: Master of Science in Architectural Engineering (MSAE) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MSAE); 90.0 (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 14.0401

Standard Occupational Classification (SOC) code: 11-9041

About the Program

Architectural Engineering is inherently an interdisciplinary enterprise that is centered on the design, construction, and operation of the built environment. Architectural Engineering MS or PhD graduates may include students with expertise in one or more of the following sub-disciplines (usually housed in civil/environmental engineering and elsewhere in traditional disciplinary constructs or newly developing fields of focus or expertise):

- Building energy efficiency and alternative energy
- Indoor environmental quality

Our graduates are engineers and researchers trained in integrated building design and operation practices, who can work on interdisciplinary teams that are able to develop creative solutions combined with technological advances to produce functional, efficient, attractive and sustainable building infrastructure.

Admission Requirements

Applicants to the MS or PhD in Architectural Engineering must meet the following requirements:

- A BS in Engineering OR
- For students without an Engineering degree, the following courses, or their approved equivalents from other departments, will meet these requirements:
 - *Introduction to Fluid Flow* – CIVE 320
 - *Introduction to Thermodynamics* – ENGR 210
 - *Heat Transfer* – MEM 345 – for Building Energy students
 - *General Chemistry II* – CHEM 102 – for Indoor Environmental Quality students

The application package will include:

- undergraduate and graduate transcripts;
- three letters of recommendation from faculty or professionals who can evaluate the applicant's promise as a graduate student;
- GRE scores;
- a written statement of career and educational goals.

Competitive applicants will possess an undergraduate GPA of 3.30 or higher and GRE scores above the 60th percentile.

Degree Requirements (MS)

The goal of the MS in Architectural Engineering (AE) is to produce graduates who have a solid understanding of the Architectural Engineering discipline as well as an understanding of the interrelationships between the major AE sub-disciplines. Graduates will have demonstrated the ability and capacity to apply that understanding and skill, and the curriculum and project requirements are designed to provide to the students and then ask them to demonstrate the ability to effectively engage in professional-level performance.

Required Courses

Core Courses for all AE students

AE 510	Intelligent Buildings	3.0
AE 550	Comfort Analysis and Indoor Air Quality	3.0
AE 544	Building Envelope Systems	3.0
AE 551	Building Energy Systems I	3.0
MEM 591	Applied Engr Analy Methods I	3.0
MEM 592	Applied Engr Analy Methods II	3.0

Building Energy Theme

Complete three of the following:		9.0
AE 552	Building Energy Systems II	
CHE 513	Chemical Engineering Thermodynamics I	
CHE 525	Transport Phenomena I	
MEM 611	Conduction Heat Transfer	
MEM 612	Convection Heat Transfer	
MEM 621	Foundations of Fluid Mechanics	

Indoor Air Quality (IAQ) Theme

Complete three of the following:		9.0
AE T780	Special Topics in AE	
CHE 525	Transport Phenomena I	

ENVE 560	Fundamentals of Air Pollution Control	
ENVE 660	Chemical Kinetics in Environmental Engineering	
ENVS 501	Chemistry of the Environment	
MEM 621	Foundations of Fluid Mechanics	
Additional Electives **		9.0
Total Credits		45.0

* Indoor Modeling and Field Measurements.

** The balance of the required 45.0 credits, a maximum of 18.0 credits, will be electives approved by the student's advisor and the departmental graduate advisor.

Degree Requirements (PhD)

The following general requirements must be satisfied in order to complete the PhD in Architectural Engineering:

- 90.0 quarter credit hours total (or 45 credit hours post-MS)
- Plan of study established with Advisor
- Qualifying courses
- Candidacy exam
- Approval of dissertation proposal
- Defense of dissertation
- Full-time residency for one continuous academic year is usually desired for the PhD degree to ensure students the opportunity for intellectual association with other scholars.

Students entering with a master's degree may be exempted from some or all of the courses in the breadth requirement; however, they are still required to meet all milestones of the program. Individual courses may also be transferred with approval of the Graduate Advisor. The total credit amount, candidacy exam, and dissertation are University Requirements. Additional requirements are determined by the department offering the degree.

MSAE coursework plus research and courses defined by the dissertation Committee 90.0

Qualifying Courses

To satisfy the qualifying requirements, students must earn a grade of B+ or better in the first 6 Architectural Engineering graduate courses taken at Drexel, and must earn an overall GPA of 3.5 or better in these courses. Normally these courses comprise at least 4 "core" courses and either 2 more courses, either "core" or in one of the Architectural Engineering themes taken as part of the PhD program; however, they may in some cases include more advanced courses (e.g., if the student has received transfer credit for a core course).

Undergraduate courses, independent studies, research credits, and courses from other departments cannot be counted toward the qualifying requirements. Student progress toward these requirements will be assessed in the Annual Review following the student's first year in the PhD program. For more information visit the Department's PhD Program Requirements page.

Candidacy Exam

After approximately one year of study beyond the master's degree, doctoral students take a candidacy examination, consisting of written and oral parts. The Architectural Engineering candidacy examination serves to define the student's research domain and to evaluate the student's knowledge and understanding of various fundamental and seminal

results in that domain. At this point the student is expected to be able to read, understand, analyze, and explain advanced technical results in a specialized area of Architectural Engineering at an adequate level of detail. The candidacy examination will evaluate those abilities using a defined set of published manuscripts. The student will prepare a written summary of the contents of the material, present the summary orally, and answer questions about the material. The examination committee will evaluate the written summary, the oral presentation, and the student's answers.

Thesis Proposal

After completing the candidacy examination successfully, the PhD candidate must prepare a thesis proposal that outlines, in detail, the specific problems that will be solved in the PhD dissertation. The quality of the research proposal should be at the level of, for example, a peer-reviewed proposal to a federal funding agency, or a publishable scientific paper. The candidate is responsible for sending the research proposal to the PhD committee two weeks before the oral presentation. The PhD committee need not be the same as the candidacy exam committee, but it follows the same requirements and must be approved by the Office of Graduate Studies. The oral presentation involves a 30-40-minute presentation by the candidate followed by an unspecified period during which the committee will ask questions.

After the question and answer period, the candidate will be asked to leave the room and the committee will determine if the research proposal has been accepted. The research proposal can be repeated at most once. A thesis proposal must be approved within two years of becoming a PhD candidate.

After approval of the proposal, the committee meets from time to time to review the progress of the research.

Thesis Defense

After completing the research proposal successfully, the PhD candidate must conduct the necessary research and publish the results in a PhD dissertation. The dissertation must be submitted to the PhD committee two weeks prior to the oral defense and at least 90 days before the graduation date. The oral presentation involves a 45-minute presentation by the candidate, open to the public, followed by an unspecified period during which the committee will ask questions. The question and answer period is not open to the public.

After the question and answer period, the candidate will be asked to leave the room and the committee will determine if the candidate has passed or failed the examination. The candidate will be granted one more chance to pass the final defense if he or she fails it the first time. Paperwork selecting the thesis committee and indicating the results of the thesis defense must be filed with the Department of Civil, Architectural and Environmental Engineering and the Office of Graduate Studies.

The PhD degree is awarded for original research on a significant Architectural Engineering problem. Graduate students who have an MS degree or have completed work equivalent to that required for of an MS degree will continue to work closely with individual faculty members to pursue the PhD degree (see Faculty Research Interests on the department website). PhD dissertation research is usually supported by a research grant from a government agency or an industrial contract.

Many doctoral students take three to five years of full-time graduate study to complete their degrees.

Sample Plan of Study (MSAE)

Indoor Air Quality - Sample Plan of Study

First Year		Credits
Term 1		
AE 544	Building Envelope Systems	3.0
AE 550	Comfort Analysis and Indoor Air Quality	3.0
MEM 591	Applied Engr Analy Methods I	3.0
Term Credits		9.0
Term 2		
AE 510	Intelligent Buildings	3.0
AE 551	Building Energy Systems I	3.0
MEM 592	Applied Engr Analy Methods II	3.0
Term Credits		9.0
Term 3		
AE T780	Special Topics in AE	3.0
Free Electives		6.0
Term Credits		9.0
Second Year		
Term 1		
ENVS 501	Chemistry of the Environment	3.0
MEM 621	Foundations of Fluid Mechanics	3.0
Free Elective		3.0
Term Credits		9.0
Term 2		
CHE 525	Transport Phenomena I	3.0
ENVE 560	Fundamentals of Air Pollution Control	3.0
ENVE 660	Chemical Kinetics in Environmental Engineering	3.0
Term Credits		9.0
Total Credit: 45.0		

Undergraduate Course Prerequisites for students without an Engineering Degree:

The following courses, or their approved equivalents from other departments, will meet these requirements:

- CIVE 320 - Fundamental Fluids
- CHEM 102 - Basic Chemistry
- ENGR 210 - Thermodynamics

Building Energy - Sample Plan of Study

First Year		Credits
Term 1		
AE 550	Comfort Analysis and Indoor Air Quality	3.0
MEM 591	Applied Engr Analy Methods I	3.0
MEM 611	Conduction Heat Transfer	3.0
Term Credits		9.0
Term 2		
AE 510	Intelligent Buildings	3.0
MEM 592	Applied Engr Analy Methods II	3.0
MEM 612	Convection Heat Transfer	3.0
Term Credits		9.0
Term 3		
AE 551	Building Energy Systems I	3.0
Free Elective		3.0
Free Elective		3.0
Term Credits		9.0
Second Year		
Term 1		

AE 544	Building Envelope Systems	3.0
CHE 513	Chemical Engineering Thermodynamics I	3.0
MEM 621	Foundations of Fluid Mechanics	3.0
Term Credits		9.0
Term 2		
CHE 525	Transport Phenomena I	3.0
ENVE 727	Risk Assessment	3.0
AE 552	Building Energy Systems II	3.0
Term Credits		9.0

Total Credit: 45.0

Undergraduate Course Prerequisites for students without an Engineering Degree

The following courses, or their approved equivalents from other departments, will meet these requirements:

- CIVE 320 - Fundamental Fluids
- MEM 345 - Heat Transfer
- ENGR 210 - Thermodynamics

Plan of Study (PhD)

Upon entering the PhD program, each student will be assigned an academic advisor, and with the help of the advisor will develop and file a plan of study (which can be brought up to date when necessary). The plan of study should be filed with the Graduate Coordinator no later than the end of the first term.

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.

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*). Teaching Professor. International infrastructure delivery; response to natural catastrophes; risk assessment and mitigation strategies; project management techniques.

Shannon Capps, PhD (*Georgia Institute of Technology*). Assistant Professor. Atmospheric chemistry; data assimilation; advanced sensitivity analysis; inverse modeling.

S.C. Jonathan Cheng, PhD (*West Virginia University*). Associate Professor. Soil mechanics; geosynthetics; geotechnical engineering; probabilistic design; landfill containments; engineering education.

Eugenia Ellis, PhD (*Virginia Polytechnic Institute and State University*). Associate Professor. Natural and electric light sources and effects on biological rhythms and health outcomes; ecological strategies for smart, sustainable buildings of the nexus of health, energy and technology.

Yaghoob (Amir) Farnam, PhD (*Purdue University*). Assistant Professor. Advanced and sustainable infrastructure materials; multifunctional, self-responsive and bioinspired construction materials; advanced multiscale manufacturing; characterization, and evaluation of construction materials; durability of cement-based materials.

Patricia Gallagher, PhD (*Virginia Polytechnic Institute and State University*). Professor. Geotechnical and geoenvironmental engineering; soil improvement; recycled materials in geotechnics.

Patrick Gurian, PhD (*Carnegie-Mellon University*). 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 Chair Professor of Environmental Engineering and Department Head, Civil, Architectural and Environmental Engineering*. Professor. Water treatment; risk assessment; bioterrorism; environmental modeling and statistics; microbiology; environmental health.

Ahmad Hamid, PhD (*McMaster University*). Professor. Engineered masonry; seismic behavior, design and retrofit of masonry structures; development of new materials and building systems.

Simi Hoque, PhD (*University of California - Berkeley*). Associate Professor. Computational methods to reduce building energy and environmental impacts, urban metabolism, thermal comfort, climate resilience.

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*) *Distinguished University Professor*. Biological processes and applications of nanotechnology in environmental systems.

L. James Lo, PhD (*University of Texas at Austin*). Assistant Professor. Architectural fluid mechanics; building automation and autonomy; implementation of natural and hybrid ventilation in buildings; airflow distribution in buildings; large-scale air movement in an urban built environment; building and urban informatics; data-enhanced sensing and control for optimal building operation and management; novel data gathering methods for building/urban problem solving; interdisciplinary research on occupant behaviors in the built environment.

Roger Marino, PhD (*Drexel University*). Associate Teaching Professor. Engineering education; land development; product Development

Joseph P. Martin, PhD (*Colorado State University*). Professor. Geotechnical and geoenvironmental engineering; hydrology; transportation; waste management.

James E. Mitchell, MArch (*University of Pennsylvania*). Professor. Architectural engineering design; building systems; engineering education.

Franco Montalto, PhD (*Cornell University*). Professor. Effects of built infrastructure on societal water needs, ecohydrologic patterns and processes, ecological restoration, green design, and water interventions.

Nariman Mostafavi, PhD (*University of Massachusetts - Amherst*). Assistant Teaching Professor. Simulation tools for analyzing urban metabolism; environmentally responsive design; urban resilience; engineering economics; industrial ecology.

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*). Associate Professor. Peace engineering; source water quality protection and management; contaminant and bacterial fate and transport; community engagement.

Miguel A. Pando, PhD (*Virginia Polytechnic Institute and State University*). Assistant Professor. Laboratory testing of geomaterials; geotechnical aspects of natural hazards; soil-structure-interaction; geotechnical engineering.

Michael Ryan, PhD (*Drexel University*) Associate Department Head of Graduate Studies. Assistant Teaching Professor. Microbial Source Tracking (MST); Quantitative Microbial Risk Assessment (QMRA); dynamic engineering systems modeling; molecular microbial biology; phylogenetics; metagenomics; bioinformatics; environmental statistics; engineering economics; microbiology; potable and waste water quality; environmental management systems.

Christopher Sales, PhD (*University of California, Berkeley*). Associate Professor. Environmental microbiology and biotechnology; biodegradation of environmental contaminants; microbial processes for energy and resource recovery from waste; application of molecular biology, analytical chemistry and bioinformatic techniques to study environmental biological systems.

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. 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: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS); 90.0 (PhD)

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional Programs (CIP) code: 14.0701

Standard Occupational Classification (SOC) code: 17-2041

About the Program

The graduate program in the Chemical and Biological Engineering Department integrates current chemical engineering science with the growing fields of engineering applications and processes, emphasizing engineering design and scientific analysis. The department intends to develop broadly educated individuals who are knowledgeable in modern theories, cognizant of the behavior of engineering systems, and aware of current mathematical and engineering tools that are useful for the solution of problems in complex processes and systems, especially those in the fields of chemical, environmental, biochemical, and materials process engineering. Areas of particular strength include biological engineering, energy and the environment, multiscale modeling and process systems engineering, and polymer science and engineering.

Programs are arranged to meet the needs and interests of individual students. The plan of study is initially formulated in consultation with the departmental graduate advisor and subsequently guided by the thesis advisor.

A graduate co-op is available for the Master of Science program. For more information, visit the Steinbright Career Development Center's website (<http://www.drexel.edu/scdc/co-op/graduate/>).

Graduates have pursued a variety of careers, ranging from faculty positions in academia to research and development in industry, in the U.S. and overseas.

Additional Information

For more information about this program, visit Drexel University's Department of Chemical and Biological Engineering (<https://drexel.edu/engineering/academics/departments/chemical-biological-engineering/>) web page.

Admission Requirements

Students should fulfill Drexel University's general requirements for admission to graduate studies. The subjects normally included in an undergraduate program in chemical engineering provide a satisfactory background. Decisions regarding prerequisite qualifications for students

who may be deficient in some areas are made after consultation with the departmental graduate advisor.

The core courses are designed for students with undergraduate training in chemical engineering. However, students with a background in biological sciences and engineering can also enroll in the core courses after completing the necessary basic engineering courses and disciplinary chemical engineering courses. Programs for such students are determined on an individual basis after consultation with the departmental graduate advisor.

Graduate study in chemical engineering is offered on a regular full-time basis and on a part-time basis. Details not covered in the following information may be obtained by contacting the departmental graduate advisor. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study.

Financial Assistance

Financial aid in the form of teaching assistantships, research assistantships, and fellowship grants is available to qualified full-time PhD students. Awards are made annually on a competitive basis.

For additional information on how to apply, visit Drexel's Admissions page for Chemical Engineering (<http://www.drexel.edu/grad/programs/coe/chemical-engineering/>).

Master of Science in Chemical Engineering

Degree Requirements

In general, each program leading to the Master of Science in Chemical Engineering must meet the following requirements: total, 45.0 credits; core chemical engineering, 15.0 credits; area of concentration, at least 15.0 credits; free electives, at most 6.0 credits; research, at most 21.0 credits. Core courses in the chemical engineering Master's program are listed below. A Master's Thesis is optional.

Thesis option: The thesis may be based on either a theoretical or an experimental investigation, or both, of limited scope but involving a significant degree of originality. The nature of the research may involve multidisciplinary areas such as biological engineering, materials processing and engineering, energy and the environment, and other topics. The scope and content of the thesis is guided by the thesis advisor. All students pursuing a Master's with Thesis must complete 9.0 credits of thesis research (CHE 898) and, at the discretion of the research advisor, up to 12.0 credits of independent study (CHE 1799).

Coursework-only (non-Thesis) option: Students not pursuing Master's with Thesis may take up to 21.0 credits of independent study (CHE 1799) although independent study is **not** required for a non-thesis Master's. Non-thesis students may also take additional concentration electives beyond the required 15.0-credit series. Non-thesis students may **not** register for thesis research.

Concentration: All Master's students must complete a 15-credit series of concentration electives. Concentration electives may be chosen from course offerings in chemical engineering, mathematics, science, and other engineering disciplines, and are subject to approval by the departmental graduate advisor. Sample concentration series courses are listed below; there are many other possibilities. Free (non-concentration) electives need only be graduate-level.

Co-op: Students have the option to pursue a co-op as part of their Master's program. In conjunction with the Steinbright Career Development Center (<http://drexel.edu/scdc/co-op/graduate/>), students will be provided an overview of professionalism, resume writing, and the job search process. Co-op will be for a six-month position running in the summer/fall terms. Students will not earn academic credit for the co-op but will earn 9.0 non-academic co-op units per term.

Full-time students usually take the core courses in the first year. Other courses may be substituted for the core courses, if equivalent courses are available and if the substitution is approved by the graduate advisor. Full-time students normally require a minimum of one calendar year to complete their study and research.

Curriculum		
CHE 502	Mathematical Methods in Chemical Engineering	3.0
CHE 513	Chemical Engineering Thermodynamics I	3.0
CHE 525	Transport Phenomena I	3.0
CHE 543	Kinetics & Catalysis I	3.0
CHE 554	Process Systems Engineering	3.0
Area of Concentration		15.0
Thesis/Research		9.0
Electives		6.0
Sample Areas of Concentration		
Biochemical Engineering		
Sample Courses		
BIO 500	Biochemistry I	
BIO 610	Biochemistry of Metabolism	
BMES 501	Medical Sciences I	
CHE 562	Bioreactor Engineering	
CHE 564	Unit Operations in Bioprocess Systems	
Computer Science		
Sample Courses		
CS 543	Operating Systems	
CS 551	Compiler Construction I	
CS 552	Compiler Construction II	
CS 550	Programming Languages	
Engineering Management		
Sample Courses		
EGMT 501	Leading and Managing Technical Workers	
EGMT 502	Analysis and Decision Methods for Technical Managers	
EGMT 504	Design Thinking for Engineering Communications	
EGMT 531	Engineering Economic Evaluation & Analysis	
EGMT 581	Meeting Engineering Leadership Challenges	
Environmental Engineering		
Sample Courses		
ENVS 501	Chemistry of the Environment	
ENVS 608	Fate of Pollutants in Air and Water	
ENVE 661	Env Engr Op-Chem & Phys	
ENVE 662	Enviro Engr Unit Oper-Bio	
ENVE 865	Benefit-Cost Analysis for Infrastructure	
Materials Science and Engineering		
Sample Courses		
MATE 500	Structure and Properties of Metals	
MATE 501	Structure and Properties of Polymers	
MATE 502	Structure and Properties of Ceramic and Electronic Materials	
MATE 505	Phase Equilibria	
MATE 507	Kinetics	
Total Credits		45.0

PhD in Chemical Engineering

Superior students with MS or BS degrees will be considered for the doctoral program in chemical engineering. Students joining with a Master's degree may satisfy up to 45.0 credit hours of the PhD course/research credit requirements depending on the courses taken and/or research carried out in their Master's programs, subject to approval by the graduate program advisor.

Degree Requirements

The following general requirements must be satisfied in order to complete the PhD in chemical engineering:

- 90 credit hours total
- 18 core credits
- 15 credit hours of specialized plan of study
- 57 credit hours of research (including a 3 credit research practice course)
- Qualifying exam (2nd term)
- Establishing a plan of study (2nd term)
- Candidacy exam (5th term)
- Dissertation/Thesis
- Defense of Dissertation/Thesis
- GPA requirements: 3.0 overall; 3.0 graduate chemical engineering (CHE) courses; 3.0 core graduate chemical engineering (CHE) courses

Qualifying Exam

The qualifying exam is administered once a year in January at the start of the 2nd term. The objective of the exam is to evaluate proficiency in core undergraduate chemical engineering material. The format is made up of seven problems, each covering a separate core topic from the undergraduate curriculum, including thermodynamics, heat transfer, mass transfer, fluid mechanics, kinetics, control, and separations. Students must display mastery of five out of the seven topics to pass the qualifying exam. A student can appeal to take a second-chance exam at the end of the 2nd term if the qualifying exam was not satisfactory in the first instance. However, the appeal is not guaranteed and will depend on student's overall performance in coursework, research and teaching assistant duties.

Plan of Study

All students must meet with their research advisor in their 2nd term to work out a plan of study.

Core Requirements

CHE 502	Mathematical Methods in Chemical Engineering	3.0
CHE 513	Chemical Engineering Thermodynamics I	3.0
CHE 525	Transport Phenomena I	3.0
CHE 543	Kinetics & Catalysis I	3.0
CHE 614	Chemical Engineering Thermodynamics II	3.0
CHE 626	Transport Phenomena II	3.0
Specialized Plan of Study Courses		15.0

15.0 credit hours of courses approved by research advisor. All students are expected to develop competence in their area(s) of specialization.

Research		57.0
57.0 credit hours of research, which may include up to 6.0 credit hours of electives.		
CHE 590	Research Methods and Practices	

CHE 998 Ph.D. Dissertation

Total Credits

90.0

Candidacy Exam

The components of the candidacy exam are as follows:

- Proposal Document (Written): The student is required to write a research proposal of about 15 pages, including background, preliminary results, and a research plan (with his/her advisor's input). The proposal must be submitted to each member of the student's thesis committee and to the graduate program advisor on the first day of the student's 5th term.
- Proposal Defense (Oral): The student provides a formal defense of his/her proposal to his/her thesis committee before the end of the student's 5th term.

Preliminary Exam

A preliminary exam is targeted at least 6 months prior to the thesis defense, with this scheduling subject to the research advisor's discretion. This preliminary exam is to ensure that the student has made adequate progress in his/her project. The components of the preliminary exam include:

- Exam Documents (Written): The student is required to write an abstract of the preliminary defense talk, a one-page document describing the plan for completing the thesis, a tentative list of the thesis chapter titles, and a current list of publications/presentations. These must be submitted to each member of the student's thesis committee and to the graduate program advisor in advance of the oral exam date.
- Preliminary Defense (Oral): The student provides a formal defense of the work to date and the anticipated work to be completed for the thesis to his/her thesis committee.
- Publications: At a minimum, at least one manuscript (original article) must have been submitted to a refereed journal prior to the oral exam date.

Thesis/Dissertation and Defense

As the culmination of intensive study and independent research, the doctoral dissertation represents a major scholarly endeavor; accordingly, it is recognized as the most important requirement of the degree. All doctoral candidates must present an acceptable dissertation based on significant work. The dissertation must represent a unique contribution to chemical engineering or biochemical engineering knowledge. A final oral examination is conducted, in part, as a defense of the dissertation. The requirements of the thesis/dissertation and defense are:

- Thesis (Written): The student is required to write a thesis detailing the entire PhD project, including background, methods, results, discussion, conclusions and bibliography.
- Defense (Oral): The student provides a formal defense of his/her PhD thesis in an oral examination to his/her thesis committee.
- Publications: At a minimum, at least one original article must be published in a refereed journal (department's minimum requirement). At the discretion of the research advisor, further publication requirements may be imposed above this minimum.

For more information, visit the Chemical and Biological Engineering Department (<http://drexel.edu/cbe/>) web page.

Facilities

Abrams Laboratory (Abrams)

Software:

- The Abrams group Github repository (<https://github.com/cameronabrams>)

Computational resources:

- Proteus, Drexel's high-performance cluster (www.drexel.edu/research/urcf/services/cluster)
- NSF XSEDE (www.xsede.org)
- DoD HPCMP (www.hpc.mil)

Alvarez Research Group (Alvarez)

- Rheo Filament- VADER1000 - Filament Extensional Rheometer with forced convection oven
- TA DHR3 – Controlled Stress Rheometer with Electronic Heated Plates
- TA ARES G2 – Controlled Strain Rheometer with Forced Convection Oven
- Controlled Film Coater
- Gel Spinning Apparatus for continuous filament and fiber formation
- Microtensiometer for measurement of dynamic transport of surfactant to fluid-fluid interfaces, including dilatational rheology of equilibrated surfaces.
- Supercritical Microtensiometer for measurement of surfactant transport to fluid-fluid interfaces at elevated pressures
- Nikon TE microscope with 3MP camera and various objectives.
- Fluigent - 4 port continuous pressure fluid pump

Nanomaterials for Energy Applications and Technology Laboratory (Baxter)

- Amplified Ti:Sapphire laser with time-resolved terahertz spectroscopy and femtosecond UV/vis/NIR transient absorption spectroscopy (Bossone 106)
- Solar simulator with monochromator and photovoltaic/photoelectrochemical test station
- Electrochemical impedance spectroscopy
- Layer-by-layer deposition robot
- Dip coater
- Spin coater
- Electrodeposition station
- Continuous flow microreactors

Biofuels Laboratory (Cairncross)

- Bubble column biodiesel reactors
- Recirculating heated oil baths
- Quartz crystal microbalance / heat conduction calorimeter (Masscal G1)
- Maxtek quartz crystal microbalance with phase lock oscillator
- Parr reactor

Nanocrystal Solar Laboratory (Fafarman)

- Two chamber fabrication glove box with separate air-purification for wet-chemical synthesis and dry-process fabrication steps, featuring HEPA filtered laminar flow air handling for class-1 cleanroom conditions in an inert atmosphere. In the wet-chemical fabrication chamber there are a spincoater, centrifuge, hot-plates and solid and liquid reagents. On the dry chamber side, there is an integrated thermal evaporator for depositing metal, and a UV-ozone cleaner.
- Custom built Schlenk vacuum/gas manifold, all necessary glassware, J-Kem precision temperature controllers and heating mantles
- Perkin Elmer Lambda 35 UV-vis spectrometer
- ThermoFisher Nicolet iS50R Fourier-transform vis-NIR-MIR absorption spectrometer covering spectral ranges 13000 – 600 and 25000 – 8000 1/cm
- Keithley dual-channel precision source-meter
- Crystalaser Q-switch laser, 300 mW at 532 nm
- Home-built 4-point probe station for thin film electrical conductivity
- 80 MHz digital oscilloscope
- Stanford Research Systems lock-in amplifier

Nanofibers for Energy Storage and Conversion Laboratory (Kalra)

- Four Electrospinning Stations (with core-shell spinning capability)
- Mbraun Dual User Glove Box
- Carver Heat Press
- Four Gamry Potentiostats (Ref 3000 and Interface 1000)
- 32-channel Maccor Battery Cycler, three 8-channel NEWARE Battery Cyclers
- Rotating Disc Electrode Test Station (Pine Instruments)
- Tube Furnaces/Convection Ovens/Vacuum Ovens/Ultrasonicator/Hot Plates/Precision Balances
- Environmental Chamber (Tenney) with high temperature/humidity control ranging from 25-200C and 5-95%RH and integrated with vapor permeation and EIS
- Thermo Fisher Nicolet IS50 FTIR Spectrometer equipped with in-operando battery/supercapacitor cells

Thin Films and Devices Laboratory (Lau)

- Chemical Vapor Deposition Thin Film Reactor System I
- Chemical Vapor Deposition Thin Film Reactor System II
- Chemical Vapor Deposition Rotating Bed Reactor System
- Denton Desktop High Vacuum Sputtering System
- Harrick RF Plasma Reactor
- Gamry Reference 600 Electrochemical Testing Station
- Gamry Interface 1000 Electrochemical Impedance Spectrometer
- Agilent Electrochemical Impedance Analyzer 4294A
- Solar Illuminator
- Nicolet 6700 FTIR Spectrometer
- Shimadzu UV-1800 UV-VIS Spectrophotometer
- Laurell Technologies Spin Coater
- Ramé-Hart 290 Goniometer
- Meiji MT5310L Microscope
- Vacuum Ovens/Hot Plates

Polymers and Composites Laboratory (Palmese)

- TA Instruments TGA Q50 Thermogravimetric Analyzer
- KSV Instruments CAM 200 Contact Angle and Surface Tension Meter
- TA Instruments DSC Q2000 Differential Scanning Calorimeter
- Instron 8872
- Thermo Nicolet Nexus 870 FTIR
- TA Instruments DMA Dynamic Mechanical Analysis
- Perkin Elmer DSC7 Differential Scanning Calorimeter
- Waters GPC/HPLC (RI, UV Detectors)
- Electrospinning station
- TA Instruments AR Rheometer
- Thinky planetary centrifugal mixer ARE-250
- Melt Press
- Portable Near Infrared Spectrometer
- Brookfield digital viscometer
- Glove Box
- Supercritical Dryer (2x)
- Dielectric Barrier Discharge (DBD) plasma reactor

Process Systems Engineering Laboratory (Soroush)

- Shimadzu GPC
- Mini-Reactors
- Agilent GC/MS
- Fluidized Sand Bath
- IKA-RCT Stirred Hotplate Reactors
- Olympus Microscope
- Shimadzu UV-Vis Spectrophotometer (UV-1700)

Electrochemical Interfaces and Catalysis Laboratory (Snyder)

- Millipore DI water system
- 302N Autolab Potentiostats (x2)
- Mettler Toledo Micro-Balance
- Ultracentrifuge
- 4 port Schlenk line
- 4 kW Ambrell Radio Frequency Induction Furnace

Tang Laboratory (Tang)

- Six-channel Bio-Logic SP-300 potentiostat with electrochemical impedance spectroscopy
- LC Technology dual-user glovebox with argon atmosphere. Includes oxygen and water analyzers, electronic feedthroughs, and integrated vacuum oven
- Coin cell crimper /decrimper for battery fabrication (TOB Battery)
- Automatic electrode film coater (TOB Battery)
- Tube furnace
- Vacuum oven
- Karl-Fischer titration apparatus (Mettler Toledo)

- Two rotating disk electrode test station (Pine Instruments) with rotating ring-disk accessories
- 32-channel battery cycler (Arbin)

Wrenn Laboratory (Wrenn)

- PTI, Inc. C-71 Time-Resolved Fluorescence Spectrometer (pulsed nitrogen and dye lasers)
- PTI, Inc. A-710 Steady State Fluorescence Spectrometer
- Brookhaven 90Plus Dynamic Light Scattering Apparatus
- Brookhaven Goniometer-based, Static Light Scattering Apparatus
- Perkin-Elmer BUV40XW0 UV-Visible Absorbance Spectrometer
- Zeiss Axioskop2 Fluorescence microscope
- Zeiss Ultraviolet Digital Image Analysis System (contains Orca Camera, Sony 17" monitor, and Axiovision II software)
- Beckman Coulter Allegra64 Centrifuge
- Misonix, Inc. XL2020 Sonicator

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*). 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.

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

Vibha Kalra, PhD (*Cornell University*). Associate 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*) *Associate Department Head*. 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*). George B Francis 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*). 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: Master of Science in Civil Engineering (MSCE) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MSCE); 90.0 (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 14.0801

Standard Occupational Classification (SOC) code: 17-2015

About the Program

Objectives

The graduate program in civil engineering offers students the opportunity to develop a more fundamental and complete understanding of the principles that govern their field as well as current design methodology. Students are encouraged to be innovative and imaginative in their quest for recognizing, stating, analyzing, and solving engineering problems.

The goal of the Master's program is to develop technical depth of expertise for a professional career in the planning, design, construction, and operation of large-scale infrastructure systems, built facilities, and water resources management. The goal of the PhD program is to develop the abilities to discover, pursue, and apply basic knowledge. PhD recipients are prepared to engage in teaching and research or in an industrial career in the development of new concepts and innovative systems.

General Information

The civil engineering programs comprise the following areas of specialization: building systems, geotechnical engineering, hydraulic and coastal engineering, structural engineering, and water resources.

For more information, visit the Department of Civil, Architectural and Environmental Engineering (<https://drexel.edu/engineering/academics/departments/civil-architectural-environmental-engineering/>) web page.

Admission Requirements

MS admission is based on an academic record demonstrating adequate preparation and potential for successful graduate study. This typically includes a BS from an engineering curriculum accredited by the Accrediting Board for Engineering and Technology (ABET) or the equivalent from a non-U.S. institution. Submission of results from the Graduate Record Exam (GRE) is required. A grade point average (GPA) of 3.0 is usually required. Graduates who do not have a bachelor's degree in either Civil, Architectural or Environmental Engineering may be required to take preparatory undergraduate courses.

For additional information on how to apply, visit Drexel's Admissions page for Civil Engineering (<http://www.drexel.edu/grad/programs/coe/civil-engineering/>).

Master of Science in Civil Engineering

The programs of study at the master's level continue the specialization developed at the senior level of the undergraduate program or newly developed interests. The Master of Science in Civil Engineering program may be elected by graduates of ABET-accredited undergraduate programs in civil engineering and related fields. Admission and prerequisites are determined on the basis of a student's undergraduate transcript.

Most MSCE graduates work as professional engineers in consulting firms, industry, or governmental agencies. A number of our graduates have started consulting and construction firms in the Philadelphia area and have been very successful. Other former students hold prominent positions in public utilities, local government agencies, and industry.

The full-time graduate academic program is closely associated with the research efforts of the faculty. Full-time master's degree candidates are encouraged to base their master's thesis on some aspect of faculty research. The one-to-one relationship between student and faculty member provides an invaluable learning experience. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study.

The master's degree requires a total of 45.0 credits, of which 24.0 credits must be in the major field of interest and 6.0 credits are to fulfill math requirements. The remaining credits are taken as electives in related areas. The choice of core and elective courses is made in consultation with the student's graduate advisor.

Areas of concentration include:

- Structural
- Geotechnical/geoenvironmental/geosynthetics
- Water resources

Geotechnical/Geosynthetic Engineering Requirements

Required Cross-Cutting Courses

CIVE 605	Advanced Mechanics Of Material *	3.0
ENVE 555	Geographic Information Systems	3.0
or CIVE 615	Infrastructure Condition Evaluation	
ENVE 571	Environmental Life Cycle Assessment	3.0
ENVE 750	Data-based Engineering Modeling	3.0
or ENVE 727	Risk Assessment	
or ENVE 865	Benefit-Cost Analysis for Infrastructure	

Required Theme Courses *

CIVE 632	Advanced Soil Mechanics	3.0
CIVE 635	Slope Stability and Landslides	3.0
or CIVE 838	Soil Behavior	
CIVE 640	Environmental Geotechnics	3.0
or CIVE 650	Geosynthetics I	
CIVE 730	Experimental Soil Mechanics I	3.0
or CIVE 731	Experimental Soil Mechanics II	
or CIVE 651	Geosynthetics II	

Technical Elective Courses 12.0

These courses must be approved by the student's advisor and the graduate advisor.
 Select from any of the following that were not already counted for credit.

CIVE 530	Geotechnical Engineering for Highways	
CIVE 531	Advanced Foundation Engineering	
CIVE 542	Incorporating Sustainability Principles in Design	
CIVE 615	Infrastructure Condition Evaluation	
CIVE 635	Slope Stability and Landslides	
CIVE 636	Ground Modification	
CIVE 640	Environmental Geotechnics	
CIVE 650	Geosynthetics I	
CIVE 651	Geosynthetics II	
CIVE 562	Introduction to Groundwater Hydrology	
CIVE 730	Experimental Soil Mechanics I	
CIVE 731	Experimental Soil Mechanics II	
CIVE 833	Earth Retaining Structures	
CIVE 838	Soil Behavior	
ENVE 555	Geographic Information Systems	
ENVE 727	Risk Assessment	
ENVE 750	Data-based Engineering Modeling	
MATH 520	Numerical Analysis I	
MATH 521	Numerical Analysis II	
MEM 591	Applied Engr Analy Methods I	
MEM 592	Applied Engr Analy Methods II	
MEM 660	Theory of Elasticity I	
MEM 663	Continuum Mechanics	
MEM 664	Introduction to Plasticity	
MEM 681	Finite Element Methods I	
MEM 682	Finite Element Methods II	

Electives or Thesis ** 9.0

Total Credits 45.0

- * Must achieve grade of B or better.
- ** For students writing an M.S. thesis, these nine credits should consist of six research credits (CIVE 997) and three thesis credits (CIVE 898). Full time Masters students are encouraged to do a thesis. Students opting not to do a thesis will be required to complete an additional 9.0 elective credits from the list above, therefore, the total elective credits required will be 21.

Structural Engineering Requirements

Required Cross-Cutting Courses

CIVE 605	Advanced Mechanics Of Material *	3.0
ENVE 555	Geographic Information Systems	3.0
or CIVE 615	Infrastructure Condition Evaluation	
ENVE 571	Environmental Life Cycle Assessment	3.0
ENVE 750	Data-based Engineering Modeling	3.0
or ENVE 727	Risk Assessment	
or ENVE 865	Benefit-Cost Analysis for Infrastructure	

Required Theme Courses *

CIVE 701	Structural Analysis I	3.0
CIVE 702	Structural Analysis II	3.0
CIVE 703	Structural Analysis III	3.0

CIVE 801	Dynamics of Structures I	3.0
----------	--------------------------	-----

Technical Elective Courses 12.0

These courses must be approved by the student's advisor and the graduate advisor.
 Select from any of the following that were not already counted for credit.

AE 510	Intelligent Buildings	
AE 561	Airflow Simulation in Built Environment	
CIVE 510	Prestressed Concrete	
CIVE 520	Advanced Concrete Technology	
CIVE 531	Advanced Foundation Engineering	
CIVE 540	Forensic Structural Engineering	
CIVE 542	Incorporating Sustainability Principles in Design	
CIVE 615	Infrastructure Condition Evaluation	
CIVE 704	Behavior and Stability of Structural Members I	
CIVE 705	Behavior and Stability of Structural Members II	
CIVE 711	Engineered Masonry I	
CIVE 714	Behavior of Concrete Structures I	
ENVE 727	Risk Assessment	
ENVE 555	Geographic Information Systems	
ENVE 750	Data-based Engineering Modeling	
MATH 520	Numerical Analysis I	
MATH 521	Numerical Analysis II	
MEM 591	Applied Engr Analy Methods I	
MEM 660	Theory of Elasticity I	
MEM 663	Continuum Mechanics	
MEM 664	Introduction to Plasticity	
MEM 681	Finite Element Methods I	
MEM 682	Finite Element Methods II	

Electives or Thesis ** 9.0

Total Credits 45.0

- * Must achieve grade of B or better.
- ** For students writing an M.S. thesis, these nine credits should consist of six research credits (CIVE 997) and three thesis credits (CIVE 898). Full time Masters students are encouraged to do a thesis. Students opting not to do a thesis will be required to complete an additional 9.0 elective credits from the list above, therefore, the total elective credits required will be 21.

Water Resources Engineering Requirements

Required Cross-Cutting Courses

CIVE 664	Open Channel Hydraulics *	3.0
ENVE 555	Geographic Information Systems	3.0
or CIVE 615	Infrastructure Condition Evaluation	
ENVE 571	Environmental Life Cycle Assessment	3.0
ENVE 750	Data-based Engineering Modeling	3.0
or ENVE 727	Risk Assessment	
or ENVE 865	Benefit-Cost Analysis for Infrastructure	

Required Theme Courses *

CIVE 565	Urban Ecohydraulics	3.0
ENVE 681	Analytical and Numerical Techniques in Hydrology	3.0
or CIVE 567	Watershed Analysis	
ENVE 665	Hazardous Waste & Groundwater Treatment	3.0
or CIVE 564	Sustainable Water Resource Engineering	
ENVS 501	Chemistry of the Environment	3.0

Technical Elective Courses 12.0

These courses must be approved by the student's advisor and the graduate advisor.

Select from any of the following that were not already counted for credit.

CIVE 562	Introduction to Groundwater Hydrology	
CIVE 564	Sustainable Water Resource Engineering	

CIVE 567	Watershed Analysis	
CIVE 615	Infrastructure Condition Evaluation	
ENVE 555	Geographic Information Systems	
ENVE 660	Chemical Kinetics in Environmental Engineering	
ENVE 661	Env Engr Op-Chem & Phys	
ENVE 665	Hazardous Waste & Groundwater Treatment	
ENVE 727	Risk Assessment	
ENVE 750	Data-based Engineering Modeling	
ENVE 865	Benefit-Cost Analysis for Infrastructure	
Electives or Thesis **		9.0
Total Credits		45.0

* Must achieve grade of B or better.

** For students writing an M.S. thesis, these nine credits should consist of six research credits (CIVE 997) and three thesis credits (CIVE 898). Full time Masters students are encouraged to do a thesis. Students opting not to do a thesis will be required to complete an additional 9.0 elective credits from the list above, therefore, the total elective credits required will be 21.

Dual graduate degrees are possible. Among the more popular programs are combining the MS in Civil Engineering with an MS in Environmental Engineering, or Engineering Management. The required credits must meet all civil engineering program requirements and will be determined on the basis of the student's proposed program of study.

Sample Plan of Study

Geotechnical/Geosynthetic Engineering

Term	Credits
Term 1	
CIVE 605	Advanced Mechanics Of Material 3.0
CIVE 615	Infrastructure Condition Evaluation 3.0
Theme elective	3.0
Term Credits	9.0
Term 2	
ENVE 727	Risk Assessment 3.0
Theme electives	6.0
Term Credits	9.0
Term 3	
ENVE 571	Environmental Life Cycle Assessment 3.0
Theme elective or Research credit	3.0
Term Credits	6.0
Term 4	
CIVE 632	Advanced Soil Mechanics 3.0
CIVE 650	Geosynthetics I 3.0
Term Credits	6.0
Term 5	
CIVE 651	Geosynthetics II 3.0
CIVE 838	Soil Behavior 3.0
Theme elective or Research credit	3.0
Term Credits	9.0
Term 6	
Theme elective	3.0
Theme elective or Thesis credit	3.0
Term Credits	6.0
Total Credit:	45.0

Structural Engineering

Term	Credits
Term 1	
CIVE 605	Advanced Mechanics Of Material 3.0
CIVE 615	Infrastructure Condition Evaluation 3.0
Theme elective	3.0
Term Credits	9.0
Term 2	
ENVE 727	Risk Assessment 3.0
Theme electives	6.0
Term Credits	9.0
Term 3	
ENVE 571	Environmental Life Cycle Assessment 3.0
Theme elective	3.0
Term Credits	6.0
Term 4	
CIVE 701	Structural Analysis I 3.0
Theme elective or Research credit	3.0
Term Credits	6.0
Term 5	
CIVE 702	Structural Analysis II 3.0
CIVE 801	Dynamics of Structures I 3.0
Theme elective or Research credit	3.0
Term Credits	9.0
Term 6	
CIVE 703	Structural Analysis III 3.0
Theme elective or Thesis credit	3.0
Term Credits	6.0
Total Credit:	45.0

Water Resources Engineering

Term	Credits
Term 1	
CIVE 615	Infrastructure Condition Evaluation 3.0
CIVE 664	Open Channel Hydraulics 3.0
Theme elective	3.0
Term Credits	9.0
Term 2	
ENVE 727	Risk Assessment 3.0
Theme electives	6.0
Term Credits	9.0
Term 3	
ENVE 571	Environmental Life Cycle Assessment 3.0
Theme elective or Research credit	3.0
Term Credits	6.0
Term 4	
ENVE 681	Analytical and Numerical Techniques in Hydrology 3.0
ENVS 501	Chemistry of the Environment 3.0
Term Credits	6.0
Term 5	
CIVE 565	Urban Ecohydraulics 3.0
Theme elective	3.0
Theme elective or Research credit	3.0
Term Credits	9.0
Term 6	
ENVE 665	Hazardous Waste & Groundwater Treatment 3.0
Theme elective or Thesis credit	3.0
Term Credits	6.0
Total Credit:	45.0

PhD in Civil Engineering

The PhD degree is awarded for original research on a significant civil engineering problem. Graduate students who have completed their MS degrees work closely with individual faculty members (see Faculty Research Interests below). PhD dissertation research is usually supported by a research grant from a government agency or an industrial contract.

The full-time graduate academic program is closely associated with the research efforts of the faculty. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study.

Doctoral students normally take at least 45.0 credits, including research credits, beyond the master's degree requirements. Full-time residency for one continuous academic year is required for the PhD degree to ensure students the opportunity for intellectual association with other scholars. Many doctoral students take two, three, or four years of full-time graduate study to complete their degrees. Involvement in the teaching activity of the Civil, Architectural and Environmental Engineering Department is required of all PhD applicants.

After approximately one year of study beyond the master's degree, doctoral students take a candidacy examination, consisting of written and oral parts. Each PhD candidate is supervised by a major professor and a doctoral committee chaired by the major professor.

PhD candidates submit a detailed proposal for dissertation research to the doctoral committee. The students then take a proposal examination; successful completion of this examination is required to become a PhD candidate. After approval of the proposal, the committee meets from time to time to review the progress of the research. The dissertation must be submitted to the doctoral committee at least 90 days before the graduation date. The committee schedules and conducts a final oral examination before approval of the dissertation.

Areas of research include:

- Structural
- Geotechnical/geoenvironmental/geosynthetics
- Water resources
- Sustainable engineering
- Building systems/energy

Dual Degree Programs

Civil Engineering students may find it useful to pursue dual MS degrees. Such programs have been pursued in concert with Environmental Engineering/Science, Mechanical Engineering, Information Studies and Engineering Management. A dual degree student must complete the required coursework for each degree. Depending upon the concentration, up to 15.0 credits from another program may count as electives for the MSCE with the advisor's approval. The student is responsible for obtaining approval of MSCE courses that apply to the second degree.

Bachelor's/Master's Dual Degree Program

Exceptional undergraduate students can also pursue a master of science degree in the same period as the bachelor of science. Many students deepen their knowledge with a Master's degree in Civil Engineering, while others have broadened their knowledge with a Master's degree in related areas such as Environmental Science, Engineering Management, Software Engineering and Information Technology.

For more information about this program, visit the Department's BS/MS Dual Degree Program (<https://drexel.edu/engineering/academics/departments/civil-architectural-environmental-engineering/academic-programs/undergraduate/accelerated-and-dual-degree-programs/>) web page.

Facilities

Construction Materials Laboratory

This laboratory contains facilities for the study of concrete, asphalt, mortar, soil-cement, and timber materials, and moist cure facilities.

Geosynthetics Laboratory

This laboratory contains a complete suite of physical, mechanical, hydraulic, endurance, and environmental test devices for assessing behavior of geotextiles, geogrids, geonets, geomembranes, and geocomposites.

HVAC and Refrigeration Laboratory

This laboratory contains complete models of heating, ventilation, air conditioning, refrigeration, and pumping system models.

Hydromechanics Laboratory

This laboratory contains a wave channel tilting flume, pipe friction equipment, bench demonstration equipment, and a beach erosion model.

Soil Mechanics and Geoenvironmental Laboratory

This laboratory contains triaxial and direct shear equipment, controlled environmental chambers, consolidation tests, flexwall permeameters, and a test bed.

Structural Testing Laboratory

This laboratory contains universal testing machines with 150,000- and 300,000-pound capacity and test beds with MTS dynamic load equipment.

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.

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*). Teaching Professor. International infrastructure delivery; response to natural catastrophes; risk assessment and mitigation strategies; project management techniques.

Shannon Capps, PhD (*Georgia Institute of Technology*). Assistant Professor. Atmospheric chemistry; data assimilation; advanced sensitivity analysis; inverse modeling.

S.C. Jonathan Cheng, PhD (*West Virginia University*). Associate Professor. Soil mechanics; geosynthetics; geotechnical engineering; probabilistic design; landfill containments; engineering education.

Eugenia Ellis, PhD (*Virginia Polytechnic Institute and State University*). Associate Professor. Natural and electric light sources and effects on biological rhythms and health outcomes; ecological strategies for smart, sustainable buildings of the nexus of health, energy and technology.

Yaghoob (Amir) Farnam, PhD (*Purdue University*). Assistant Professor. Advanced and sustainable infrastructure materials; multifunctional, self-responsive and bioinspired construction materials; advanced multiscale manufacturing; characterization, and evaluation of construction materials; durability of cement-based materials.

Patricia Gallagher, PhD (*Virginia Polytechnic Institute and State University*). Professor. Geotechnical and geoenvironmental engineering; soil improvement; recycled materials in geotechnics.

Patrick Gurian, PhD (*Carnegie-Mellon University*). 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 Chair Professor of Environmental Engineering and Department Head, Civil, Architectural and Environmental Engineering*. Professor. Water treatment; risk assessment; bioterrorism; environmental modeling and statistics; microbiology; environmental health.

Ahmad Hamid, PhD (*McMaster University*). Professor. Engineered masonry; seismic behavior, design and retrofit of masonry structures; development of new materials and building systems.

Simi Hoque, PhD (*University of California - Berkeley*). Associate Professor. Computational methods to reduce building energy and environmental impacts, urban metabolism, thermal comfort, climate resilience.

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*) *Distinguished University Professor*. Biological processes and applications of nanotechnology in environmental systems.

L. James Lo, PhD (*University of Texas at Austin*). Assistant Professor. Architectural fluid mechanics; building automation and autonomy; implementation of natural and hybrid ventilation in buildings; airflow distribution in buildings; large-scale air movement in an urban built environment; building and urban informatics; data-enhanced sensing and control for optimal building operation and management; novel data gathering methods for building/urban problem solving; interdisciplinary research on occupant behaviors in the built environment.

Roger Marino, PhD (*Drexel University*). Associate Teaching Professor. Engineering education; land development; product Development

Joseph P. Martin, PhD (*Colorado State University*). Professor. Geotechnical and geoenvironmental engineering; hydrology; transportation; waste management.

James E. Mitchell, MArch (*University of Pennsylvania*). Professor. Architectural engineering design; building systems; engineering education.

Franco Montalto, PhD (*Cornell University*). Professor. Effects of built infrastructure on societal water needs, ecohydrologic patterns and processes, ecological restoration, green design, and water interventions.

Nariman Mostafavi, PhD (*University of Massachusetts - Amherst*). Assistant Teaching Professor. Simulation tools for analyzing urban

metabolism; environmentally responsive design; urban resilience; engineering economics; industrial ecology.

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*). Associate Professor. Peace engineering; source water quality protection and management; contaminant and bacterial fate and transport; community engagement.

Miguel A. Pando, PhD (*Virginia Polytechnic Institute and State University*). Assistant Professor. Laboratory testing of geomaterials; geotechnical aspects of natural hazards; soil-structure-interaction; geotechnical engineering.

Michael Ryan, PhD (*Drexel University*) *Associate Department Head of Graduate Studies*. Assistant Teaching Professor. Microbial Source Tracking (MST); Quantitative Microbial Risk Assessment (QMRA); dynamic engineering systems modeling; molecular microbial biology; phylogenetics; metagenomics; bioinformatics; environmental statistics; engineering economics; microbiology; potable and waste water quality; environmental management systems.

Christopher Sales, PhD (*University of California, Berkeley*). Associate Professor. Environmental microbiology and biotechnology; biodegradation of environmental contaminants; microbial processes for energy and resource recovery from waste; application of molecular biology, analytical chemistry and bioinformatic techniques to study environmental biological systems.

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. 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 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: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS); 90.0 (PhD)

Co-op Option: Available for full-time on-campus master's-level students

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 computer engineering curriculum is designed to: (1) address the needs of students with a variety of different backgrounds; (2) ensure that graduates will have adequate knowledge and skills in at least one area of specialization; (3) meet the immediate needs of working students as well as to adequately prepare full-time students for a real-world technological environment; and (4) equip students with tools to grasp and develop new technologies and trends.

The Master of Science in Computer Engineering degree requires a minimum of 45.0 approved credits chosen in accordance with a plan of study arranged in consultation with the student's advisor and the departmental graduate advisor. Up to but not exceeding 9.0 research/thesis credits may be taken by students who choose to write a master's thesis. Students who elect a non-thesis option are also encouraged to engage in research, by registering for supervised research credits (not to exceed 9.0 credits).

Students within the Master of Science in Computer Engineering are eligible to take part in the Graduate Coop Program, which combines classroom coursework with a 6-month, full-time work experience. For more information, visit the Steinbright Career Development Center's website (<http://www.drexel.edu/scdc/co-op/graduate/>).

For more information, visit the Department of Electrical and Computer Engineering (<https://drexel.edu/engineering/academics/departments/electrical-computer-engineering/>) web site.

Admission Requirements

Applicants should have an undergraduate degree equivalent to a US bachelor's degree in computer engineering, computer science, or electrical engineering. Students holding degrees in other engineering and science disciplines with appropriate coursework or training will also be considered.

Appropriate coursework includes experience with all of the following: Software (advanced programming and operating systems); Computer Architecture (digital systems design, computer organization and architecture); Algorithms and Data Structures; Computer Networks. Students must have a minimum 3.0 GPA (on a 4.0 scale) for the last two years of undergraduate studies, as well as for any subsequent graduate-level work.

The GRE General Test is required of applicants to full-time MS and PhD programs. Students whose native language is not English and who do not hold a degree from a US institution must take the Test of English as a Foreign Language (TOEFL).

For additional information on how to apply, visit Drexel's Admissions page for Computer Engineering (<http://www.drexel.edu/grad/programs/coe/computer-engineering/>).

Degree Requirements (MS)

The Master of Science in Computer Engineering curriculum encompasses 45.0 approved credit hours, chosen in accordance with the following requirements and a plan of study arranged with the departmental graduate advisor in consultation with the student's research advisor, if applicable. Before the end of the first quarter in the Department of Electrical and Computer Engineering, for a full-time student, or by the end of the first year for a part-time student, said plan of study must be filed and approved with the departmental graduate advisor.

A total of at least 30.0 credit hours must be taken from among the graduate course offerings of the Department of Electrical and Computer Engineering. These credits must be taken at Drexel University. No transfer credit may be used to fulfill these requirements, regardless of content equivalency.

The remaining courses needed to reach the minimum credit hour requirement for the degree program are considered elective courses. Elective courses can be chosen from among the graduate course offerings of the Department of Electrical and Computer Engineering; other departments within the College of Engineering; the School of Biomedical Science, Engineering and Health Systems; the Department of Mathematics; the Department of Physics; the Department of Chemistry, the Department of Biology, and the Department of Computer Science. In order to have courses outside of these departments and schools count towards degree completion, they must be approved by the departmental graduate advisors prior to registration for said courses.

Please note that ECEC 500 *Fundamentals of Computer Hardware* and ECEC 600 *Fundamentals of Computer Networks* do **not** count toward the credit requirements to complete the MS in Electrical Engineering degree program.

Computer Engineering (ECEC) Courses	21.0
General Electrical and Computer Engineering (ECEC, ECEE, ECEP, ECES, ECET) Courses	9.0
Elective Courses	15.0
Total Credits	45.0

Options for Degree Fulfillment

Although not required, students are encouraged to complete a Master's Thesis as part of the MS studies. Those students who choose the thesis option may count up to 9.0 research/thesis credits as part of their required credit hour requirements.

Students may choose to participate in the Graduate Co-Op Program working on curriculum related projects. Graduate Co-op enables graduate students to alternate class terms with a six-month period of hands-on experience, gaining access to employers in their chosen industries. Whether co-op takes students throughout the United States or abroad, they are expanding their professional networks, enhancing their resumes, and bring that experience back to the classroom and their peers.

For more information on curricular requirements, visit the Department of Electrical and Computer Engineering (<http://drexel.edu/ece/>)' (<http://www.ece.drexel.edu/>)s web site.

PhD in Electrical Engineering

General Requirements

The following general requirements must be satisfied in order to complete the PhD in Electrical Engineering:

- 90.0 credit hours total
- candidacy examination
- research proposal
- dissertation defense

Students entering with a master's degree in electrical or computer engineering or a related field will be considered a post-masters PhD student and will only be required to complete a total of 45.0 credit hours, in accordance with University policy.

Curriculum

Appropriate coursework is chosen in consultation with the student's research advisor. A plan of study must be developed by the student to encompass the total number of required credit hours. Both the departmental graduate advisor and the student's research advisor must approve this plan.

Candidacy Examination

The candidacy examination explores the depth of understanding of the student in his/her specialty area. The student is expected to be familiar with, and be able to use, the contemporary tools and techniques of the field and to demonstrate familiarity with the principal results and key findings.

The student, in consultation with his/her research advisor, will declare a principal technical area for the examination. The examination includes the following three parts:

- A self-study of three papers from the archival literature in the student's stated technical area, chosen by the committee in consultation with the student.
- A written report (15 pages or less) on the papers, describing their objectives, key questions and hypotheses, methodology, main results and conclusions. Moreover, the student must show in an appendix independent work he/she has done on at least one of the papers – such as providing a full derivation of a result or showing meaningful examples, simulations or applications.
- An oral examination which takes the following format:
 - A short description of the student's principal area of interest (5 minutes, by student).

- A review of the self-study papers and report appendix (25-30 minutes, by students).
- Questions and answers on the report, the appendix and directly related background (40-100 minutes, student and committee).

In most cases, the work produced during the candidacy examination will be a principal reference for the student's PhD dissertation; however, this is not a requirement.

Research Proposal

Each student, after having attained the status of PhD Candidate, must present a research proposal to a committee of faculty and industry members, chosen with his/her research advisor, who are knowledgeable in the specific area of research. This proposal should outline the specific intended subject of study; i.e., it should present a problem statement, pertinent background, methods of study to be employed, expected difficulties and uncertainties and the anticipated form, substance and significance of the results.

The purpose of this presentation is to verify suitability of the dissertation topic and the candidate's approach, and to obtain the advice and guidance of oversight of mature, experienced investigators. It is not to be construed as an examination, though approval by the committee is required before extensive work is undertaken. The thesis proposal presentation must be open to all; announcements regarding the proposal presentation must be made in advance.

The thesis advisory committee will have the sole responsibility of making any recommendations regarding the research proposal. It is strongly recommended that the proposal presentation be given as soon as possible after the successful completion of the candidacy examination.

Dissertation Defense

Dissertation Defense procedures are described on the Graduate College's webpage (<http://drexel.edu/graduatecollege/academics/thesis-and-dissertation/>). The student must be a PhD candidate for at least one year before he/she can defend his/her doctoral thesis.

Dual Degree

The ECE Department offers outstanding students the opportunity to receive two diplomas (BS and MS) at the same time. The program requires five (5) years to complete. BSMS applicants, who represent some of the best undergraduates students in the department, can work with faculty members on research projects and also have the option to pursue MS Thesis. This program prepares individuals for careers in research and development; many of its past graduates continued their studies toward a PhD.

For more information on eligibility and academic requirements, visit the Engineering Combined BS/MS (<http://drexel.edu/ece/academics/undergrad/bs-ms/>) page.

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 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:

- Delay mitigating codes for network coded systems
- Distributed estimation in sensor networks via expectation propagation
- Turbo speaker identification
- Performance and convergence of expectation propagation
- 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 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 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:

- software defined radio network testbeds for rapidly prototyping new communications and network systems,
- electromagnetic anechoic chamber and reverberation chambers for testing new wireless technologies,
- experimental cell tower for field testing new wireless technologies.

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. The lab offers laboratory coursework in wireless network security, collaborative intelligent radio networks, and fundamental analog and digital communication systems.

Ecological and Evolutionary Signal-processing and Informatics Laboratory

The Ecological and Evolutionary Signal-processing and Informatics Laboratory (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.

Multimedia & Information Security Lab [MISL]

The Multimedia and Information Security Lab (MISL) develops algorithms to detect fake images and videos, along with algorithms to determine the true source an image or video. This research is particularly important because widely available editing software enables multimedia forgers to create perceptually realistic forgeries. Our goal at MISL, is to conduct research that provides information verification and security in scenarios when an information source cannot be trusted.

The research conducted at MISL is part of a new area, known as multimedia forensics, which lies at the intersection of many areas in machine learning and artificial intelligence, signal processing, image and video processing, game theory, etc. Our algorithms work by identifying or learning visually imperceptible traces left in images and videos by processing operations. We use these traces to detect editing or forgery as well as to link an image or video back to the camera that captured it. We also perform research on anti-forensic operations designed to fool forensic techniques. By studying anti-forensics, researchers can

identify and address weaknesses in existing forensic techniques as well as develop techniques capable of identifying the use of anti-forensics.

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

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.

Computer Engineering Faculty

Tom Chmielewski, PhD (*Drexel University*). 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.

Anup Das, PhD (*University of Singapore*). Assistant Professor. Design of algorithms for neuromorphic computing, particularly using spiking neural networks, dataflow-based design of neuromorphic computing system, design of scalable computing system; hardware-software co-design and management, and thermal and power management of many-core embedded systems

Bruce A. Eisenstein, PhD (*University of Pennsylvania*). Arthur J. Rowland Professor of Electrical and Computer Engineering. Pattern recognition; estimation; decision theory.

Adam K. Fontecchio, PhD (*Brown University*) *Director, Center for the Advancement of STEM Teaching and Learning Excellence (CASTLE)*. Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Gary Friedman, PhD (*University of Maryland-College Park*) *Associate Department Head for Graduate Affairs*. Professor. Biological and biomedical applications of nanoscale magnetic systems.

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*). 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 Undergraduate Affairs*. Associate Professor. Embedded systems, self-managing systems, reliable and fault-tolerant computing, distributed systems, computer architecture, and testing and verification of digital systems.

Youngmoo Kim, PhD (*MIT*) *Director, Expressive and Creative Interactive Technologies (ExCITE) Center*. Professor. Audio and music signal processing, voice analysis and synthesis, music information retrieval, machine learning.

Fei Lu, PhD (*University of Michigan*). Assistant Professor. Power electronics; wireless power transfer technology for the high-power electric vehicles and the low-power electronic devices.

Karen Miu, PhD (*Cornell University*). Professor. Power systems; distribution networks; distribution automation; optimization; system analysis.

Bahram Nabet, PhD (*University of Washington*). Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Prawat Nagvajara, PhD (*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.

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 Prabhu, PhD (*Harvard University*). Teaching Professor. Computer engineering education; computer architecture; embedded 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.

Ioannis Savidis, PhD (*University of Rochester*). Associate 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 Dean for Undergraduate Affairs. 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*). Associate 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*). Associate Professor. Information Security; multimedia forensics and anti-forensics; information verification; adversarial dynamics; signal processing

Baris Taskin, PhD (*University of Pittsburgh*). Professor. Very large-scal integration (VLSI) systems, computer architecture, circuits and systems, electronic design automation (EDA), energy efficient computing.

John Walsh, PhD (*Cornell University*). Associate Professor. Bounding the region of entropic vectors and its implications for the limits of communication networks, big data distributed storage systems, and graphical model based machine learning; efficient computation and analysis of rate regions for network coding and distributed storage; code construction, polyhedral computation, hierarchy, and symmetry

Steven Weber, PhD (*University of Texas-Austin*) Department Head. Professor. Mathematical modeling of computer and communication networks, specifically streaming multimedia and ad hoc networks.

Jaudelice 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

Emeritus Faculty

Suryadevara Basavaiah, PhD (*University of Pennsylvania*). Professor Emeritus. Computer engineering; computer engineering education; custom circuit design; VLSI technology; process and silicon fabrication

Eli Fromm, PhD (*Jefferson Medical College*). Professor Emeritus. Engineering education; academic research policy; bioinstrumentation; physiologic systems.

Edwin L. Gerber, PhD (*University of Pennsylvania*). Professor Emeritus. Computerized instruments and measurements; undergraduate engineering education.

Construction Management

Major: Construction Management

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 52.2001

Standard Occupational Classification (SOC) code: 11-9021

About the Program

The Master of Science in Construction Management program gives professionals the opportunity to develop the multidisciplinary skills required of effective construction managers. The program focuses on training professionals to meet the challenge of increasing owner demands, tighter project delivery times and increasing regulation. The program provides the leadership skills professionals need to navigate the many daily challenges construction organizations face in successfully managing construction operations.

Three concentrations are available: construction project management, real estate, and sustainability and green construction.

Program Goals

The program is designed to increase the students' breadth and depth of knowledge in the principles and practices of construction management. The program serves as an excellent platform to develop senior management for the nation's construction industry.

Graduates of the Master of Science in Construction Management program will:

- exhibit strong technical and managerial skills
- apply scientific methodologies to problem solving
- think critically
- exercise creativity and inject innovation into the process
- operate at the highest level of ethical practice
- employ principles of transformational leadership

Concentrations

Three concentrations are available:

Construction Project Management

This concentration provides the knowledge and skills required to successfully manage complex construction projects. Topics include the hard skills of project management, such as estimating and budgeting, time management, and planning. Other topics include managerial and legal aspects of construction contract administration, international construction practices, strategic planning, quality management, and productivity analysis.

Real Estate

In this concentration students explore the knowledge and skills required to create, maintain, and build environments for living, working and entertainment purposes. Relevant issues include project finance, real estate as investments, design and construction, operations, development law, environmental remediation, public policy, market analysis, and architecture.

Sustainability and Green Construction

Sustainable development means integrating the decision-making process across the project team, so that every decision is made with an eye to the greatest long-term benefits. Currently, in the Leadership in Energy and Environmental Design (LEED) green building rating system, the construction process represents a significant portion of the effort required to achieve high performance building programs. This concentration is intended to explore these concepts in detail.

For additional information, view the College of Engineering's Construction Management (<https://drexel.edu/engineering/academics/departments/construction-engineering-project-management-systems-engineering/>) web page or the program academic adviser:

Ms. Jessica Cruz, jc635@drexel.edu, 215-895-5943

Admissions Requirements

Admission to the program requires:

- A bachelor's degree in construction management or engineering, or a baccalaureate business or non-technical degree.
- A completed application
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Potential students must supply transcripts regardless of the number of credits earned or the type of school attended. If a potential student does not list all post-secondary institutions on his or her application, and these are listed on transcripts received from other institutions, processing of the application will be delayed until the remaining transcripts have been submitted.
- GPA of 3.0 or higher
- Two letters of recommendation (professional or academic)
- Up-to-date resume
- 500 word essay on why the applicant wishes to pursue graduate studies in this program
- International Students must submit a TOEFL score indicating a minimum of 600 (paper exam) or 250 (CBT exam). For more information regarding international applicant requirements, view the International Students Admissions Information (<http://drexel.edu/grad/resources/international/>) page.

Visit the Graduate Admissions (<http://www.drexel.edu/grad/programs/coe/construction-management/>) website for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements

The Master of Science in Construction Management curriculum includes a core of 5 required courses (15.0 credits), a concentration (24.0 credits), and 6.0 credits of culminating experience. The culminating experience includes a capstone project in construction management.

Core Foundation Courses

CMGT 501	Leadership in Construction	3.0
CMGT 505	Construction Accounting and Financial Management	3.0
CMGT 510	Construction Control Techniques	3.0
CMGT 512	Cost Estimating and Bidding Strategies	3.0
CMGT 515	Risk Management in Construction	3.0

Concentrations **15.0-24.0**

Students pursue a concentration in one of the following areas:

Construction Management Project Management Concentration

CMGT 525	Applied Construction Project Management
CMGT 528	Construction Contract Administration
CMGT 530	Equipment Applications and Economy
CMGT 532	International Construction Practices
CMGT 538	Strategic Management in Construction
CMGT 540	Schedule Impact Analysis
CMGT 548	Quality Management and Construction Performance
CMGT 550	Productivity Analysis and Improvement

Real Estate Concentration

Select eight of the following:

CMGT 535	Community Impact Analysis
REAL 568	Real Estate Development
REAL 571	Advanced Real Estate Investment & Analysis
REAL 572	Advanced Market Research & Analysis
REAL 573	Sales & Marketing of Real Estate
REAL 574	Real Estate Economics in Urban Markets
REAL 575	Real Estate Finance
REAL 576	Real Estate Valuation & Analysis
REAL 577	Legal Issues in Real Estate Development

Sustainability and Green Construction Concentration

CMGT 535	Community Impact Analysis
CMGT 545	Sustainable Principles & Practices
CMGT 546	Sustainable Technologies
CMGT 547	LEED Concepts
CMGT 558	Community Sustainability

Culminating Experience **6.0**

CMGT 696	Capstone Project in Construction Management I
CMGT 697	Capstone Project in Construction Management II

Total Credits 45.0

Construction Management Faculty

Jeffrey 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.

Johanna Casale, PhD (*Rutgers University*). Assistant Teaching Professor. Engineering education, first year design, structural aspects of construction.

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

Kathleen M. Short, PhD (*Virginia Tech*). Assistant Teaching Professor. Workforce development and women in construction; transformative safety leadership; construction education.

Cybersecurity

Major: Cybersecurity

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional Programs (CIP) code: 11.1003

Standard Occupational Classification (SOC) code: 15-1122

About the Program

As a greater percentage of people worldwide use computers, there is a marked increase in cybersecurity concerns. Motivated through

discussions with the National Security Agency (NSA), Drexel University's MS in Cybersecurity program prepares students with both academic and practical training to be competitive in today's rapidly changing technical landscape. The program provides deeply technical and specialized training and enables graduates to understand, adapt, and develop new techniques to confront emerging threats in cybersecurity.

Administered by the Electrical & (<http://www.drexel.edu/ece/>) Computer Engineering Department in the College of Engineering, this program is interdisciplinary in nature and includes courses from Drexel University's College of Computing & Informatics. Topics covered include computer networking, probability concepts, techniques for analyzing algorithms, dependable software design, reverse software engineering, intrusion detection, ethics, privacy, confidentiality, authenticity, and social networking.

The program offers multidisciplinary "research rotations" as an independent study component of the degree program and an option to participate in the Graduate Coop Program. For more information relating to Graduate Coop, please see the Steinbright Career Development Center's website (<https://drexel.edu/scdc/co-op/graduate/>).

Additional Information

For additional information about this program, please visit the ECE Department's Cybersecurity degree page (<https://drexel.edu/engineering/academics/departments/electrical-computer-engineering/academic-programs/graduate/ms/cybersecurity/>).

Degree Requirements

The Master of Science in Cybersecurity program encompasses a minimum of 45.0 approved credit hours, chosen in accordance with the requirements listed below. A plan of study should be arranged with the departmental graduate advisors, and in consultation with the student's research advisor, if applicable.

The required core courses provide students with a theoretical foundation in the field of cybersecurity and a framework to guide the application of knowledge gained in technical electives to the practice of cybersecurity.

Core Courses

INFO 517	Principles of Cybersecurity	3.0
INFO 679	Information Ethics	3.0
INFO 725	Information Policy and Ethics	3.0
SE 578	Security Engineering	3.0
Cybersecurity Track-Specific Technical Electives *		24.0
Cybersecurity Non-Track Technical Electives **		9.0
Total Credits		45.0

* Cybersecurity technical electives are used to build a deep understanding of one or more areas of technical expertise within the field of cybersecurity. All students are required to take a minimum of 18.0 credits of cybersecurity technical electives from the graduate course offerings of the Department of Computer Science, the Department of Computing and Security Technology, and the Department of Electrical and Computer Engineering [ECE]. A list of pre-approved technical electives can be found on the ECE Department website.

** General electives are the remaining courses needed to reach the minimum credit hour requirement for the degree program. General electives can be chosen from among the graduate course offerings of the College of Computing & Informatics; the Department of Computer Science; the Department of Computing and Security Technology; the Department of Electrical and Computer Engineering, and the Department of Mathematics. In order to have courses outside of these departments and schools count towards degree completion, they must be approved by the departmental graduate advisors prior to registration for said courses.

Graduate Co-op/Career Opportunities

Graduate Co-Op

Students may choose to participate in the Graduate Co-op Program, working on curriculum related projects. Graduate Co-op enables graduate students to alternate class terms with a six-month period of hands-on experience, gaining access to employers in their chosen industries. Whether co-op takes students throughout the United States or abroad, they are expanding their professional networks, enhancing their resumes, and bringing that experience back to the classroom and their peers.

Further information on the Graduate Co-Op Program (<http://www.drexel.edu/scdc/coop/graduate/>) is available at the Drexel Steinbright Career Development Center. (<http://www.drexel.edu/scdc/>)

Career Opportunities

The program was deliberately designed to address needs of the Federal Cyber Service, the Department of Defense, and the National Security Agency. The program strengthens ties between these agencies and Drexel University and will provide professional opportunities for students pursuing this degree.

Research

Students in the MS in Cybersecurity program have opportunities to perform research-oriented coursework for academic credit. Research-oriented coursework can be divided into three categories: research rotations, master's thesis, and independent research.

A total of 9.0 credits of research-oriented coursework may be counted towards the minimum credit hour requirement of the degree program. These credits are considered general electives.

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 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:

- software defined radio network testbeds for rapidly prototyping new communications and network systems,
- electromagnetic anechoic chamber and reverberation chambers for testing new wireless technologies,
- experimental cell tower for field testing new wireless technologies.

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. The lab offers laboratory coursework in wireless network security, collaborative intelligent radio networks, and fundamental analog and digital communication systems.

Ecological and Evolutionary Signal-processing and Informatics Laboratory

The Ecological and Evolutionary Signal-processing and Informatics Laboratory (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.

Multimedia & Information Security Laboratory

The Multimedia & Information Security Laboratory (MISL) conducts research that provides information verification and security in scenarios when an information source cannot be trusted.

The majority of MISL's research is in digital multimedia forensics. Digital multimedia forensics involves the developing mathematical techniques to identify multimedia forgeries such as falsified images and videos. This research is particularly important because widely available editing software enables multimedia forgers to create perceptually realistic forgeries. MISL performs research on anti-forensic operations designed to fool forensic techniques. By studying anti-forensics, researchers can identify and address weaknesses in existing forensic techniques as well as develop techniques capable of identifying the use of anti-forensics.

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

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.

Privacy, Security and Automation Lab

Drexel University's Privacy, Security, and Automation Laboratory (PSAL) researches on topics at the intersection between artificial intelligence, privacy and security, and human-computer interaction.

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.

Cybersecurity Faculty

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.

Constantine Katsinis, PhD (*University of Rhode Island*). Teaching Professor. High-performance computer networks, parallel computer architectures with sustained teraflops performance, computer security, image processing.

Steven Weber, PhD (*University of Texas-Austin*) Department Head. Professor. Mathematical modeling of computer and communication networks, specifically streaming multimedia and ad hoc networks.

Christopher C. Yang, PhD (*University of Arizona, Tucson*). 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.

Electrical Engineering

Major: Electrical Engineering

Degree Awarded: Master of Science (MS): or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS) or 90.0 (PhD)

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional Programs (CIP) code: 14.1001

Standard Occupational Classification (SOC) code: 17-2071

About the Program

The program in electrical engineering prepares students for careers in research and development, and aims to endow graduates with the ability to identify, analyze and address new technical and scientific challenges. At present, the department offers graduate coursework in six general areas: (1) computer engineering; (2) control, robotics and intelligent systems; (3) electrophysics; (4) image and signal processing and interpretation; (5) power engineering and energy; and (6) telecommunications and networking.

A student's plan of study must contain a selection of courses from the department's offerings and may include appropriate graduate elective courses from other engineering departments or from physics or mathematics. Further information can be obtained from the department website or from the graduate advisor.

Students are also encouraged to engage in thesis research. The combined thesis and research cannot exceed 9.0 credits. The MS program is organized so that a student may complete the degree requirements in less than 2 years of full-time study or 2-3 years of part-time study.

Students within the Master of Science in Electrical Engineering are eligible to take part in the Graduate Co-op Program, which combines classroom coursework with a 6-month, full-time work experience. For more information, visit the Steinbright Career Development Center's website (<http://www.drexel.edu/scdc/co-op/graduate/>).

For more information about the MS or PhD in Electrical Engineering, please visit the Electrical and Computer Engineering (<https://drexel.edu/engineering/academics/departments/electrical-computer-engineering/>) Department (<http://drexel.edu/ece/>) web site.

Admission Requirements

Applicants must satisfy general requirements for graduate admission, including a minimum 3.0 GPA (on a 4.0 scale) for the last two years of undergraduate studies, as well as for any subsequent graduate work, and hold a bachelor's degree in electrical engineering, computer engineering, or the equivalent from an accredited college or university. A degree in science (physics, mathematics, computer science, etc.) is also acceptable. Applicants with degrees in sciences may be required to take a number of undergraduate engineering courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's.

Applicants for full-time MS and PhD programs must take the GRE general test. Students whose native language is not English and who do not hold a degree from a US institution must take the TOEFL within two years before application.

For additional information on how to apply, visit Drexel's Admissions page for Electrical Engineering (<http://www.drexel.edu/grad/programs/coe/electrical-engineering/>).

Degree Requirements (MS)

The Master of Science in Electrical Engineering curriculum encompasses 45.0 or 48.0 (with the Graduate Co-op option) approved credit hours, chosen in accordance with the following requirements and a plan of study arranged with the departmental graduate advisor in consultation with the student's research advisor, if applicable. Before the end of the first quarter in the Department of Electrical and Computer Engineering, for a full-time student, or by the end of the first year for a part-time student, said plan of study must be filed and approved with the departmental graduate advisor.

A total of at least 30.0 credit hours must be taken from among the graduate course offerings of the Department of Electrical and Computer Engineering. These credits must be taken at Drexel University. No transfer credit may be used to fulfill these requirements, regardless of content equivalency.

The remaining courses needed to reach the minimum credit hour requirement for the degree program are considered elective courses. Elective courses can be chosen from among the graduate course offerings of the Department of Electrical and Computer Engineering; other departments within the College of Engineering; the School of Biomedical Science, Engineering and Health Systems; the Department of Mathematics; the Department of Physics; the Department of Chemistry and the Department of Biology. In order to have courses outside of these departments and schools count towards degree completion, they must be approved by the departmental graduate advisors prior to registration for said courses.

Please note that ECEC 500 *Fundamentals of Computer Hardware* and ECEC 600 *Fundamentals of Computer Networks* do **not** count toward the credit requirements to complete the MS in Electrical Engineering degree program.

Required Courses	
Electrical Engineering (ECEE, ECEP, ECES, ECET) Courses	21.0
General Electrical and Computer Engineering (ECEC, ECEE, ECEP, ECES, ECET) Courses	9.0
Elective Courses	15.0
Total Credits	45.0

Options for Degree Fulfillment

Although not required, students are encouraged to complete a Master's Thesis as part of the MS studies. Those students who choose the thesis option may count up to 9.0 research/thesis credits as part of their required credit hour requirements.

Students may choose to participate in the Graduate Co-op Program, where 6.0 credit hours can be earned for a six month cooperative education experience in industry, working on curriculum related projects. The total number of required credit hours is increased to 48.0 for those students who choose to pursue the Graduate Co-op option. This change represents an increase in non-departmental required credit hours to a total of 18.0 credit hours, 6.0 of which are earned from the cooperative education experience.

For more information on curricular requirements, visit the Department of Electrical and Computer Engineering' (<http://www.ece.drexel.edu/>)s web site.

PhD in Electrical Engineering General Requirements

The following general requirements must be satisfied in order to complete the PhD in Electrical Engineering:

- 90.0 credit hours total
- candidacy examination
- research proposal
- dissertation defense

Students entering with a master's degree in electrical or computer engineering or a related field will be considered a post-masters PhD student and will only be required to complete a total of 45.0 credit hours, in accordance with University policy.

Curriculum

Appropriate coursework is chosen in consultation with the student's research advisor. A plan of study must be developed by the student to encompass the total number of required credit hours. Both the departmental graduate advisor and the student's research advisor must approve this plan.

Candidacy Examination

The candidacy examination explores the depth of understanding of the student in his/her specialty area. The student is expected to be familiar with, and be able to use, the contemporary tools and techniques of the field and to demonstrate familiarity with the principal results and key findings.

The student, in consultation with his/her research advisor, will declare a principal technical area for the examination. The examination includes the following three parts:

- A self-study of three papers from the archival literature in the student's stated technical area, chosen by the committee in consultation with the student.
- A written report (15 pages or less) on the papers, describing their objectives, key questions and hypotheses, methodology, main results and conclusions. Moreover, the student must show in an appendix independent work he/she has done on at least one of the papers – such as providing a full derivation of a result or showing meaningful examples, simulations or applications.
- An oral examination which takes the following format:
 - A short description of the student's principal area of interest (5 minutes, by student).
 - A review of the self-study papers and report appendix (25-30 minutes, by student).
 - Questions and answers on the report, the appendix and directly related background (40-100 minutes, student and committee).

In most cases, the work produced during the candidacy examination will be a principal reference for the student's PhD dissertation; however, this is not a requirement.

Research Proposal

After having attained the status of PhD Candidate, each student must present a research proposal to a committee of faculty and industry members, chosen with his/her research advisor, who are knowledgeable in the specific area of research. This proposal should outline the specific

intended subject of study, i.e., it should present a problem statement, pertinent background, methods of study to be employed, expected difficulties and uncertainties and the anticipated form, substance and significance of the results.

The purpose of this presentation is to verify suitability of the dissertation topic and the candidate's approach, and to obtain the advice and guidance of oversight of mature, experienced investigators. It is not to be construed as an examination, though approval by the committee is required before extensive work is undertaken. The thesis proposal presentation must be open to all; announcements regarding the proposal presentation must be made in advance.

The thesis advisory committee will have the sole responsibility of making any recommendations regarding the research proposal. It is strongly recommended that the proposal presentation be given as soon as possible after the successful completion of the candidacy examination.

Dissertation Defense

Dissertation Defense procedures are described in the Graduate College of Drexel University (<http://www.drexel.edu/graduatecollege/>) policies regarding Doctor of Philosophy Program Requirements. The student must be a PhD candidate for at least one year before he/she can defend his/her doctoral thesis.

Dual Degree

The Department of Electrical and Computer Engineering offers outstanding students the opportunity to receive two diplomas (BS and MS) at the same time. The program requires five (5) years to complete. Participants, who are chosen from the best undergraduates students, work with a faculty member on a research project and follow a study plan that includes selected graduate classes. This program prepares individuals for careers in research and development; many of its past graduates continued their studies toward a PhD.

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 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:

- Delay mitigating codes for network coded systems
- Distributed estimation in sensor networks via expectation propagation
- Turbo speaker identification
- Performance and convergence of expectation propagation

- 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 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 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:

- software defined radio network testbeds for rapidly prototyping new communications and network systems,
- electromagnetic anechoic chamber and reverberation chambers for testing new wireless technologies,
- experimental cell tower for field testing new wireless technologies.

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. The lab offers laboratory coursework in wireless network security, collaborative intelligent radio networks, and fundamental analog and digital communication systems.

Ecological and Evolutionary Signal-processing and Informatics Laboratory

The Ecological and Evolutionary Signal-processing and Informatics Laboratory (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.

Multimedia & Information Security Lab [MISL]

The Multimedia and Information Security Lab (MISL) develops algorithms to detect fake images and videos, along with algorithms to determine the true source an image or video. This research is particularly important because widely available editing software enables multimedia forgers to create perceptually realistic forgeries. Our goal at MISL, is to conduct research that provides information verification and security in scenarios when an information source cannot be trusted.

The research conducted at MISL is part of a new area, known as multimedia forensics, which lies at the intersection of many areas in machine learning and artificial intelligence, signal processing, image and video processing, game theory, etc. Our algorithms work by identifying or learning visually imperceptible traces left in images and videos by processing operations. We use these traces to detect editing or forgery as well as to link an image or video back to the camera that captured it. We also perform research on anti-forensic operations designed to fool forensic techniques. By studying anti-forensics, researchers can identify and address weaknesses in existing forensic techniques as well as develop techniques capable of identifying the use of anti-forensics.

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

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.

Electrical Engineering Faculty

Tom Chmielewski, PhD (*Drexel University*). 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.

Anup Das, PhD (*Universit of Singapore*). Assistant Professor. Design of algorithms for neuromorphic computing, particularly using spiking neural

networks, dataflow-based design of neuromorphic computing system, design of scalable computing system; hardware-software co-design and management, and thermal and power management of many-core embedded systems

Bruce A. Eisenstein, PhD (*University of Pennsylvania*). Arthur J. Rowland Professor of Electrical and Computer Engineering. Pattern recognition; estimation; decision theory.

Adam K. Fontecchio, PhD (*Brown University*) Director, Center for the Advancement of STEM Teaching and Learning Excellence (CASTLE). Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Gary Friedman, PhD (*University of Maryland-College Park*) Associate Department Head for Graduate Affairs. Professor. Biological and biomedical applications of nanoscale magnetic systems.

Allon Guez, PhD (*University of Florida*). Professor. Intelligent control systems; robotics, biomedical, automation and manufacturing; business systems engineering.

Leonid Hrebien, PhD (*Drexel University*). Professor. Tissue excitability; acceleration effects on physiology; bioinformatics.

Nagarajan Kandasamy, PhD (*University of Michigan*) Associate Department Head for Undergraduate Affairs. Associate Professor. Embedded systems, self-managing systems, reliable and fault-tolerant computing, distributed systems, computer architecture, and testing and verification of digital systems.

Youngmoo Kim, PhD (*MIT*) Director, Expressive and Creative Interactive Technologies (ExCITE) Center. Professor. Audio and music signal processing, voice analysis and synthesis, music information retrieval, machine learning.

Fei Lu, PhD (*University of Michigan*). Assistant Professor. Power electronics; wireless power transfer technology for the high-power electric vehicles and the low-power electronic devices.

Karen Miu, PhD (*Cornell University*). Professor. Power systems; distribution networks; distribution automation; optimization; system analysis.

Bahram Nabet, PhD (*University of Washington*). Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Prawat Nagvajara, PhD (*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.

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

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.

Ioannis Savidis, PhD (*University of Rochester*). Associate 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 Dean for Undergraduate Affairs. 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*). Associate 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*) Department Head, Mechanical Engineering and Mechanics. 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*). Associate Professor. Information Security; multimedia forensics and anti-forensics; information verification; adversarial dynamics; signal processing

Baris Taskin, PhD (*University of Pittsburgh*). Professor. Very large-scale integration (VLSI) systems, computer architecture, circuits and systems, electronic design automation (EDA), energy efficient computing.

John Walsh, PhD (*Cornell University*). Associate Professor. Bounding the region of entropic vectors and its implications for the limits of communication networks, big data distributed storage systems, and graphical model based machine learning; efficient computation and analysis of rate regions for network coding and distributed storage; code construction, polyhedral computation, hierarchy, and symmetry

Steven Weber, PhD (*University of Texas-Austin*) Department Head. Professor. Mathematical modeling of computer and communication networks, specifically streaming multimedia and ad hoc networks.

Jauelice 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

Emeritus Faculty

Eli Fromm, PhD (*Jefferson Medical College*). Professor Emeritus. Engineering education; academic research policy; bioinstrumentation; physiologic systems.

Edwin L. Gerber, PhD (*University of Pennsylvania*). Professor Emeritus. Computerized instruments and measurements; undergraduate engineering education.

Electrical Engineering/ Telecommunications Engineering

Major: Electrical/Telecommunications Engineering

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS) or 90.0 (PhD)

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional Programs (CIP) code: 14.1001; 14.1004

Standard Occupational Classification (SOC) code: 15-1143; 17-2071

About the Program

Drexel University's Electrical and Computer Engineering Department prepares students to contribute to advances in the rapidly changing field of telecommunications by providing advanced studies as part of the Master of Science (MS) in Electrical and Telecommunications Engineering degree program. The MS in Electrical and Telecommunications Engineering combines the expertise of its faculty in electrical and computer engineering, business, information systems, and humanities. Through its interdisciplinary approach, Drexel's Telecommunications Engineering program trains and nurtures the complete telecommunications engineer.

The MS in Electrical Engineering/Telecommunications Engineering degree is awarded to students who demonstrate in-depth knowledge of the field. The average time required to complete the master's degree is two years of full-time study or three years of part-time study.

A graduate co-op is available for the Master of Science program. For more information, visit the Steinbright Career Development Center's website (<http://www.drexel.edu/scdc/co-op/graduate/>).

For more information, visit the Department of Electrical and Computer Engineering' (<https://drexel.edu/engineering/academics/departments/electrical-computer-engineering/academic-programs/graduate/ms/electrical-and-telecommunications-engineering/>)s web site.

Admission Requirements

Applicants must meet the general requirements for graduate admission, which include at least a 3.0 GPA for the last two years of undergraduate study and for any graduate level study undertaken, and are required to hold a bachelor of science degree in electrical engineering or a related field. Applicants whose undergraduate degrees are not in the field of electrical engineering may be required to take a number of undergraduate courses. The GRE General Test is required of applicants for full-time MS and PhD programs. Applicants whose native language is not English and who do not have a previous degree from a US institution are required to take the Test of English as a Foreign Language (TOEFL).

For additional information on how to apply, visit Drexel's Admissions page for Electrical-Telecommunications Engineering (<http://www.drexel.edu/grad/programs/coe/electrical-telecommunications/>).

MS in Electrical and Telecommunications Engineering

The Master of Science in Electrical and Telecommunications Engineering curriculum encompasses 45.0 or 48.0 (with the Graduate Co-Op) approved credit hours, chosen in accordance with the following requirements and a plan of study arranged with the departmental graduate advisor in consultation with the student's research advisor (if applicable). This plan of study must be filed in the Department of Electrical and Computer Engineering and approved with the departmental graduate advisor before the end of the first quarter for a full-time student, or by the end of the first year for a part-time student.

Degree Requirements

A total of at least 30.0 credit hours must be taken from among the graduate course offerings of the Department of Electrical and Computer Engineering. These credits must be taken at Drexel University. No transfer credit may be used to fulfill these requirements, regardless of content equivalency.

Telecommunications Engineering (ECET) Courses	6.0
Telecommunications Engineering Elective (ECEC, ECEE, ECES, ECET) Courses	15.0
General Electrical and Computer Engineering (ECEC, ECEE, ECEP, ECES, ECET) Courses	9.0
Elective Courses	15.0
Total Credits	45.0

With the remaining required 15.0 credit hours, students may take graduate coursework, subject to the approval of the departmental graduate advisor, in electrical and computer engineering, mathematics, physics or other engineering disciplines.

In addition, students pursuing an MS in Electrical and Telecommunications Engineering are allowed and strongly encouraged to take the following course as part of their required 15.0 credit hours:

- COM 650 *Telecommunications Policy in the Information Age*

Although not required, students are encouraged to complete a master's thesis as part of the MS studies. Those students who choose the thesis option may count up to 9.0 research/thesis credits as part of their required credit hour requirements.

Graduate Co-op Program

Students may choose to participate in the Graduate Co-op Program, where 6.0 credit hours can be earned for a six month cooperative education experience in industry, working on curriculum related projects. The total number of required credit hours is increased to 48.0 for those students who choose to pursue the Graduate Co-op option. This change represents an increase in non-departmental required credit hours to a total of 18.0 credit hours, 6.0 of which are earned from the cooperative education experience.

Please note that ECEC 500 *Fundamentals of Computer Hardware* and ECEC 600 *Fundamentals of Computer Networks* do **not** count toward the credit requirements to complete the MS in Electrical Engineering degree program.

For more information on curricular requirements, visit the Department of Electrical and Computer Engineering (<http://www.ece.drexel.edu/>)'s web site.

PhD in Electrical Engineering

General Requirements

The following general requirements must be satisfied in order to complete the PhD in Electrical Engineering:

- 90.0 credit hours total
- candidacy examination
- research proposal
- dissertation defense

Students entering with a master's degree in electrical or computer engineering or a related field will be considered a post-masters PhD student and will only be required to complete a total of 45.0 credit hours, in accordance with University policy.

Curriculum

Appropriate coursework is chosen in consultation with the student's research advisor. A plan of study must be developed by the student to encompass the total number of required credit hours. Both the departmental graduate advisor and the student's research advisor must approve this plan.

Candidacy Examination

The candidacy examination explores the depth of understanding of the student in his/her specialty area. The student is expected to be familiar with, and be able to use, the contemporary tools and techniques of the field and to demonstrate familiarity with the principal results and key findings.

The student, in consultation with his/her research advisor, will declare a principal technical area for the examination. The examination includes the following three parts:

- A self-study of three papers from the archival literature in the student's stated technical area, chosen by the committee in consultation with the student.
- A written report (15 pages or less) on the papers, describing their objectives, key questions and hypotheses, methodology, main results and conclusions. Moreover, the student must show in an appendix independent work he/she has done on at least one of the papers – such as providing a full derivation of a result or showing meaningful examples, simulations or applications.
- An oral examination which takes the following format:
 - A short description of the student's principal area of interest (5 minutes, by student).
 - A review of the self-study papers and report appendix (25-30 minutes, by student).
 - Questions and answers on the report, the appendix and directly related background (40-100 minutes, student and committee).

In most cases, the work produced during the candidacy examination will be a principal reference for the student's PhD dissertation; however, this is not a requirement.

Research Proposal

After having attained the status of PhD Candidate, each student must present a research proposal to a committee of faculty and industry members, chosen with his/her research advisor, who are knowledgeable in the specific area of research. This proposal should outline the specific

intended subject of study, i.e., it should present a problem statement, pertinent background, methods of study to be employed, expected difficulties and uncertainties and the anticipated form, substance and significance of the results.

The purpose of this presentation is to verify suitability of the dissertation topic and the candidate's approach, and to obtain the advice and guidance of oversight of mature, experienced investigators. It is not to be construed as an examination, though approval by the committee is required before extensive work is undertaken. The thesis proposal presentation must be open to all; announcements regarding the proposal presentation must be made in advance.

The thesis advisory committee will have the sole responsibility of making any recommendations regarding the research proposal. It is strongly recommended that the proposal presentation be given as soon as possible after the successful completion of the candidacy examination. The student must be a PhD candidate for at least one year before he/she can defend his/her doctoral thesis.

Dissertation Defense

Dissertation Defense procedures are described in the Graduate College of Drexel University (<http://www.drexel.edu/graduatecollege/>) policies regarding Doctor of Philosophy Program Requirements. The student must be a PhD candidate for at least one year before he/she can defend his/her doctoral thesis.

Dual Degree

The ECE Department offers outstanding students the opportunity to receive two diplomas (BS and MS) at the same time. The program requires five (5) years to complete. Participants, who are chosen from the best undergraduates students, work with a faculty member on a research project and follow a study plan that includes selected graduate classes. This program prepares individuals for careers in research and development; many of its past graduates continued their studies toward a PhD.

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 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:

- Delay mitigating codes for network coded systems,
- Distributed estimation in sensor networks via expectation propagation,
- Turbo speaker identification,
- 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 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) 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

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.

Electrical Engineering Faculty

Tom Chmielewski, PhD (*Drexel University*). 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.

Anup Das, PhD (*Universit of Singapore*). Assistant Professor. Design of algorithms for neuromorphic computing, particularly using spiking neural networks, dataflow-based design of neuromorphic computing system, design of scalable computing system; hardware-software co-design and management, and thermal and power management of many-core embedded systems

Bruce A. Eisenstein, PhD (*University of Pennsylvania*). Arthur J. Rowland Professor of Electrical and Computer Engineering. Pattern recognition; estimation; decision theory.

Adam K. Fontecchio, PhD (*Brown University*) Director, *Center for the Advancement of STEM Teaching and Learning Excellence (CASTLE)*. Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Gary Friedman, PhD (*University of Maryland-College Park*) Associate Department Head for Graduate Affairs. Professor. Biological and biomedical applications of nanoscale magnetic systems.

Allon Guez, PhD (*University of Florida*). Professor. Intelligent control systems; robotics, biomedical, automation and manufacturing; business systems engineering.

Leonid Hrebien, PhD (*Drexel University*). Professor. Tissue excitability; acceleration effects on physiology; bioinformatics.

Nagarajan Kandasamy, PhD (*University of Michigan*) Associate Department Head for Undergraduate Affairs. Associate Professor. Embedded systems, self-managing systems, reliable and fault-tolerant computing, distributed systems, computer architecture, and testing and verification of digital systems.

Youngmoo Kim, PhD (*MIT*) Director, *Expressive and Creative Interactive Technologies (ExCITe) Center*. Professor. Audio and music signal processing, voice analysis and synthesis, music information retrieval, machine learning.

Fei Lu, PhD (*University of Michigan*). Assistant Professor. Power electronics; wireless power transfer technology for the high-power electric vehicles and the low-power electronic devices.

Karen Miu, PhD (*Cornell University*). Professor. Power systems; distribution networks; distribution automation; optimization; system analysis.

Bahram Nabet, PhD (*University of Washington*). Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Prawat Nagvajara, PhD (*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.

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

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.

Ioannis Savidis, PhD (*University of Rochester*). Associate 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 Dean for Undergraduate Affairs. 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*). Associate 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*) Department Head, Mechanical Engineering and Mechanics. 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*). Associate Professor. Information Security; multimedia forensics and anti-forensics; information verification; adversarial dynamics; signal processing

Baris Taskin, PhD (*University of Pittsburgh*). Professor. Very large-scale integration (VLSI) systems, computer architecture, circuits and systems, electronic design automation (EDA), energy efficient computing.

John Walsh, PhD (*Cornell University*). Associate Professor. Bounding the region of entropic vectors and its implications for the limits of communication networks, big data distributed storage systems, and graphical model based machine learning; efficient computation and analysis of rate regions for network coding and distributed storage; code construction, polyhedral computation, hierarchy, and symmetry

Steven Weber, PhD (*University of Texas-Austin*) Department Head. Professor. Mathematical modeling of computer and communication networks, specifically streaming multimedia and ad hoc networks.

Jaudelice 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

Emeritus Faculty

Eli Fromm, PhD (*Jefferson Medical College*). Professor Emeritus. Engineering education; academic research policy; bioinstrumentation; physiologic systems.

Edwin L. Gerber, PhD (*University of Pennsylvania*). Professor Emeritus. Computerized instruments and measurements; undergraduate engineering education.

Master of Engineering

Major: Engineering
Degree Awarded: Master of Engineering (ME)

Calendar Type: Quarter

Total Credit Hours: 48.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 14.0101

Standard Occupational Classification (SOC) code: 17.2199

About the Program

This ME program is a highly customizable program primarily used for international and visiting students studying engineering at Drexel whose plan of study must be customized. This program may be offered by any department and will be reviewed by the department Advisor to make certain the plan of study meets degree requirements.

The ME program offers wide flexibility for those students who wish to combine technical and nontechnical study with hands-on experience in industry and laboratory research. This degree program may not be the best choice for those who wish to earn a PhD in Engineering.

Admission Requirements

This program allows for maximum flexibility for international visiting students and students on study abroad. In addition to meeting requirements for graduate admission, which include at least a 3.0 GPA for the last two years of undergraduate study and for any graduate study, applicants must hold a bachelor's degree in engineering from an accredited institution or an equivalent. Students whose background is in science or mathematics may be accepted to the program, but they will be required to take undergraduate engineering courses.

Although the Graduate Record Examination (GRE) is not required for admission, it may be required of students interested in a teaching or research assistantship. Applicants whose native language is not English and who do not have previous degrees from a U.S. institution are required to submit scores of at least 550 on the Test of English as a Foreign Language (TOEFL).

Degree Requirements

Students take a series of core and elective courses. Students work closely with and advisor to develop an individualized plan of study. This is a highly customizable degree program and may include a mix of courses, Co-op, research and thesis. The average time required to complete the master's degree is two years of full-time study or three years of part-time study. This is primarily used for visiting students.

Degree Requirements

The degree requires a total of 48.0 credits, including at least 18.0 credits from an engineering discipline core. This core may be from any engineering department: Civil and Architectural, Chemical, Electrical and Computer, Materials, or Mechanical Engineering and Mechanics. (Please refer to the appropriate departmental description in this catalog for more information about each department.) The department Advisor will work closely with the student to develop an plan of study that meets the program requirements.

Engineering Management

Major: Engineering Management

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 15.1501
Standard Occupational Classification (SOC) code: 11-9041

About the Program

In our increasingly complex, technologically oriented economy, demand has risen for professionals with the expertise to manage both human and technological resources: a combination of talents crucial to organizations competing in the global marketplace. Students graduating with the master's in engineering management are significantly better positioned to meet the challenge.

The Engineering Management Program (<http://www.drexel.edu/egmt/>) is designed to provide the background in management science necessary to advance from purely technical positions to supervisory responsibilities in such areas as research and development, production, engineering, design, and technical marketing. Study can be on a part-time or full-time basis, and courses are available both online and face to face.

Engineering management is a multidisciplinary program offering a core curriculum and specialization in a selected area of technology or management. Majors in engineering management should hold a bachelor's degree in engineering, basic science, or a related field. The program is open to those professionals who aspire to be engineering or technically based managers.

Certificate Opportunity

The Engineering Management Program offers a five-course Graduate Certificate in Engineering Management (<http://catalog.drexel.edu/graduate/collegeofengineering/engineeringmanagementpbc/>).

Students can pursue the Graduate Certificate in Engineering Management, earn the credential, and subsequently apply those credits toward completion of a master's in engineering management. However, current students in pursuit of the master's in engineering management may not simultaneously pursue the graduate certificate.

Non-engineering management graduate students in the College of Engineering are welcome to apply for the certificate with advisor approval, and they can do so while simultaneously pursuing their primary degree.

Additional Information

For more information about the program, visit the Engineering Management (<http://online.drexel.edu/online-degrees/engineering-degrees/ms-egmt/>) program page.

Admission Requirements

Admission to this program requires:

- A four-year bachelor of science degree in engineering from an ABET-accredited institution in the United States or an equivalent international institution. Bachelor's degrees in math or the physical sciences may also be considered for admission.
- Minimum cumulative undergraduate GPA of 3.0. If any other graduate work has been completed, the average GPA must be at least 3.0.
- Complete graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation, professional or academic (at least one professional).
- Resume

- A personal statement explaining why you wish to earn the degree and why you are prepared to succeed.
- International students must submit an Internet-based TOEFL (IBT = score of 94 or higher).

At least three years of relevant professional work experience are recommended but not required.

Interested students should complete the Drexel University Online admission application (<http://online.drexel.edu/online-degrees/engineering-degrees/ms-egmt/#admissionscriteria>) for admission into this online program.

Degree Requirements

The master's in engineering management degree requires 45.0 credits: 30.0 credits in required core courses and 15.0 graduate elective credits.

Students may take their required elective credits from any graduate-level course(s) in engineering, business, or another college for which they have adequate preparation and can obtain approvals from the college and the engineering management program.

All candidates are encouraged to discuss areas of interest with the program advisor and to develop a proposed plan of study during the early stages of the program.

Note: Specific course requirements may be waived for students who have taken equivalent courses elsewhere.

Engineering Management

EGMT 501	Leading and Managing Technical Workers	3.0
EGMT 502	Analysis and Decision Methods for Technical Managers	3.0
EGMT 504	Design Thinking for Engineering Communications	3.0
EGMT 581	Meeting Engineering Leadership Challenges	3.0

Quantitative Analysis

EGMT 571	Engineering Statistics	3.0
EGMT 572	Statistical Data Analysis *	3.0
EGMT 573	Operations Research	3.0

Economics and Financial Management

EGMT 531	Engineering Economic Evaluation & Analysis	3.0
EGMT 535	Financial Management	3.0

Engineering Management Capstone

EGMT 692	Engineering Management Capstone	3.0
----------	---------------------------------	-----

Electives

Select five of the following electives: ** 15.0

EGMT 536	Advanced Financial Management for Engineers	
EGMT 650	Systems Thinking for Leaders	

Marketing & Business Development

EGMT 614	Marketing: Identifying Customer Needs	
EGMT 615	New Product Conceptualization, Justification, and Implementation	
EGMT 616	Value Creation through New Product Development	
EGMT 660	Sustainable Business Practices for Engineers	

Project Management

EGMT 620	Engineering Project Management	
EGMT 625	Project Planning, Scheduling and Control	
EGMT 630	Global Engineering Project Management	

Systems Engineering & Systems Thinking

EGMT 635	Visual System Mapping	
SYSE 685	Systems Engineering Management	
SYSE 688	Systems Engineering Analysis	
SYSE 690	Modeling and Simulation	

Engineering Law & Ethics

EGMT 610	Ethics & Business Practices for Engineers
EGMT 652	Engineering Law
Other Approved Electives	
SYSE 510	Systems Engineering Process
SYSE 511	Systems Engineering Tools
SYSE 520	Global Sustainment and Integrated Logistics
SYSE 521	Integrated Risk Management
SYSE 522	Engineering Supply Chain Systems
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
SYSE 533	Systems Integration and Test
Total Credits	45.0

* EGMT 572 Statistical Data Analysis requires as a prerequisite EGMT 571 Managerial Statistics or approval from the program administration to complete a waiver and request to take then pass the STAT Placement Exam in place of EGMT 571. If approved for the waiver of EGMT 571, students will be eligible to complete an upper level course substitution to satisfy the degree requirements.

** Students may select electives from other disciplines outside of Engineering Management with prior approval from their advisor.

Sample Plan of Study

Term 1		Credits
EGMT 501	Leading and Managing Technical Workers	3.0
EGMT 504	Design Thinking for Engineering Communications	3.0
	Term Credits	6.0
Term 2		
EGMT 502	Analysis and Decision Methods for Technical Managers	3.0
EGMT 571	Engineering Statistics	3.0
	Term Credits	6.0
Term 3		
EGMT 572	Statistical Data Analysis	3.0
EGMT 531	Engineering Economic Evaluation & Analysis	3.0
	Term Credits	6.0
Term 4		
EGMT 573	Operations Research	3.0
EGMT 535	Financial Management	3.0
	Term Credits	6.0
Term 5		
EGMT 581	Meeting Engineering Leadership Challenges	3.0
EGMT 610	Ethics & Business Practices for Engineers	3.0
	Term Credits	6.0
Term 6		
EGMT 652	Engineering Law	3.0
EGMT 620	Engineering Project Management	3.0
	Term Credits	6.0
Term 7		
EGMT 692	Engineering Management Capstone	3.0
EGMT 650	Systems Thinking for Leaders	3.0
	Term Credits	6.0
Term 8		
EGMT 635	Visual System Mapping	3.0
	Term Credits	3.0
Total Credit:		45.0

First Year		
Fall		Credits
EGMT 501	Leading and Managing Technical Workers	3.0
EGMT 504	Design Thinking for Engineering Communications	3.0
Elective		3.0
	Term Credits	9.0
Winter		
EGMT 502	Analysis and Decision Methods for Technical Managers	3.0
EGMT 571	Engineering Statistics	3.0
Elective		3.0
	Term Credits	9.0
Spring		
EGMT 531	Engineering Economic Evaluation & Analysis	3.0
EGMT 572	Statistical Data Analysis	3.0
Elective		3.0
	Term Credits	9.0
Summer		
EGMT 535	Financial Management	3.0
EGMT 573	Operations Research	3.0
Elective		3.0
	Term Credits	9.0
Second Year		
Fall		
EGMT 581	Meeting Engineering Leadership Challenges	3.0
EGMT 692	Engineering Management Capstone	3.0
Elective		3.0
	Term Credits	9.0

Total Credit: 45.0

Engineering Management Faculty

James Breen, MBA, PE (*Drexel University*). Adjunct Instructor. Vice President of Manufacturing Network Strategy at Johnson & Johnson.

Robert Brehm, PhD (*Drexel University*). Teaching Professor. International infrastructure delivery; response to natural catastrophes; risk assessment and mitigation strategies; project management techniques.

James Lill, MS, PE (*Drexel University*). Adjunct Instructor. Director of Facilities, Planning and Management for the Downingtown Area School District.

Carole Mablekos, PhD (*Purdue University*). Adjunct Instructor. Public speaking, technical writing, organizational behavior, and business writing courses.

Miray Pereira, MBA (*Rutgers University*). Adjunct Instructor. Manages a team of consultants responsible for development, facilitation and implementation of fundamental demand management systems and capabilities for DuPont, most recently with the DuPont Safety & Protection Platform in strategic planning, mergers & acquisitions.

Fredric Plotnick, PhD, JD, PE (*Drexel University; Widener University*). Adjunct Professor. CEO and principal consultant of Engineering & Property Management Consultants, Inc.

Stephen Smith, PhD (*Drexel University*). Associate Teaching Professor. Development of online learning and distance teaching/learning techniques for engineering.

Walter Sobkiw, BS (*Drexel University*). Adjunct Faculty. Author of "Systems Engineering Design Renaissance" and "Systems Practices as Common Sense."

Fernando Tovia, PhD (*University of Arkansas*). Adjunct Instructor. Core quantitative analysis, strategic planning, supply chain management and manufacturing systems.

John Via, DEngr (*Southern Methodist University*). Teaching Professor. Pharmaceutical, Bio-pharmaceutical, and Medical Device development and manufacturing

Engineering Technology

Major: Engineering Technology

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 15.0000

Standard Occupational Classification (SOC) code: 17-3029

About the Program

The Master of Science in Engineering Technology offers courses focused on the technologies used in today's modern emerging industries. The program is designed for individuals who want marketable, applicable skills, and currently hold an accredited baccalaureate degree in engineering technology or have relevant work or class experience in science, technology, engineering, or mathematics (STEM) fields. The primary goal of the Master of Science in Engineering Technology is to develop advanced-level practitioners who are capable in resolving technical problems through the application of engineering principles and technology.

The program can be pursued on a part-time or full-time basis. Courses will be delivered in several modes: face-to-face and/or on-line, and allow practicing professionals the opportunity to update knowledge and skills based on the latest technological developments in the industrial environment and therefore advance in their chosen careers. The flexibility of the program curriculum permits students to select a combination of courses relevant to their individual career goals or to provide the foundation for further advanced study.

Program Goals

Graduates of the Master of Science in Engineering Technology will be expected to:

- Apply scientific and technological concepts to solving technological problems.
- Apply concepts and skills developed in a variety of technical and professional disciplines including computer applications and networking, materials properties and production processes, and quality control to improve production processes and techniques.
- Plan, facilitate, and integrate technology and problem solving techniques in the leadership functions of the industrial enterprise system.
- Engage in applied technical research that will add to the knowledge of the discipline and solve problems in an industrial environment.
- Develop the communication skills required for technical managers.

For additional information, view the College of Engineering's Engineering Technology program (<http://drexel.edu/engtech/>) web page or contact Gerry Willis at 215-895-6253 or gtm23@drexel.edu.

Admission Requirements

Applicants must have a 3.0 grade point average in their undergraduate or upper division (junior and senior year) coursework.

International students who have their undergraduate degree from a country whose language is not English can be admitted with a Test of English as a Foreign Language (TOEFL) test score of 550 or better. For more information regarding international applicant requirements, view the International Students Admissions Information (<http://drexel.edu/grad/resources/international/>) page.

Prerequisite courses

The following prerequisite courses must be completed at the undergraduate level with a minimum grade of C:

- Calculus I
- Calculus II
- Physics I (can be algebra-based)
- Physics II (can be algebra-based)
- AC/DC Circuit Analysis
- Digital Electronics
- Chemistry I or Materials
- Business Statistics

Visit the Graduate Admissions (<http://www.drexel.edu/grad/programs/coe/engineering-technology/>) website for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements

Candidates for the MS in Engineering Technology must complete a minimum of 45.0 quarter credits. A minimum grade of B is required in all core courses and no more than two C grades in electives.

Of the 45.0 quarter credits required for the degree, 30.0 must be earned at Drexel University, including 24.0 credits of Engineering Technology (ET) courses. A maximum of 15.0 transfer credits may be allowed for graduate courses taken at other institutions, if they are appropriate to the student's plan of study.

Core Courses

EGMT 571	Engineering Statistics	3.0
EGMT 610	Ethics & Business Practices for Engineers	3.0
ET 610	Networks for Industrial Environments	3.0
ET 615	Rapid Prototyping and Product Design	3.0
ET 619	Programmable Devices and Systems	3.0
ET 620	Microsystems and Microfabrication	3.0
ET 681	Nanomaterials and Nanoengineering	3.0
ET 725	Sensors and Measurement Systems	3.0
ET 732	Modern Energy Conversion Technologies	3.0
Electives		9.0

Select three of the following:

EGMT 572	Statistical Data Analysis
ET 605	Materials for Emerging Technologies
ET 635	Engineering Quality Methods
ET 675	Reliability Engineering
ET 685	Precision Manufacturing
ET 730	Lean Manufacturing Principles

ET 733	Renewable Energy Technology	
ET 755	Sustainable and Green Manufacturing	
PROJ 501	Introduction to Project Management	
SYSE 685	Systems Engineering Management	
Capstone Course		9.0
ET 775	Master's Project and Thesis in Engineering Technology *	
Total Credits		45.0

* This is a three (3) credit course that is repeated three (3) times.

Engineering Technology Faculty

M. Eric Carr, MsCpE (*Drexel University*). Instructor. Computer Engineering, Digital Design, Programmable Devices, Genetic Algorithms, Programming, Additive Manufacturing, Maker Movement.

Richard Chiou, PhD (*Georgia Institute of Technology*). Associate Professor. Green manufacturing, mechatronics, Internet-based robotics and automation, and remote sensors and monitoring.

Yalcin Ertekin, PhD (*University of Missouri-Rolla*). Associate Clinical Professor. High speed machining with micromachining applications, machining process optimization and condition monitoring using multiple sensors, FEA simulation with 3D solid modeling applications, rapid prototyping and reverse engineering, quality and reliability improvement through statistically designed experiments, neural networks and data mining and Taguchi methods, CNC machine tool calibration characterization of cold fastening, clinching and self-pierced riveting processes, non-invasive surgical tool design, student learning enhancement using online simulation tools.

Vladimir Genis, PhD (*Kiev State University, Ukraine*) *Department Head, Engineering Technology*. Professor. Ultrasound wave propagation and scattering, ultrasound imaging, electronic instrumentation, piezoelectric transducers, and engineering education. Designed and developed diagnostic and therapeutic equipment for medical applications and electronic systems and techniques for defense-related and industrial applications.

Irina Ciobanescu Husanu, PhD (*Drexel University*). Assistant Clinical Professor. Microgravity combustion, thermal-fluid science with applications in micro-combustion, fuel cells and research of alternative and green fuels, energy conversion and renewable energy, industrial experience in aerospace engineering areas (theoretical analysis, numerical simulations and experimental investigations), design and testing of propulsion systems, mechanical instrumentation, and developing industrial applications of aircraft engines.

Lunal Khuon, PhD (*Massachusetts Institute of Technology*). Clinical Associate Professor. Radio frequency, analog, and biomedical integrated circuits, biomedical instrumentation, neural interfaces, wireless systems, and engineering education. Research topics include area-efficient and power-efficient integrated circuits, plasmonics, adiabatic circuits, rotary clocks, and medical cyber-physical systems.

Michael Mauk, PhD, PE (*University of Delaware*). Assistant Clinical Professor. Rapid prototyping, microfluidics, alternative energy including solar energy and photovoltaics, semiconductor materials science, nanotechnology.

Environmental Engineering

Major: Environmental Engineering

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS); 90.0 (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 14.1401

Standard Occupational Classification (SOC) code: 17-2081

About the Program

Programs in environmental engineering are available with specializations in air pollution, hazardous and solid waste, subsurface contaminant hydrology, water resources, water and wastewater, and sustainability treatment.

Environmental engineering is concerned with protecting human, animal, and plant populations from the effects of adverse environmental factors, including toxic chemicals and wastes, pathogenic bacteria, and global warming.

Environmental engineers also try to minimize the effect of human activities on the physical and living environment so that we can all live more healthy and sustainable lives. 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 public health. 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.

For more information about this program, visit the MS in Environmental Engineering (<http://www.drexel.edu/cae/academics/grad-doctoral-programs/>) web page.

Admission Requirements

In addition to the general entrance requirements for all environmental engineering applicants, entrance to the MS in Environmental Engineering program requires an undergraduate engineering degree from an ABET-approved institution. Students lacking this credential will be required to complete additional undergraduate courses to incorporate related elements of the functional equivalent of the ABET engineering BS degree. Typically, courses must be taken in computer programming, differential equations, linear algebra and fluid mechanics.

For additional information on how to apply, visit Drexel's Admissions page for Environmental Engineering (<http://www.drexel.edu/grad/programs/coe/environmental-engineering/>).

Degree Requirements (MS)

The MS in Environmental Engineering program requires 45.0 credits of coursework. Both a theses and a non-thesis option are available. It is possible to finish the MS degree on either a part-time or full-basis. The degree consists of a set of core courses, a sequence in one of several areas of emphasis (treatment process, human risks, water resources, environmental modeling, and air quality) and completion of cognate and elective sequences. After the first term of study, a detailed plan of study is developed with the student's graduate advisor.

Students entering the program without an ABET accredited BS degree in engineering will be required to take additional undergraduate coursework depending on their background and their career objectives.

Core Courses

ENVE 660	Chemical Kinetics in Environmental Engineering	3.0
ENVS 501	Chemistry of the Environment	3.0
An approved course in statistics such as ENVE 750, ENVS 506 or BMES 510		3.0
An approved policy course such as EOH 560, PLCY 503 or ENVP 774		3.0
An approved life science course such as ENVE 516 or ENVS 511		3.0
Specialization Courses *		10.0-13.0
Cognate Discipline **		12.0
Electives or Thesis		8.0-11.0
Total Credits		45.0-51.0

* Students must take 4 courses in an approved specialization, such as environmental treatment processes, human risks, water resources, environmental modeling, or air quality.

** Students must complete a course sequence aside from their specialization. This might include a second specialization or a sequence within engineering, an applicable science, public health, or other as approved by the graduate advisor.

Degree Requirements (PhD)

Applicants to the doctoral program are judged on the basis of academic excellence and the alignment of their research interests with those of the faculty in the School. To be awarded the PhD, students must complete a major research project publishable in peer-reviewed journals. The degree requires a total of 90.0 credits; credits earned toward a master's degree may apply toward the 90.0 credits. There is no prescribed coursework—students must take courses needed to complete their research under guidance of an academic advisor. There is a one-year residency requirement. Students must successfully pass the candidacy examination, the proposal defense, and a PhD dissertation and oral defense.

Prospective PhD student are welcome to contact the Department (<http://www.drexel.edu/cae/>) to discuss their research interests.

Dual Degree

Dual MS Degree

The university encourages students with broad interest to consider a dual-master's option. Students can simultaneously work on two master's degree, applying to both programs a limited number of credits (a maximum of 15.0 to each). Applicants interested in a dual degree should apply for just one program; once enrolled at Drexel, the student may then request admission to the second program. The graduate advisors from both degree programs must approve the student's enrollment, and they must approve the transfer of credits from one program to another. Applicants considering two degrees are encouraged to contact the appropriate academic departments.

Bachelor's/Master's Dual Degree Program

The BS/MS dual degree is an accelerated program providing the academically qualified student an opportunity to simultaneously earn both BS and MS degrees (two diplomas are awarded) in program areas of his/her choice in five years, the time normally required to finish a bachelor's degree alone. Because both degrees are completed in the time usually required for the bachelor's degree, both degrees may be completed at the undergraduate tuition rate.

The five-year completion period is possible because fewer undergraduate credits are required for the combined degrees (180.0 credits instead of 192.0 credits). Also, co-op experience may be adjusted (two co-op periods instead of three) giving the BS/MS student two additional quarters

to take courses. If needed, students may also take evening courses while on co-op.

The program combines the practical work experience of Drexel undergraduate cooperative education with the graduate credentials of an advanced degree. Students may earn both degrees in the same major, or may complete their master's degree in a different field. With both an undergraduate and graduate degree and practical work experience, BS/MS graduates enter the work force with specialized knowledge and training.

Students interested in the Environmental Engineering BS/MS program, may contact Dr. Charles N. Haas at haas@drexel.edu for more information.

Facilities

The Department of Civil, Architectural, and Environmental Engineering is well equipped with state-of-the-art facilities:

- Analytical instrumentation for measuring biological and chemical contaminants in air, water and land
- Field sampling equipment for water and air measurements
- Molecular biology capability
- Computational facilities including access to multi-processor clusters, and advanced simulation and data analysis software

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.

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*). Teaching Professor. International infrastructure delivery; response to natural catastrophes; risk assessment and mitigation strategies; project management techniques.

Shannon Capps, PhD (*Georgia Institute of Technology*). Assistant Professor. Atmospheric chemistry; data assimilation; advanced sensitivity analysis; inverse modeling.

S.C. Jonathan Cheng, PhD (*West Virginia University*). Associate Professor. Soil mechanics; geosynthetics; geotechnical engineering; probabilistic design; landfill containments; engineering education.

Eugenia Ellis, PhD (*Virginia Polytechnic Institute and State University*). Associate Professor. Natural and electric light sources and effects on biological rhythms and health outcomes; ecological strategies for smart, sustainable buildings of the nexus of health, energy and technology.

Yaghoob (Amir) Farnam, PhD (*Purdue University*). Assistant Professor. Advanced and sustainable infrastructure materials; multifunctional, self-responsive and bioinspired construction materials; advanced multiscale manufacturing; characterization, and evaluation of construction materials; durability of cement-based materials.

Patricia Gallagher, PhD (*Virginia Polytechnic Institute and State University*). Professor. Geotechnical and geoenvironmental engineering; soil improvement; recycled materials in geotechnics.

Patrick Gurian, PhD (*Carnegie-Mellon University*). 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 Chair Professor of Environmental Engineering and Department Head, Civil, Architectural and Environmental Engineering*. Professor. Water treatment; risk assessment; bioterrorism; environmental modeling and statistics; microbiology; environmental health.

Ahmad Hamid, PhD (*McMaster University*). Professor. Engineered masonry; seismic behavior, design and retrofit of masonry structures; development of new materials and building systems.

Simi Hoque, PhD (*University of California - Berkeley*). Associate Professor. Computational methods to reduce building energy and environmental impacts, urban metabolism, thermal comfort, climate resilience.

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*) *Distinguished University Professor*. Biological processes and applications of nanotechnology in environmental systems.

L. James Lo, PhD (*University of Texas at Austin*). Assistant Professor. Architectural fluid mechanics; building automation and autonomy; implementation of natural and hybrid ventilation in buildings; airflow distribution in buildings; large-scale air movement in an urban built environment; building and urban informatics; data-enhanced sensing and control for optimal building operation and management; novel data gathering methods for building/urban problem solving; interdisciplinary research on occupant behaviors in the built environment.

Roger Marino, PhD (*Drexel University*). Associate Teaching Professor. Engineering education; land development; product Development

Joseph P. Martin, PhD (*Colorado State University*). Professor. Geotechnical and geoenvironmental engineering; hydrology; transportation; waste management.

James E. Mitchell, MArch (*University of Pennsylvania*). Professor. Architectural engineering design; building systems; engineering education.

Franco Montalto, PhD (*Cornell University*). Professor. Effects of built infrastructure on societal water needs, ecohydrologic patterns and processes, ecological restoration, green design, and water interventions.

Nariman Mostafavi, PhD (*University of Massachusetts - Amherst*). Assistant Teaching Professor. Simulation tools for analyzing urban metabolism; environmentally responsive design; urban resilience; engineering economics; industrial ecology.

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*). Associate Professor. Peace engineering; source water quality protection and management; contaminant and bacterial fate and transport; community engagement.

Miguel A. Pando, PhD (*Virginia Polytechnic Institute and State University*). Assistant Professor. Laboratory testing of geomaterials; geotechnical aspects of natural hazards; soil-structure-interaction; geotechnical engineering.

Michael Ryan, PhD (*Drexel University*) *Associate Department Head of Graduate Studies*. Assistant Teaching Professor. Microbial Source Tracking (MST); Quantitative Microbial Risk Assessment (QMRA); dynamic engineering systems modeling; molecular microbial biology; phylogenetics; metagenomics; bioinformatics; environmental statistics; engineering economics; microbiology; potable and waste water quality; environmental management systems.

Christopher Sales, PhD (*University of California, Berkeley*). Associate Professor. Environmental microbiology and biotechnology; biodegradation of environmental contaminants; microbial processes for energy and resource recovery from waste; application of molecular biology, analytical chemistry and bioinformatic techniques to study environmental biological systems.

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. 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: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS); 90.0 (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 14.1801

Standard Occupational Classification (SOC) code: 17-2131

About the Program

The graduate program in Materials Science and Engineering aims to provide an education which encompasses both the breadth and depth of the most recent knowledge base in the materials science and engineering fields in a format suitable for individuals seeking careers in academia and/or industry.

In addition, the program provides students with research training through their courses and thesis research at the MS and PhD levels.

The graduate student body reflects a broad spectrum of undergraduate backgrounds. Because of the expansion into interdisciplinary areas, qualified physical and biological science graduates may also join the program. Students without an undergraduate degree in Materials Science and Engineering are required to take MATE 503 *Introduction to Materials Engineering*.

Graduate programs in materials science and engineering are offered both on a regular full-time and on a part-time (MS only) basis. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study.

Career Opportunities

Graduates go on to careers in engineering firms, consulting firms, law firms, private industry, business, research laboratories, academia, and national laboratories. Materials scientists and engineers find employment in such organizations as Hewlett-Packard, Intel, IBM, 3M, DuPont, Lockheed-Martin, Johnson and Johnson, Merck, AstraZeneca, Arkema, Army Research Laboratory, Los Alamos National Laboratory, Air Products, Micron, Xerox, Motorola, Monsanto, Corning, and Eastman Kodak.

For more information about Materials Science and Engineering, visit the Department of Materials Science and Engineering (<https://drexel.edu/engineering/academics/departments/materials-science-engineering/>) web page.

Admission Requirements

Applicants must meet the graduate requirements for admission to Drexel University. The graduate student body reflects a broad spectrum of undergraduate backgrounds. Because of the expansion into interdisciplinary areas, qualified non-MSE engineering, physical and biological science graduates may also join the program.

For specific information on how to apply to this program, visit Drexel University's Materials Science and Engineering Graduate Admissions (<http://www.drexel.edu/grad/programs/coe/materials-science-engineering/>) page.

Degree Requirements (MS)

The 45.0 quarter credits required for the MS degree include two required core courses on MATE 510 *Thermodynamics of Solids* and MATE 512 *Introduction to Solid State Materials*. Students choose four additional selected core courses.

Thesis Options

Students pursuing the thesis option are required to undertake a 9.0 credit thesis on a topic of materials research supervised by a faculty member. Alternatively, MS students can select the non-thesis option, in which case, the thesis may be replaced by 9.0 credits of coursework.

All students in the thesis option are required to propose an advisor-supported research thesis topic during their first year. Students are urged to make a choice of topic as early as possible and to choose appropriate graduate courses in consultation with their advisor.

The program is organized so that part-time students may complete the degree requirements in two to four years. Full-time students may complete the program in two years.

There is no general exam required for MS students. If an MS student wishes to continue for a PhD then the student must apply and be admitted to the PhD program (there is no guarantee that an MS student will be admitted to the PhD program).

Materials Science and Engineering (MSMSE) Core Courses *

Required core courses:		
MATE 510	Thermodynamics of Solids	3.0
MATE 512	Introduction to Solid State Materials	3.0
Select four additional core courses from the following:		12.0
MATE 501	Structure and Properties of Polymers	
MATE 507	Kinetics	
MATE 515	Experimental Technique in Materials	
MATE 535	Numerical Engineering Methods	
MATE 610	Mechanical Behavior of Solids	
MATE 661	Biomedical Materials I	
Any additional related courses if approved by the graduate advisor/thesis advisor (such as MATE 514 and MATE 573)		
Optional Core Courses **		18.0
Thesis and Alternatives		9.0
9.0 credits MS thesis OR 6.0 credits of thesis proposal (literature review) + 3.0 credit course OR 9.0 credits of electives		
Total Credits		45.0

* PhD candidates must achieve a minimum B- grade in each of the core courses. Waiver of any of the 6 core courses must be approved by the MSE Department Graduate Advisor and the student's Thesis Advisor in Advance.

** Of the 18 technical elective credits, at least 9 credits must be taken as Materials Science and Engineering (MATE) courses, while the rest may be taken within the College of Engineering, College of Arts and Sciences, or at other colleges if consistent with the student's plan of study (and given advance written approval by his/her advisor). At least 9 of these 18 technical electives must be exclusive of independent study courses or research credits.

Degree Requirements (PhD)

Curriculum

A student must have at least the required 90.0 quarter credits for the PhD degree. An MS degree *is not* a prerequisite for the PhD degree, but can count for 45.0 quarter credits if the courses are approved by the Graduate Advisor. For students without an MS degree, but with previous graduate course work, they may transfer no more than 15.0 credits (equivalent to 12 semester-credits) from approved institutions, provided they follow the rules and regulations described in the Materials Requirements of Graduate Degrees (<http://mse.drexel.edu/media/49885/mse-graduate-program.pdf>).

The required 90.0 credits for a PhD degree are tabulated below:

- Required Core Courses: 6.0 credits
- Additional Required Courses: 7.0 credits (MATE 504 & MATE 536 [1.0 credit for first 6 terms])
- Selected Core Courses: 12.0 credits
- Optional Courses: 9.0 credits
- Research or additional option courses: 47.0 credits
- Dissertation: 9.0 credits (MATE 998)

Total: 90.0 credits

Required Core Courses: *

MATE 510	Thermodynamics of Solids	3.0
MATE 512	Introduction to Solid State Materials	3.0

Additional Required Courses:

MATE 504	The Art of Being a Scientist	2.0
MATE 536	Materials Seminar Series	6.0
MATE 998	Ph.D. Dissertation	9.0

Selected Core Courses: Choose 4 *

MATE 501	Structure and Properties of Polymers	
MATE 507	Kinetics	
MATE 514	Structure, Symmetry, and Properties of Materials	
MATE 515	Experimental Technique in Materials	
MATE 535	Numerical Engineering Methods	
MATE 610	Mechanical Behavior of Solids	
MATE 661	Biomedical Materials I	

Related courses as approved by the Graduate Advisor/Thesis Advisor

Optional Courses: 55.0

MATE 541	Introduction to Transmission Electron Microscopy and Related Techniques	
MATE 542	Nuclear Fuel Cycle & Materials	
MATE 543	Thermal Spray Technology	
MATE 544	Nanostructured Polymeric Materials	
MATE 563	Ceramics	
MATE 572	Materials for High Temperature and Energy	
MATE 573	Electronic, Magnetic and Optical Characterization of Energy Materials	
MATE 576	Recycling of Materials	
MATE T580	Special Topics in MATE	
MATE 582	Materials for Energy Storage	
MATE 583	Environmental Effects on Materials	

MATE 585	Nanostructured Carbon Materials
MATE 602	Soft Materials
MATE 702	Natural Polymers
MATE 897	Research
Other MSE courses that may be available	
Out-of-department courses, as approved by the Graduate Advisor/Thesis Advisor	
Total Credits	90.0

* PhD students must achieve a minimum "B-" grade in each of the core courses. Waiver of any of the six (6) core courses must be approved by the MSE Department Graduate Advisor and the student's Thesis Advisor in advance. MATE 536 is a 1.0 credit course that must be repeated 6 times.

An introductory course, MATE 503, is required for students without an undergraduate materials science and engineering degree.

Additional courses are encouraged for students entering the department with an MS degree. Students choose a doctoral thesis topic after consultation with the faculty. Students are required to consider topics early in the program. An oral thesis presentation and defense are scheduled at the completion of the thesis work.

In addition to the graduate seminar, which is required of all graduate students, doctoral program students must pass an oral candidacy examination and a thesis proposal defense. The exam is designed to improve and assess the communication skills and the analytical abilities of the student. The following procedures should be followed to complete the PhD.

Candidacy Exam Requirement

All MSE PhD students are required to take the PhD Candidacy Examinations administered by the MSE Department.

For more information, visit the Department of Materials Science and Engineering (<http://www.materials.drexel.edu/>) web page.

Facilities

Biomaterials and Biosurfaces Laboratory

This laboratory contains 10 kN biaxial and 5 kN uniaxial servo-hydraulic mechanical testing machines, a Fluoroscan 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 Phase Ceramics Processing Laboratory

This laboratory contains a vacuum hot-press; cold isostatic press (CIP) and hot isostatic press (HIP) for materials consolidation and synthesis; precision dilatometer; laser scattering particle size analyzer; impedance analyzer, creep testers, and assorted high temperature furnaces.

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 testing and manipulation of materials under microscope, high-temperature autoclaves, Sievert's apparatus; glove-box; high-temperature vacuum and other furnaces for the synthesis of nano-carbon coatings and nanotubes; 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; lyophilizer; centrifuge; 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 on the Core Facilities web page (<http://crf.coe.drexel.edu>).

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.

Hao Cheng, PhD (*Northwestern University*). Associate Professor.

Drug delivery, molecular self-assembly, cell-nanomaterial interactions, regenerative medicine and cell membrane engineering.

Yury Gogotsi, PhD (*Kiev Polytechnic Institute*) Director, A. J. Drexel Nanotechnology Institute. Distinguished University & Charles T. and Ruth M. Bach Professor. Nanomaterials; carbon nanotubes; nanodiamond; graphene; MXene; materials for energy storage, supercapacitors, and batteries.

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.

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, Materials Science and Engineering*. Professor. Orthopedic biomaterials; acellular regenerative medicine, biomimetic proteoglycans; hydrogels.

Steven May, PhD (*Northwestern University*) *Department Head*. Professor. Synthesis of complex oxide films, superlattices, and devices; materials for energy conversion and storage; magnetic and electronic materials; x-ray and neutron scattering.

Ekaterina Pomerantseva, PhD (*Moscow State University, Russia*). Associate 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*) *Associate Dean, Faculty Affairs College of Engineering*. Professor. Polysaccharide thin films and nanofibers.

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.

Jonathan E. Spanier, PhD (*Columbia University*) *Department Head, Mechanical Engineering and Mechanics*. Professor. Light-matter interactions in electronic materials, including ferroelectric semiconductors, complex oxide thin film science; laser spectroscopy, including Raman scattering.

Mitra Taheri, PhD (*Carnegie Mellon University*) *Hoeganeas Professor of Metallurgy*. 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.

Jörn Venderbos, PhD (*Leiden University*). Assistant Professor. Theory of quantum materials: topological insulators, topological semimetals, materials prediction and design, strongly correlated electron materials, complex electronic ordering phenomena, unconventional superconductors

Christopher Weyant, PhD (*Northwestern University*). Teaching Professor. Engineering education

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.

Mechanical Engineering and Mechanics

Major: Mechanical Engineering and Mechanics

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS) or 90.0 (PhD)

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional (CIP) code: 14.1901

Standard Occupational Classification (SOC) code: 17-2141

About the Program

The Mechanical Engineering and Mechanics (MEM) Department (<http://drexel.edu/mem/>) offers MS and PhD degrees. The courses often associate with one or more areas of specialization: design and manufacturing, mechanics, systems and control, and thermal and fluid sciences. The mechanical engineering field is rapidly changing due to ongoing advances in modern science and technology. Effective mechanical engineers must possess expertise in mechanical engineering core subjects, interdisciplinary skills, teamwork skills, as well as entrepreneurial and managerial abilities. The degree programs are designed so students can learn the state-of-the-art knowledge now, and have the foundation to acquire new knowledge as they develop in future.

The MS degree program is offered on both a full-time and a part-time basis. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study. Graduate courses are often scheduled in the late afternoon and evening, so full-time students and part-time students can take the same courses. The department has recently adopted the Graduate Co-op program at the master's level as an option.

The PhD degree program is offered for full-time students only and is a research intensive program. The research areas include, but are not limited to, bio-engineering, energy systems, high performance materials, nanotechnology, plasma science and engineering, and robotics.

Admission Requirements

Applicants must meet the graduate requirements for admission to Drexel University. Students holding a bachelor's degree in a science or engineering discipline other than mechanical engineering are advised to take several undergraduate courses as preparation for graduate studies. Though these courses are not counted toward the required credits for the degree, they also must be listed in the student's plan of study. Outstanding students with a GPA of at least 3.5 in their master's program will be considered for admission to the program leading to the doctor of philosophy degree in mechanical engineering.

Degree Requirements (MS) Requirements

The MS program has a two-fold mission: to prepare some students for continuation of their graduate studies and research toward a PhD degree, and to prepare other students for a career in industry upon graduation

with the MS degree. The MS program has a non-thesis option and a thesis option. Students who plan to continue to the PhD degree are advised to select the thesis-option.

The MS program is structured so that students have the opportunity to specialize in areas of interest while also obtain the broadest engineering education possible. Of the required 45.0 credits (15 courses) MS students are required to complete two core-course sequences (two terms each) from two different core areas. Students can take eight technical elective courses of which up to four courses can be from outside the Mechanical Engineering and Mechanics Department if they are approved in the students' plan of study. MS students have opportunity to apply to the optional graduate Co-op program. Students in the MS program should consult with the department graduate adviser at the beginning of their program and must file a plan of study prior to the third quarter of study. Further details can be obtained from the department's Graduate Programs Manual.

Typical MS Program

Two Core-Course Sequences (required)	12.0
Three Mathematics Courses (required) *	9.0
Eight Technical Electives (including 9 credits for thesis option)	24.0
Total Credits	45.0

* Mathematics courses: MEM 591, MEM 592, MEM 593.

Core Areas

All students take core courses in the department's areas of specialization as part of a comprehensive and flexible program. Further details can be obtained from the department's Graduate Programs Manual (<http://www.drexel.edu/mem/academics/graduate/grad-manual/>).

The core courses in each area are listed below:

Mechanics Area

Theory of Elasticity

MEM 660	Theory of Elasticity I	3.0
MEM 661	Theory of Elasticity II	3.0

Solid Mechanics

MEM 663	Continuum Mechanics	3.0
MEM 664	Introduction to Plasticity	3.0

Advanced Dynamics

MEM 666	Advanced Dynamics I	3.0
MEM 667	Advanced Dynamics II	3.0

Systems and Control Area

Robust Control Systems

MEM 633	Robust Control Systems I	3.0
MEM 634	Robust Control Systems II	3.0

Non-Linear Control Theory

MEM 636	Theory of Nonlinear Control I	3.0
MEM 637	Theory of Nonlinear Control II	3.0

Real-Time Microcomputer Control

MEM 639	Real Time Microcomputer Control I	3.0
MEM 640	Real Time Microcomputer Control II	3.0

Thermal and Fluid Sciences Area

Advanced Thermodynamics *

MEM 601	Statistical Thermodynamics I	3.0
MEM 602	Statistical Thermodynamics II	3.0

Heat transfer

MEM 611	Conduction Heat Transfer	3.0
MEM 612	Convection Heat Transfer	3.0
or MEM 613	Radiation Heat Transfer	

Fluid Mechanics *

MEM 621	Foundations of Fluid Mechanics	3.0
MEM 622	Boundary Layers-Laminar & Turbulent	3.0

* Consult the Thermal and Fluid Sciences area advisor for other options.

Degree Requirements (PhD)

Outstanding students with a GPA of at least 3.5 in their master's program will be considered for admission to the program leading to the Doctor of Philosophy degree in mechanical engineering.

PhD Course Requirements

At least 90.0 credits are required for the PhD degree. The master's degree is not a prerequisite for the PhD, but does count as 45.0 credits toward the 90.0 credit requirement.

For students entering the PhD program with a prior MS degree:

- 45.0 credits of graduate courses out of which 18.0 credits are graduate courses exclusive of independent study and dissertation. If the MS degree was not from Drexel's Mechanical Engineering and Mechanics (MEM) Department, 12.0 of these 18.0 credits must be MEM graduate courses (600-level or above). The remaining 27.0 credits consist of a combination of dissertation, independent study, and additional advanced coursework consistent with the approved plan of study.

For students entering the PhD program with a BS degree but without a prior master's degree:

- 90.0 credits of graduate courses. 45.0 of these 90.0 credits must satisfy the MS in Mechanical Engineering degree requirements. The remaining 45.0 credits must satisfy the requirements above.

PhD Candidacy Examination

A graduate student in the PhD program needs be nominated by his/her supervising adviser to take the candidacy examination. A student who enters the PhD program with a prior MS degree must take the Candidacy Examination within the first year after entry to the PhD program. A student who enters the PhD program without a prior MS degree must take the Candidacy Examination within 2 years after entry to the PhD program.

The Candidacy Examination consists of two components: A course-component examination and a research-component examination. The student must demonstrate excellence in both components. The research-component examination consists of a written report and an oral presentation. The Candidacy Committee selects three or more research papers in the student's declared research area for student to conduct a critical review. In three weeks the student submits a written report. One week after the written report is submitted the student makes an oral presentation. The presentation is followed by questions by the Committee. The goals of the questions: To evaluate the student's knowledge in the scientific fields related to the research area, including related background and fundamental material, and the student's ability to integrate information germane to success in research. Additional details are given in the Mechanical Engineering and Mechanics Graduate Program Manual.

Thesis Proposal

At least one year prior to graduation, the PhD candidate must give a thesis proposal to the dissertation advisory committee. The student must submit a written proposal and make a presentation. The written proposal normally includes: abstract, introduction, detailed literature

review, preliminary results, proposed research tasks and timetable. The committee will approve/reject the thesis topic, the scope of work and the general method of attack.

Thesis Defense

A final examination consisting of a presentation and defense of the research dissertation is required, before the PhD degree is granted.

Further details can be obtained from the department's Graduate Programs Manual.

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.

Biofabrication Laboratory

Utilizes cells or biologics as basic building blocks in which biological models, systems, devices and products are manufactured. Biofabrication techniques encompass a broad range of physical, chemical, biological, and/or engineering processes, with various applications in tissue science and engineering, regenerative medicine, disease parthenogenesis and drug testing studies, biochips and biosensors, cell printing, patterning and assembly, and organ printing.

The Biofabrication Lab at Drexel University integrates computer-aided tissue engineering, modern design and manufacturing, biomaterials and biology in modeling, design and biofabrication of tissue scaffolds, tissue constructs, micro-organ, tissue models. The ongoing research focuses on bio-tissue modeling, bio-blueprint modeling, scaffold informatics modeling, biomimetic design of tissue scaffold, additive manufacturing of tissue scaffolds, cell printing and organ printing.

Biological Systems Analysis Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=5)

The research in the Laboratory for Biological Systems Analysis involves the integration of biology with systems level engineering analysis and design, with an emphasis on: (1) the development of robotic systems that borrow from nature's designs and use novel technologies to achieve superior performance and function; and (2) the use of system identification techniques to evaluate the functional performance of animal physiological systems under natural, behavioral conditions. Facilities include rapid prototyping machines, compliant material manufacturing, mold making facilities, and a traditional machine shop and electronics workshop.

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 Hospital.

Combustion Diagnostics Laboratory

High-speed cameras, spectrometers, and laser systems are used to conduct research in low temperature hydrocarbon oxidation, cool flames, and plasma-assisted ignition and combustion. Research in optical diagnostic development is conducted in this lab with a specific focus on tools to measure small peroxy radicals.

Combustion, Fuel Chemistry, and Emissions 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 two single cylinder research engines, a pressurized flow reactor (PFR) facility, flat flame and slot burner systems, and complete analytical and monitoring instrumentation. The engine systems are used to study the effects of operating variables, fuel type, ambient conditions, and control devices on engine performance and emissions. The PFR facility is used for detailed kinetic studies of hydrocarbon pyrolysis and oxidation processes.

Complex Fluids and Multiphase Transport Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1) The research focus of this lab lies at the interface of thermal-fluid sciences, nano materials, and colloid and surface sciences. We apply these fundamental sciences to advance energy conversion and storage systems, to provide effective thermal management solutions, and to enable scalable additive nanomanufacturing. Facilities include materials printing systems, fluorescence microscope and imaging systems, complex fluid characterization, microfluidics and heat transfer testers, coating and solar cell testing devices, electrochemical characterization, and high performance computing facilities.

Dynamic Multifunctional Materials Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1) The focus of the Dynamic Multifunctional Materials Laboratory (DMML) is mechanics of materials; namely fracture and failure mechanisms under extreme conditions and their correlation to meso- and microstructural characteristics. Utilizing highly integrated experimental facilities such as a Kolsky (split-Hopkinson pressure bar), single-stage, and two stage light-gas gun, complex material behavior is deconstructed into dominant time and length scales associated with the energetics of damage evolution. In-situ laser and optical diagnostics such as caustics, interferometry techniques, schlieren visualization and virtual grid method, are used to investigate coupled field properties of multifunctional materials with the goal of not only analyzing and understanding behavior, but ultimately tailoring material properties for specific applications.

Electrochemical Energy Systems Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)

The Electrochemical Energy Systems Laboratory (ECSL) specializes in the design, diagnostics and characterization of next generation electrochemical energy conversion and storage systems. Current areas of research include flow-assisted supercapacitors, next generation flow battery technology and fuel cells for transportation, stationary and portable applications. ECSL utilizes a comprehensive approach, including: advanced diagnostics, system design, materials characterization, and computational modeling of electrochemical energy systems. The core mission of ECSL is to develop novel diagnostic and computational tools to understand critical issues in flow-assisted electrochemical systems and enable better system design. Due to the complex nature of these systems,

our research is highly interdisciplinary and spans the interface of transport phenomena, materials characterization, electrochemistry and system engineering.

Heat Transfer Laboratory

The heat transfer laboratory is outfitted with an array of instrumentation and equipment for conducting single- and multi-phase heat transfer experiments in controlled environments. Present efforts are studying the heat and mass transfer processes in super-critical fluids and binary refrigerants.

Lab-on-a-Chip and BioMEMS Lab (<http://mems.mem.drexel.edu/>) Develops miniature devices for biological and medical applications using microfabrication and microfluidics technologies. Our research projects have highly multidisciplinary nature and thus require the integration of engineering, science, biology and medicine. Projects are conducted in close collaboration with biologists and medical doctors. Our research methodology includes design and fabrication of miniature devices, experimental characterization, theoretical analysis, and numerical simulation.

Microcomputer Controls Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=7)

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.

Multiscale Thermofluidics Laboratory

Develops novel scalable nanomanufacturing techniques using biological templates to manipulate micro- and nano- scale thermal and fluidic phenomena. Current work includes enhancing phase-change heat transfer with super-wetting nanostructured coatings and transport and separation through nanoporous membranes.

Nyheim Plasma Institute (<http://drexel.edu/NyheimInstitute/>) The Nyheim Plasma Institute (NPI) was formed in 2002 (originally the A.J. Drexel Plasma Institute) to stimulate and coordinate research projects related to plasma and other modern high-energy engineering techniques. Today the NPI is an active multidisciplinary organization involving 23 faculty members from 6 engineering departments working in close collaboration with the School of Biomedical Engineering, College of Arts and Sciences, and the College of Nursing and Health Professions.

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.

Space Systems Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)

The objective of the Space Systems Laboratory (SSL) is to inspire future generations to advance aerospace engineering. It provides research opportunities in orbital mechanics, rendezvous and docking maneuvers, mission planning, and space environment. The lab provides facilities for activities in High Altitude Balloons, construction of air-vehicles and nano-

satellites, 0-g flights, and STK simulation package for satellite flights and trajectories.

Theoretical and Applied Mechanics Group (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)

Research in the Theoretical and Applied Mechanics Group (TAMG) focuses on using experimental, analytical and computational tools to understand deformation and failure of materials, components and structures in a broad range of time and length scales. To accomplish this goal, TAMG develops procedures that include mechanical behavior characterization coupled with non-destructive testing and modern computational tools. This information is used both for understanding the role of important material scales in the observed bulk behavior and for the formulation of constitutive laws that can model the response including damage initiation and progression according to prescribed loading conditions. Equipment and facilities used by TAMG include a range of mechanical testing equipment for testing in tension, compression, fatigue and fracture.

Vascular Kinetics Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)

The Vascular Kinetics Laboratory (VKL) uses engineering methods to understand how biomechanics and biochemistry interact in cardiovascular disease. In particular, we study fluid flow and blood vessel stiffness impact cellular response to glucose, growth factors, and inflammation to lead to atherosclerosis and metabolic syndrome. We then apply these discoveries to novel biomaterials and therapies, with a particular focus on treating cardiovascular disease in under-served populations. This research is at the interface of engineering and medicine, with close collaborations with biologists and physicians and a strong emphasis on clinical applications.

Mechanical Engineering Faculty

Jennifer Atchison, PhD (*Drexel University*). Assistant Teaching Professor. Engineering Education, Functional Fabrics, and Nanofibers

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.

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.

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

Y. Grace Hsuan, PhD (*Imperial College*). Professor. Durability of polymeric construction materials; advanced construction materials; and performance of geosynthetics.

Andrei Jablokow, PhD (*University of Wisconsin, Madison*) Associate Department Head for Undergraduate Affairs, Mechanical Engineering and Mechanics. Associate Teaching Professor. Engineering education; 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. 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.

Alan Lau, PhD (*Massachusetts Institute of Technology*). Professor. Deformation and fracture of nano-devices and macroscopic structures; damage-tolerant structures and microstructures.

Michele Marcolongo, PhD, PE (*University of Pennsylvania*) Department Head, Materials Science and Engineering. Professor. Orthopedic biomaterials; acellular regenerative medicine, biomimetic proteoglycans; hydrogels.

Roger Marino, PhD (*Drexel University*). Associate Teaching Professor. Engineering education; land development; product Development

Matthew McCarthy, PhD (*Columbia University*) Associate Department Head for Graduate Affairs, Mechanical Engineering and Mechanics. Associate 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*). Professor. Gas-phase reaction kinetics; thermodynamics; biofuels.

Moses Noh, PhD (*Georgia Institute of Technology*). Associate Professor. MEMS; BioMEMS; lab-on-a-chip; microfabrication; microfluidics.

Mira S. Olson, PhD (*University of Virginia*). Associate Professor. Peace engineering; source water quality protection and management; contaminant and bacterial fate and transport; community engagement.

Sorin Siegler, PhD (*Drexel University*). Professor. Orthopedic biomechanics; robotics; dynamics and control of human motion; applied mechanics.

Jonathan E. Spanier, PhD (*Columbia University*) Department Head, Mechanical Engineering and Mechanics. 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*) Department Head, Engineering 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.

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*). Professor Emeritus. Treatment of damage evolution processes in multi-phased high-temperature materials, including ceramics and ceramic-matrix composites.

Project Management

Major: Project Management

Degree Awarded: Master of Science (MS) and Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS); 90.0 (PhD)

Co-op Option: None

Classification of Instructional Programs (CIP) code: 52.0211

Standard Occupational Classification (SOC) code: 11-9199

The MS in Project Management is now housed in the Goodwin College of Professional Studies.

About the Program

Modern project management is a field that began in the 1950s in the defense industry. In the 1980s, the field gained critical mass in a broad range of industries, including, but not limited to building/construction, IT/

systems development, defense, engineering, film and video, financial services, healthcare, and government contracting. Organizations are using project management concepts, tools, and techniques to achieve their objectives and gain a competitive advantage.

Master of Science in Project Management

The Master of Science (MS) in Project Management, a part-time online program, is designed to equip professionals with the knowledge and skills expected of project managers in any field. The course content is mapped to the internationally-recognized Project Management Institute's (PMI)® *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*.

Interested candidates should visit Drexel University Online (<http://online.drexel.edu/online-degrees/business-degrees/project-management/>) for admissions requirements and more information about how to apply.

Questions about the MS in Project Management should be directed to:

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.

Degree Requirements

The Master of Science in Project Management requires completion of 45.0 credit hours (quarter) of study. The curriculum includes a core of 10 required courses (30.0 credits), a culminating capstone project experience (PROJ 695 (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/proj/>)) integrating the knowledge and skills acquired during the program (3.0 credits) and 12.0 credits of electives.

Electives

Students should use electives to increase project management, creativity, communication, or leadership skills or to develop areas of specialization. Any appropriate graduate course offered in the University can serve as an elective if the student has sufficient background to take the course. In addition, the program will offer its own elective courses including special topics (PROJ T580 (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/proj/>); PROJ T680; (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/proj/>) or PROJ T780 (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/proj/>)). Qualified students may also pursue independent study (PROJ I599 (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/proj/>); PROJ I699 (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/proj/>); or PROJ I799 (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/proj/>)) for elective credit in special cases.

Curriculum

Core Courses		
PROJ 501	Introduction to Project Management	3.0
PROJ 502	Project Planning & Scheduling	3.0
PROJ 510	Project Quality Management	3.0
PROJ 515	Project Estimation & Cost Management	3.0
PROJ 520	Project Risk Assessment & Management	3.0
PROJ 530	Managing Multiple Projects	3.0

PROJ 535	International Project Management	3.0
PROJ 540	Project Procurement Management	3.0
PROJ 603	Project Leadership & Teamwork	3.0
PROJ 645	Project Management Tools	3.0
Free Electives		12.0
Capstone Project		
PROJ 695	Capstone Project in Project Management	3.0
Total Credits		45.0

Degree Requirements

NOTE: The Project Management Program is not currently accepting applications to the PhD in Project Management.

The following general requirements must be satisfied to complete the PhD in Project Management:

- 90.0 quarter credit hours total (or 45.0 credit hours post-MS)
- Plan of study established with Advisor
- Qualifying courses
- Candidacy exam
- Approval of dissertation proposal
- Defense of dissertation
- Full-time residency is desired for the PhD degree to ensure students the opportunity for intellectual association with other scholars.

Students entering with a master's degree may be exempted from some or all of the courses in the breadth requirement; however, they are still required to meet all milestones of the program. Individual courses may also be transferred with approval of the Project Management program. The total credit amount, candidacy exam, and dissertation are University Requirements. Additional requirements are determined by the Project Management program.

To be enrolled into the PhD in Project Management program, students must be accepted by the program and the faculty member with whom they will be working.

Required Qualifying Project Management Courses		33.0
PROJ 501	Introduction to Project Management	
PROJ 502	Project Planning & Scheduling	
PROJ 510	Project Quality Management	
PROJ 515	Project Estimation & Cost Management	
PROJ 520	Project Risk Assessment & Management	
PROJ 530	Managing Multiple Projects	
PROJ 535	International Project Management	
PROJ 540	Project Procurement Management	
PROJ 603	Project Leadership & Teamwork	
PROJ 645	Project Management Tools	
PROJ 695	Capstone Project in Project Management	
Free Electives		12.0
Research and Candidacy Courses		15.0
Students must complete 15.0 credit hours of research courses as approved by their faculty/research advisor. Courses will include study in research methodologies, research design, data analysis; and writing for research, publication, and funding.		
Required Candidacy Courses		21.0
Students must complete 21.0 credit hours of courses in consultation with their faculty/research advisor/committee. Courses will include study in applied research and dissertation research.		
Professional Electives		9.0
PROJ 650	Project Stakeholder Management	
PROJ 665	Managing Project Knowledge	

PROJ 670	Project Management Methodologies: Managing Project Lifecycles	
Other electives approved by faculty advisor and the Project Management program (must be 6XX or higher)		
Total Credits		90.0

Candidacy Exam

After approximately one year of study beyond the master's degree, doctoral students will take a candidacy examination, consisting of written and oral parts. The Project Management candidacy examination serves to define the student's research domain and to evaluate the student's knowledge and understanding of various fundamental and seminal results in that domain. At this point the student is expected to be able to read, understand, analyze, and explain advanced results in a specialized area of Project Management at an adequate level of detail. The candidacy examination will evaluate those abilities using a defined set of published manuscripts. The student will prepare a written summary of the contents of the material, present the summary orally, and answer questions about the material. The examination committee will evaluate the written summary, the oral presentation, and the student's answers.

Dissertation Proposal

After successfully completing the candidacy examination, the PhD candidate must prepare a dissertation proposal that outlines, in detail, the specific problems that will be solved in the PhD dissertation. The quality of the dissertation proposal should be at the level of, for example, a peer-reviewed proposal to a federal funding agency, or a publishable scientific paper. A dissertation proposal must be approved within two years of becoming a PhD candidate.

Dissertation Defense

After successfully completing the dissertation proposal, the PhD candidate must conduct the necessary research and publish the results in a PhD dissertation.

Sample Plan of Study (MS)

First Year		
Fall		
PROJ 501	Introduction to Project Management	3.0
Free elective		3.0
Term Credits		6.0
Winter		
PROJ 502	Project Planning & Scheduling	3.0
PROJ 510	Project Quality Management	3.0
Term Credits		6.0
Spring		
PROJ 515	Project Estimation & Cost Management	3.0
PROJ 520	Project Risk Assessment & Management	3.0
Term Credits		6.0
Summer		
PROJ 535	International Project Management	3.0
Free elective		3.0
Term Credits		6.0
Second Year		
Fall		
PROJ 530	Managing Multiple Projects	3.0
PROJ 540	Project Procurement Management	3.0
Term Credits		6.0
Winter		
PROJ 603	Project Leadership & Teamwork	3.0
Free elective		3.0
Term Credits		6.0

Spring		
PROJ 645	Project Management Tools	3.0
PROJ 695	Capstone Project in Project Management	3.0
Term Credits		6.0

Summer		
Free elective		3.0
Term Credits		3.0

Total Credit: 45.0

Sample Plan of Study (PhD)

Upon entering the PhD in Project Management program, each student will be assigned an advisor, and with the help of the advisor will develop and file a plan of study (which can be brought up to date when necessary). The plan of study will be filed with the Project Management program; the student's advisor; and the Graduate College.

BS (in any discipline)/MS in Project Management

Note: The Project Management program is not currently accepting applications to this program.

Motivated Drexel undergraduate students from any discipline considering the BS/MS option have the opportunity to add the MS in Project Management to their curriculum. Students approved to pursue this option will work with advisors to develop a plan of study that will allow them to graduate with a BS in their undergraduate field of study and an MS in Project Management.

BS/MS students who complete an MS in Project Management will be equipped with the fundamental competencies expected of project managers in virtually any field. They will also be prepared to pursue the Certified Associate in Project Management (CAPM)[®] or Project Management Professional (PMP)[®] credentials from the Project Management Institute (PMI). Course content, which is the same as that of the MS in Project Management degree, is aligned with the internationally recognized Project Management Institute's (PMI)[®] *A Guide to the Project Management Body of Knowledge (PMBOK[®] Guide)*.

Eligible Students

Current Drexel undergraduate students who have completed between 90.0 and 120.0 credits of their respective undergraduate degree with a minimum cumulative GPA of 3.2 and who have successfully completed at least 1 co-op experience or have at least 1 year of professional experience should contact their undergraduate advisor about this option.

Application Requirements

- Signed Accelerated Degree Program Application (<http://drexel.edu/graduatecollege/forms-policies/forms/>) (approved by the student's primary academic advisor)
- Current resume
- Personal essay discussing the following:
 - Why you are pursuing a BS in your chosen discipline/the MS in Project Management
 - How you feel having a BS in your chosen discipline/the MS in Project Management will set you apart from your peers

Degree Requirements

Core Courses		
PROJ 501	Introduction to Project Management	3.0

PROJ 502	Project Planning & Scheduling	3.0
PROJ 510	Project Quality Management	3.0
PROJ 515	Project Estimation & Cost Management	3.0
PROJ 520	Project Risk Assessment & Management	3.0
PROJ 530	Managing Multiple Projects	3.0
PROJ 535	International Project Management	3.0
PROJ 540	Project Procurement Management	3.0
PROJ 603	Project Leadership & Teamwork	3.0
PROJ 645	Project Management Tools	3.0
Free Electives		12.0
PROJ 650	Project Stakeholder Management	
PROJ 665	Managing Project Knowledge	
Other graduate-level courses with approval of Project Management program (must be 5XX or higher)		
Capstone Project		
PROJ 695	Capstone Project in Project Management	3.0
Total Credits		45.0

Sample Plan of Study

The plan of study above is a sample plan. It is the responsibility of students to satisfy all prerequisites. Students approved to pursue the BS/MS option must work with their primary academic advisor and the Project Management program to develop a plan of study that fits their respective degree requirements.

First Year		Credits
Fall		
CHEM 101	General Chemistry I	3.5
ENGL 101 or 111	Composition and Rhetoric I: Inquiry and Exploratory Research English Composition I	3.0
ENGR 101	Engineering Design Laboratory I	2.0
ENGR 121	Computation Lab I	2.0
ENGR T180	Special Topics in ENGR (ENGR Math Assistance)	1.0
ENGR T180	Special Topics in ENGR (Computer Lab I)	2.0
MATH 121	Calculus I	4.0
UNIV E101	The Drexel Experience	1.0
Term Credits		18.5
Winter		
CHEM 102	General Chemistry II	4.5
COOP 101	Career Management and Professional Development	0.0
ENGL 102 or 112	Composition and Rhetoric II: Advanced Research and Evidence-Based Writing English Composition II	3.0
ENGR 102	Engineering Design Laboratory II	2.0
ENGR 122	Computation Lab II	1.0
ENGR T180	Special Topics in ENGR (Computer 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		20.0
Spring		
BIO 141	Essential Biology	4.5
ENGL 103 or 113	Composition and Rhetoric III: Themes and Genres English Composition III	3.0
ENGR 103	Engineering Design Laboratory III	2.0
ENGR T180	Special Topics in ENGR (MATH Practicum)	1.0
MATH 200	Multivariate Calculus	4.0
PHYS 102	Fundamentals of Physics II	4.0

UNIV E101	The Drexel Experience	0.5
Term Credits		19.0
Second Year		
Fall		
ECE 200	Digital Logic Design	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
ENGR T180	Special Topics in ENGR (Mentorship)	1.0
PHYS 201	Fundamentals of Physics III	4.0
Term Credits		18.0
Winter		
MATH 221	Discrete Mathematics	3.0
ECE 201	Foundations of Electric Circuits I	3.0
ECE 203	Programming for Engineers	3.0
ENGR 202	Evaluation & Presentation of Experimental Data II	3.0
ENGR 232	Dynamic Engineering Systems	3.0
ENGR T180	Special Topics in ENGR (Leadership)	1.0
ENGR T180	Special Topics in ENGR (Engineering Edu)	1.0
Gen Ed Elective		3.0
Term Credits		20.0
Spring		
Co-op #1		
Term Credits		0.0
Summer		
Co-op #1		
Term Credits		0.0
Third Year		
Fall		
ECE 361	Probability and Data Analytics for Engineers	3.0
ECEC 301	Advanced Programming for Engineers	3.0
ECEC 302	Digital Systems Projects	4.0
ECEL 301 [WI]	Electrical Engineering Laboratory	2.0
ECES 301	Signals and Systems I	4.0
Gen Ed Elective		3.0
Term Credits		19.0
Winter		
ECEC 304	Design with Microcontrollers	4.0
ECEC 355	Computer Organization & Architecture	4.0
ECEL 302	ECE Laboratory II	2.0
PHIL 315	Engineering Ethics	3.0
Free Elective		3.0
Gen Ed Elective		3.0
Term Credits		19.0
Spring		
Co-op #2		
Term Credits		0.0
Summer		
Co-op #2		
Term Credits		0.0
Fourth Year		
Fall		
CS 265	Advanced Programming Tools and Techniques	3.0
ECEC 356	Embedded Systems	4.0
ECEC 357	Introduction to Computer Networks	4.0
ECEL 303	ECE Laboratory III	2.0
PROJ 501	Introduction to Project Management	3.0
Graduate-Level Elective*		3.0
Term Credits		19.0
Winter		
CS 260	Data Structures	3.0

ECE 391	Introduction to Engineering Design Methods	1.0
ECEC 353	Systems Programming	3.0
ECEL 304	ECE Laboratory IV	2.0
PROJ 502	Project Planning & Scheduling	3.0
PROJ 645	Project Management Tools	3.0
Term Credits		15.0
Spring		
Co-op #3		
PROJ 515	Project Estimation & Cost Management	3.0
Term Credits		3.0
Summer		
Co-op #3		
PROJ 510	Project Quality Management	3.0
Term Credits		3.0
Fifth Year		
Fall		
ECE 491 [WI]	Senior Design Project I	2.0
PROJ 520	Project Risk Assessment & Management	3.0
PROJ 535	International Project Management	3.0
ECEC 4XX (CS Elective)		3.0
Graduate-Level Electives*		6.0
Term Credits		17.0
Winter		
ECE 492 [WI]	Senior Design Project II	2.0
PROJ 530	Managing Multiple Projects	3.0
PROJ 540	Project Procurement Management	3.0
ECEC 4XX (CE Elective)		3.0
Free Elective		3.0
Graduate-Level Elective*		3.0
Term Credits		17.0
Spring		
ECE 493	Senior Design Project III	4.0
PROJ 603	Project Leadership & Teamwork	3.0
PROJ 695	Capstone Project in Project Management	3.0
ECEC 4XX (CE Elective)		3.0
Gen Ed Elective		3.0
Free Elective		3.0
Term Credits		19.0

Total Credit: 226.5

* Graduate-level electives must be approved by the Project Management program.

Additional Information

Questions about the BS/MS option featuring a BS in any discipline and the MS in Project Management, as well as the materials requested for those wishing to pursue the option, should be directed to:

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.

Project Management Faculty

Frank Anbari, PMP, PhD (*Drexel University*). Clinical Professor.
 Transportation engineering; project scheduling; project cost management;

earned value management; project quality management; project leadership; project management education; Six Sigma.

Jon Boyle, PhD (*Virginia Polytechnic Institute and State University*). Adjunct Associate Professor. Cognitive neurosciences; industrial/organizational psychology; knowledge management; group processes; human resources and workforce development; business strategy; technology-enabled learning; research and development; process improvement

Simon Cleveland, PhD, PMP, CSM, CSPO, ITIL, SSBB (*Nova Southeastern University*). Adjunct Professor. Project management fundamentals; project scope management; project schedule management and cost control; project risk and quality management; project management for NGOs; managing project complexity; project initiation and development; introduction to program and portfolio management; technical projects planning and scheduling; managing troubled projects; project evaluation and assessment; project negotiation and conflict resolution; managing technology projects; project management for PMP certification; IT project and team management

Patrick O'Brien, PE, CCM, PMP, PhD (*Walden University*). Adjunct Instructor. Negotiations and executive communication; environmental management; scope and time management; project cost and risk management; project quality management; construction management; structural analysis;

Scott Serich, JD, PhD (*University of Michigan*). Adjunct Associate Professor. Procurement management; information technology project management

John Via, DEngr (*Southern Methodist University*). Adjunct Professor.

Tiffani A. Worthy, PMP, EdD (*George Washington University*). Adjunct Instructor. Project management fundamentals; project leadership; project communications; cross cultural communications; project management education; Myers-Briggs Type Indicator

Vince and Judy Vidas Program in Systems Engineering

Major: Systems Engineering

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

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 interdisciplinary curriculum which integrates systems thinking with 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. Study can be on a part-time or full-time basis, and all courses are offered online.

The curriculum features the following:

- Include models relevant to sustainable, high performance systems as they relate to effective systems engineering

- Expose students to model-based systems engineering using SysML and DODAF, also covering major aspects of the systems domain.
- Teach systems engineering processes and skills to integrate user needs, manage requirements, conduct technological evaluation, and build elaborate system architectures, assess risk and establish financial and schedule constraints.
- Prepare students to intelligently manage and contribute to any engineering challenge, including concept development, technology assessment, architecture selection, and proposal development. The courses stimulate and challenge students as they consider sustainability-oriented projects and become serious systems engineering managers and practitioners.

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.

Certificate Opportunity

Students may complete a Graduate Certificate as a standalone pursuit or as a gateway to the full Master of Science in Systems Engineering. Students may apply for admission to the Masters of Science in Systems Engineering degree program at any point in a certificate series. Upon admission, graduate courses successfully completed in the certificate series may be applied toward the Master's degree as applicable. Certificate opportunities include:

- Certificate in Systems Design and Development (p. 299)
- Certificate in Systems Engineering (<http://catalog.drexel.edu/graduate/collegeofengineering/systemsengineering/systemsengineeringcert/>)
- Certificate in Systems Engineering Analysis (p. 299)
- Certificate in Systems Engineering Integrated Logistics (p. 300)
- Certificate in Systems Reliability Engineering (p. 300)

Admission Requirements

Degree and GPA Requirement

A bachelor's degree in an Engineering discipline from an ABET-accredited college or university is required. A bachelor's degree in science (Physics, Mathematics, Computer Science, etc.) may also be acceptable. An undergraduate degree earned abroad must be deemed equivalent to a U.S. bachelor's degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor's degree as well as for any subsequent graduate-level work is required.

GRE Requirement

The GRE General Test is only required of applicants for full-time studies; part-time applicants do not need to take the GRE. Official documents of

the exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted. The GRE can be waived for students who have successfully completed a Master's degree or a Drexel certificate in the systems curriculum.

TOEFL Requirement

For students whose native language is not English and who do not hold a degree from a US institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum total score of 94 (internet-based). Official documents of this exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

Other Requirements

- Submission of an application
- Official, sealed college transcripts
- An essay
- Two or more letters of recommendation

Degree Requirements

The master of science in systems engineering degree requires a minimum of 45 credits, including 33 credits in required core courses and 12.0 graduate elective credits.

Students may take their required elective credits from any graduate-level course(s) in engineering, business, or another college for which they have adequate preparation and can obtain approvals from the college and the systems engineering program.

All candidates are encouraged to discuss areas of interest with the program advisor and to develop a proposed plan of study during the early stages of the program.

Note: Specific course requirements may be waived for students who have taken equivalent courses elsewhere.

Engineering Management Required Courses

EGMT 531	Engineering Economic Evaluation & Analysis	3.0
EGMT 572	Statistical Data Analysis	3.0
EGMT 573	Operations Research	3.0

Systems Engineering Required Courses

SYSE 510	Systems Engineering Process	3.0
SYSE 520	Global Sustainment and Integrated Logistics	3.0
SYSE 521	Integrated Risk Management	3.0
SYSE 533	Systems Integration and Test	3.0
SYSE 685	Systems Engineering Management	3.0
SYSE 688	Systems Engineering Analysis	3.0
SYSE 690	Modeling and Simulation	3.0

Capstone in Systems Engineering

SYSE 598	Capstone in Systems Engineering	3.0
----------	---------------------------------	-----

Electives

12.0

Complete four of the following:

ECEP 501	Power System Analysis
ECEP 502	Computer Analysis of Power Systems
ECEP 503	Synchronous Machine Modeling
ECEP 610	Power System Dynamics
ECEP 611	Power System Security
ECEP 612	Economic Operation of Power Systems
ECES 511	Fundamentals of Systems I
ECES 512	Fundamentals of Systems II
ECES 513	Fundamentals of Systems III

concept development, technology assessment, architecture selection, and proposal development.

Systems engineers are highly valued in industry because their skills complement those in traditional engineering fields. Whereas other engineering disciplines usually focus deeply in only one area, systems engineers must integrate all of those areas into a comprehensive and effective system. This is a versatile skill-set that allows for a flexible career path, as systems engineering expertise is sought by a wide range of industries such as healthcare, defense, communications, aerospace, government, transportation, finance, and more. Drexel University's MS Systems Engineering will prepare students from any of these fields to lead large, complex projects in their organizations.

Systems Engineering Faculty

Richard Grandrino, MBA (*Drexel University*). Teaching Faculty. Manager for advanced logistics operations at Lockheed Martin

Steven Mastro, PhD (*Drexel University*). Adjunct Faculty. Machinery Research and Silencing Division of NAVSEA Philadelphia. Work focuses on advanced sensor and control technologies for condition-based maintenance, damage control, and automation.

Miray Pereira, MBA (*Rutgers University*). Adjunct Instructor. Manages a team of consultants responsible for development, facilitation and implementation of fundamental demand management systems and capabilities for DuPont, most recently with the DuPont Safety & Protection Platform in strategic planning, mergers & acquisitions.

Walter Sobkiw, BS (*Drexel University*). Adjunct Faculty. Author of "Systems Engineering Design Renaissance" and "Systems Practices as Common Sense."

Fernando Tovia, PhD (*University of Arkansas*). Adjunct Instructor. Core quantitative analysis, strategic planning, supply chain management and manufacturing systems.

John Via, DEngr (*Southern Methodist University*). Teaching Professor. Pharmaceutical, Bio-pharmaceutical, and Medical Device development and manufacturing

Certificate in Construction Management

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 52.2001

Standard Occupational Classification (SOC) Code: 11-9021

About the Program

The certificate in Construction Management program teaches professionals the multidisciplinary skills required of effective senior construction managers. The program produces industry leaders that exhibit strong technical and managerial skills, apply scientific

methodologies to problem solving, are critical thinkers, exercise creativity, and inject innovation into the process.

Students have the option of completing this 18.0 credit certificate in construction management as a stand-alone professional development credential, or as a step toward the MS in Construction Management program (<http://drexel.edu/engmgmt/cmgt/academics/ms/>).

Admission Requirements

The admissions process for this program is the same as for the MS in Construction Management (<http://www.drexel.edu/grad/apply/overview/>).

Program Requirements

Requirements		
CMGT 510	Construction Control Techniques	3.0
CMGT 512	Cost Estimating and Bidding Strategies	3.0
CMGT 515	Risk Management in Construction	3.0
CMGT 525	Applied Construction Project Management	3.0
CMGT 528	Construction Contract Administration	3.0
CMGT 538	Strategic Management in Construction	3.0
Total Credits		18.0

Additional Information

For additional information, view the College of Engineering's Construction Management (<https://drexel.edu/engineering/academics/areas-of-study-programs/construction-management/>) web page or contact the program academic adviser:

Ms. Jessica Cruz

Emails: jc635@drexel.edu

Phone: 215-895-5943

Graduate Certificate in Project Management

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 52.0211

Standard Occupational Classification (SOC) Code: 11-9199

About the Program

While project management has been around since the 1950s, the field has experienced an explosion of growth, both in the number of project managers being employed and in the expectations of the industry. Not only is work becoming more "projectized," but also more organizations are using project management to achieve business results. This requires a solid foundation in business fundamentals, communication, and leadership, as well as skills in program management and portfolio management.

The Graduate Certificate in Project Management is designed to support the growing need for project management graduate education. It provides students with the knowledge and skills necessary for successful professional and leadership careers in the rapidly-expanding field of

project management and will prepare students to pursue the Certified Associate in Project Management (CAPM)[®] or Project Management Professional (PMP)[®] credential from the Project Management Institute (PMI).

Program Requirements

Required Courses

PROJ 501	Introduction to Project Management	3.0
PROJ 502	Project Planning & Scheduling	3.0
PROJ 510	Project Quality Management	3.0
PROJ 515	Project Estimation & Cost Management	3.0
PROJ 603	Project Leadership & Teamwork	3.0

Elective courses 3.0

Select 1 of the following:		
PROJ 520	Project Risk Assessment & Management	
PROJ 530	Managing Multiple Projects	
PROJ 535	International Project Management	
PROJ 540	Project Procurement Management	
PROJ 645	Project Management Tools	
PROJ 650	Project Stakeholder Management	
PROJ 665	Managing Project Knowledge	
Other graduate-level courses, with approval of student's Academic Advisor and the Project Management program (must be 5XX or higher)		

Total Credits 18.0

Additional Information

Interested candidates should visit Drexel University Online (<http://online.drexel.edu/online-degrees/business-degrees/project-management/>) for admissions requirements and more information about how to apply.

Questions about the Graduate Certificate in Project Management should be directed to:

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.

Certificate in Real Estate

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Campus, Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 52.1501

Standard Occupational Classification (SOC) Code: 11-9141

About the Program

This graduate certificate seeks to produce professionals with the knowledge, skills, and perspective required to be successful in the real estate development process and the industry as a whole. Students explore the knowledge and skills required to create, maintain, and build environments for living, working and entertainment purposes.

Relevant issues include project finance, real estate as investments, design and construction, operations, development law, environmental remediation, public policy, market analysis, and architecture.

Students wishing to complete this certificate in the context of a master's degree should consider the MS in Construction Management (<http://drexel.edu/engmgmt/cmgt/academics/ms/>) with a concentration in Real Estate.

Program Requirements

Requirements

REAL 568	Real Estate Development	3.0
REAL 571	Advanced Real Estate Investment & Analysis	3.0
REAL 572	Advanced Market Research & Analysis	3.0
REAL 575	Real Estate Finance	3.0
REAL 577	Legal Issues in Real Estate Development	3.0
Select one of the following:		3.0
REAL 573	Sales & Marketing of Real Estate	
REAL 574	Real Estate Economics in Urban Markets	
REAL 576	Real Estate Valuation & Analysis	

Total Credits 18.0

Additional Information

For additional information, view the College of Engineering's Construction Management (<https://drexel.edu/engineering/academics/departments/construction-engineering-project-management-systems-engineering/academic-programs/undergraduate/construction-management/>) web page or the program academic adviser:

Ms. Jessica Cruz, jc635@drexel.edu, 215-895-5943

Certificate in Sustainability and Green Construction

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: 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

About the Program

The architectural, engineering, and construction community faces the daunting task of providing a built environment which is in harmony with the natural environment—meeting the current needs of society without jeopardizing the ability of future generations to meet their needs. Sustainable development means integrating the decision-making process across the project team, so that every decision is made with an eye to the greatest long-term benefits.

The certificate in Sustainability and Green Construction is a flexible, part-time post-baccalaureate program, focused on the sustainable aspects of the construction process. Students have the opportunity to complete all requirements within one and a half years.

Currently, in the Leadership in Energy and Environmental Design (LEED) green building rating system, the construction process represents a

significant portion of the effort required to achieve high performance building programs. This certificate program is intended to explore these concepts in detail. Credits from this certificate will transfer toward a Master of Science in Construction Management.

Program Requirements

Requirements		
CMGT 535	Community Impact Analysis	3.0
CMGT 545	Sustainable Principles & Practices	3.0
CMGT 546	Sustainable Technologies	3.0
CMGT 547	LEED Concepts	3.0
CMGT 558	Community Sustainability	3.0
Total Credits		15.0

Additional Information

For additional information, view the College of Engineering's Construction Management (<https://drexel.edu/engineering/academics/departments/construction-engineering-project-management-systems-engineering/academic-programs/undergraduate/construction-management/>) web page or the program academic adviser:

Ms. Jessica Cruz, jc635@drexel.edu, 215-895-5943

Certificate in Systems Design and Development

Certificate Level: Graduate

Admission Requirements: Bachelor's degree in engineering or other science

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 14.2701

Standard Occupational Classification (SOC) Code: 17-2199

About the Program

The courses in this certificate focus on teaching students engineering design and management of large complex systems, including software intensive systems. By exposing the students to the systems engineering design body of knowledge and allowing them to develop systems skills in stimulating and challenging environments, they will be prepared to become industry leaders who can make a significant difference. Upon completion of this certificate, the students will be able to design, lead, and manage any systems engineering effort -- regardless of size, complexity, technologies, or engineering emphasis.

Admission Requirements

Degree and GPA Requirement

A bachelor's degree in an engineering discipline from an ABET-accredited college or university is required. A bachelor's degree in the sciences (physics, mathematics, computer science, etc.) may also be acceptable. Applicants with degrees in the sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's

degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor's degree as well as for any subsequent graduate-level work is required.

TOEFL Requirement

For students whose native language is not English and who do not hold a degree from a US institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum total score of 94 (internet-based). Official documents of this exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

Other Requirements

- Submission of an application
- Official, sealed college transcripts
- An essay
- Two or more letters of recommendation

Requirements

SYSE 685	Systems Engineering Management	3.0
SYSE 688	Systems Engineering Analysis	3.0
SYSE 530	Systems Engineering Design	3.0
SYSE 531	Systems Architecture Development	3.0
SYSE 532	Software Systems Engineering	3.0
Total Credits		15.0

Certificate in Systems Engineering Analysis

Certificate Level: Graduate

Admission Requirements: Bachelor's degree in engineering or other science

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 15.1501

Standard Occupational Classification (SOC) Code: 11-9041

About the Program

The courses in this certificate focus on teaching students statistical analysis and the use of mathematical models to solve a variety of problems. The courses are structured to discuss theory, process and application. The primary emphasis is application as the objectives of the courses are to provide students with skills to model problems, determine a quantitative solution, and perform sensitivity analysis. Theory and process are also studied so students learn how the models work by understanding the underlying theory associated with a particular model. Understanding of theory also enforces skills to conduct sensitivity analyses and helps answer "what if" type questions. Upon successful completion of this certificate, students will be able to formulate mathematical models and solve quantitative problems.

Any students interested in decision sciences or advanced mathematical modeling and analysis should consider pursuing this certification.

Admission Requirements

Degree and GPA Requirement

A bachelor's degree in an engineering discipline from an ABET-accredited college or university is required. A bachelor's degree in the sciences (physics, mathematics, computer science, etc.) may also be acceptable. Applicants with degrees in the sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor's degree as well as for any subsequent graduate-level work is required.

TOEFL Requirement

For students whose native language is not English and who do not hold a degree from a US institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum total score of 94 (internet-based). Official documents of this exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

Other Requirements

- Submission of an application
- Official, sealed college transcripts
- An essay
- Two or more letters of recommendation

Requirements

EGMT 571	Engineering Statistics	3.0
EGMT 572	Statistical Data Analysis	3.0
EGMT 573	Operations Research	3.0
SYSE 525	Statistical Modeling & Experimental Design	3.0
SYSE 690	Modeling and Simulation	3.0
Total Credits		15.0

Certificate in Systems Engineering Integrated Logistics

Certificate Level: Graduate

Admission Requirements: Bachelor's degree in engineering or other science

Certificate Type: Graduate Certificate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 14.2701

Standard Occupational Classification (SOC) Code: 17-2199

About the Program

The courses in this certificate focus on teaching students to understand, analyze and enhance the performance of complex and dynamic global supply chains. The certificate is structured with three quantitative courses: EGMT 571, EGMT 572, and EGMT 573, that will provide the students with mathematical and statistical tools to analyze and evaluate the supply chain.

The remaining three courses (SYSE 520, SYSE 522, SYSE 690) allow students to understand the dynamic and complex nature of global supply chains from a systems engineering perspective. They also teach students to implement the quantitative tools learned during the first three courses to efficiently manage the supply chain. Students will evaluate and analyze diverse types of supply chains through case studies, and they will analyze and discuss the best practices in supply chains across the world.

All affiliated courses may be applied to the Master of Science in Systems Engineering (p. 294) and the Master of Science in Engineering Management (p. 276).

Admission Requirements

Degree and GPA Requirement

A bachelor's degree in an engineering discipline from an ABET-accredited college or university is required. A bachelor's degree in the sciences (physics, mathematics, computer science, etc.) may also be acceptable. Applicants with degrees in the sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor's degree as well as for any subsequent graduate-level work is required.

TOEFL Requirement

For students whose native language is not English and who do not hold a degree from a US institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum total score of 94 (internet-based). Official documents of this exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

Other Requirements

- Submission of an application
- Official, sealed college transcripts
- An essay
- Two or more letters of recommendation

Requirements

EGMT 571	Engineering Statistics	3.0
EGMT 572	Statistical Data Analysis	3.0
EGMT 573	Operations Research	3.0
SYSE 690	Modeling and Simulation	3.0
SYSE 520	Global Sustainment and Integrated Logistics	3.0
SYSE 522	Engineering Supply Chain Systems	3.0
Total Credits		18.0

Certificate in Systems Reliability Engineering

Certificate Level: Graduate

Admission Requirements: Bachelor's degree in engineering or other science

Certificate Type: Graduate Certificate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 14.2701
Standard Occupational Classification (SOC) Code: 17-2199

SYSE 524	Systems Reliability, Availability & Maintainability Analysis	3.0
Total Credits		18.0

About the Program

The courses in this certificate focus on teaching students to design for sustainability and reliability of systems during the life cycle of an operation. The first three courses will teach students the analytical tools required to perform reliability and maintainability modeling and analysis. The final three courses will focus on systems reliability, maintainability, and availability analysis (RM&A) for systems. The courses have an application to all phases of the systems engineering process, including requirements definition through systems design and development. The students will learn the process that starts with RM&A in the initial phases of development, conducting trade off analysis during the system development phase to optimize reliability and availability of the system. The students will also learn to improve the reliability and availability of a product or a system by modeling and analysis of systems reliability using probability models.

Upon completion of the courses, students will be able to understand RM&A and modeling and apply reliability models for a product or system during its life-cycle: design, production, and warranty. Additionally, students will learn to conduct trade off analysis to enhance availability and reliability of the system and to develop maintenance concepts that are cost effective and support sustainment of the system.

Admission Requirements

Degree and GPA Requirement

A bachelor's degree in an engineering discipline from an ABET-accredited college or university is required. A bachelor's degree in the sciences (physics, mathematics, computer science, etc.) may also be acceptable. Applicants with degrees in the sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor's degree as well as for any subsequent graduate-level work is required.

TOEFL Requirement

For students whose native language is not English and who do not hold a degree from a US institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum total score of 94 (internet-based). Official documents of this exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

Other Requirements

- Submission of an application
- Official, sealed college transcripts
- An essay
- Two or more letters of recommendation

Program Requirements

EGMT 571	Engineering Statistics	3.0
EGMT 572	Statistical Data Analysis	3.0
EGMT 573	Operations Research	3.0
SYSE 688	Systems Engineering Analysis	3.0
SYSE 523	Systems Reliability Engineering	3.0

The College of Medicine

Overview

Renowned for its innovative, student-centered educational programs, Drexel University College of Medicine (<http://www.drexel.edu/medicine/>) represents the consolidation of two venerable medical schools with rich and intertwined histories: Hahnemann Medical College and Woman's Medical College of Pennsylvania. Established in 1848 and 1850, respectively, they were two of the earliest medical colleges in the United States, and Woman's was the very first medical school for women.

Today, with more than 1,000 medical students, Drexel University College of Medicine is educating one in every 83 medical students in the nation. Graduate students number more than 800, and the College is the academic partner in the education of nearly 600 medical residents and fellows. There are more than 700 clinical and basic science faculty, and more than 1,700 affiliate and volunteer faculty.

Within the College of Medicine, The Graduate School of Biomedical Sciences and Professional Studies (p. 39) offers an additional 29 majors, 3 graduate minors, and 5 professional certificates.

Major

- Medicine (MD) (p. 302)

About the College of Medicine

Mission Statement

Drexel University College of Medicine excels and innovates in education, research, and delivery of compassionate care in our culture of diversity, spirited inquiry, collaboration, and opportunity.

About the College

The College of Medicine's main campus, Queen Lane, is in a suburban-like setting in the East Falls section of Philadelphia. Additional education and research facilities are located at the Center City campus. Students receive their clinical education at 25 affiliated hospitals and ambulatory sites chosen for their commitment to teaching as well as medical excellence.

The College of Medicine has established one of the largest centers for spinal cord research in the Mid-Atlantic region, and founded one of the leading centers for malaria study in the nation. Collaborative projects leveraging Drexel University's technological expertise continue to push the frontiers of nanomedicine and neuroengineering.

The multifaceted HIV/AIDS program includes an affiliated primary care and specialty practice, and extensive NIH-funded research in prevention and therapeutic interventions. Faculty physicians are highly respected in numerous other specialties, including cardiology, sports medicine and neurology. The first medical school in the country to completely integrate women's health into its curriculum, the College is the home of ELAM[®], the highly regarded Executive Leadership in Academic Medicine Program for Women.

Facilities

Queen Lane Student Activities Center

A 17,700 square-foot student activity center was completed in 2006 at the Queen Lane Campus. The Student Activities Center occupies 2 floors and houses a full line of exercise equipment, a bookstore, student government offices and flexible space for events and lectures. The facility is available to students, staff and groups.

Queen Lane Medical Simulation Center

The College opened a state-of-the-art simulation center for medical education in 2010. Part of a new 25,000 square-foot addition, the center allows students to learn in simulated operating room and patient room settings.

Clinical Education Assessment Center

Ten examination rooms with digital capture that simulate physicians' offices are linked to control and observation rooms for faculty. Students work with standardized patients to enhance their abilities in medical interviewing, physical examination skills, and patient counseling.

Multidisciplinary Laboratories

- Forty-two tables with microscopes for teaching neuroanatomy, microbiology, and pathology are available.
- Microscopes are equipped with a networked video system so that all students in a class can look at a single slide under the microscope through monitors on their lab tables or on a projection screen and can retrieve microscopic images via computer.

New College Building

The New College Building at the Center City Campus is designed for the purpose of teaching basic and clinical sciences, with auditoriums, classrooms, laboratories and offices. The lecture halls accommodate a variety of educational methodologies, spanning from the basic lecture format to the enriched laboratory setting, where courses such as Anatomy, Pathology, Microbiology, Histology and Applied Anatomic Pathology can be taught.

The Doctor of Medicine (MD) Program

About the Program

Drexel University College of Medicine's MD program trains future physicians in the science and art of medicine. At Drexel, our medical students learn to combine cutting-edge technology with the lightest level of compassion in the practice of medicine. Our supportive educational environment emphasizes collaboration and gives students a comfort level that lets them learn and thrive. Faculty members are concerned first and foremost with teaching and helping students.

Recognizing that students have different learning styles, students choose between two innovative academic curricula for their first two years of study. Both options focus on professional medical education, preparing students to pursue a career as either a generalist or specialist. Both stress problem solving, lifelong learning skills and the coordinated teaching of basic science with clinical medicine.

Drexel has implemented a new, innovative MD curriculum called **Foundations and Frontiers**, designed to create physicians for the 21st century. The curriculum instills all of the enduring qualities essential to clinical excellence while also including essential emerging competencies

such as understanding of population health, health informatics, quality and patient safety, and health care systems and financing.

Foundations and Frontiers Highlights

Foundations and Frontiers was created with input from current medical students, faculty, alumni and national medical education experts. The program builds on the College of Medicine's legacy in medical education and embraces Drexel University's reputation for innovation and collaboration.

The new curriculum is supported technologically by Drexel-developed iPad applications and a state-of-the-art simulation center and clinical education center where medical students can apply what they have learned in the classroom with hands-on training.

Other hallmarks of the distinctive Frontiers and Foundations curriculum include:

- Early and frequent clinical exposure
- Integrated basic science and clinical education
- Team learning
- Technology-enhanced education
- Cultural competence
- Community and civic engagement
- And award winning, nationally recognized Professional Formation program
- Enhanced opportunities for research and scholarly projects in basic science as well as other areas such as Women's Health, Population Health, Healthcare Economics, and Humanities

The Societies

Incoming medical students are placed into one of six learning communities, or "societies," each taking its name from a famous Philadelphia landmark: Athenaeum, Liberty Bell, Physick House, Rocky Statue, Reading Terminal, and Eakins House.

Each society is led by a faculty director and student representatives, all of whom are responsible for coordinating and planning society activities. In addition, society-associated faculty serve as advisors to small groups of medical students in the first two years of the educational program.

The society provides the framework for relationships among medical students and faculty. The society also provides a social structure for each student, giving a small-school feel while maintaining all of the advantages and amenities of a large institution.

The program helps promote a greater sense of community and connectedness among the medical students and faculty. The society serves as the core unit for a variety of valuable activities including:

- Small group learning
- A faculty advising/peer mentoring program
- Community service projects
- Activities to promote student wellness
- Social activities
- Society-based competitions culminating in the coveted "Dean's Cup"

The Foundations and Frontiers curriculum information presented is subject to revision. Last updated June 1, 2017.

For more information, including admissions details, visit the College of Medicine's MD Program (<http://drexel.edu/medicine/academics/md-program/>) web site.

Three-Phase Curriculum

Foundations and Frontiers is a four-year curriculum that has been divided into three phases. Phase One (years 1 and 2) lays the groundwork for basic and clinical science. Phase Two (year 3) allows medical students to apply their patient care knowledge and skills to a variety of clinical settings. Phase Three (year 4) focuses on advanced clinical skills and preparation for residency.

Phase 1: Foundations

The 18-month "Foundations" phase includes basic and clinical science courses that integrate multiple disciplines. Medical students also spend time in non-traditional classroom settings working in teams to apply knowledge to clinical problems. This phase of the curriculum also includes multiple experiences in our state-of-the-art simulation center working with high-fidelity mannequins and standardized patients. The basic science content begins with an introduction to cells and tissues and then proceeds into organ-based blocks with a focus on normal processes. During the second year, medical students revisit the major organ systems with a focus on abnormal processes.

Lectures, conferences, laboratory, simulation and other team-learning formats develop and extend the principles introduced in the case throughout the week.

A longitudinal practicum experience extends through the Foundations phase and exposes medical students to patients in varied community settings. It provides experiences in chronic care, service learning and inter-professional education, and is combined with a social justice and health disparities curriculum.

During four one-week blocks, medical students will be immersed in the "Frontiers" portion of the curriculum, providing cutting-edge study in such areas as healthcare informatics, population health, quality and patient safety, healthcare economics, and principles of translational research.

Phase 2: Applications

The one-year long "Applications" phase allows medical students to practice their patient care knowledge and skills in a variety of clinical settings. The year starts with participating in a two-week structured session, "*Intersession I: Transition to the Clinical Years*," which focuses on skills needed for medical students to function effectively on the wards.

During the third year, medical students rotate through clerkships in surgery, internal medicine, family medicine, pediatrics, psychiatry, neurology, ambulatory medicine, and obstetrics and gynecology. To enhance the diversity of their clinical experience, medical students work with faculty members at multiple sites in metropolitan centers, working-class neighborhoods, suburbs, inner city areas, and rural communities.

All third-year clerkships take place on Drexel's academic campuses. Assignments for third year are based on the results of a lottery system, although medical students can elect year-long assignments at our six regional campuses:

- Abington Memorial Hospital
- Allegheny General Hospital
- York Hospital

- Kaiser Permanente in Sacramento
- Monmouth Medical Center
- Crozer Chester Medical Center

Phase 3: Transitions

The "Transitions" phase focuses on advanced clinical skills and preparation for residency. The fourth year curriculum is structured within "Pathways" - an advising system that gives medical students a well-rounded educational experience and also prepares them for potential career. Medical students may choose a discipline-specific Pathway or one that provides more broad-based experiences. All medical students have a Pathway-specific advisor who works with the student to balance the structure and flexibility of their learning needs, helps prepare the student to enter postgraduate training with confidence, and works to maximize the guidance and counseling available from preceptors.

The Pathway advisors help medical students focus their preparation for graduate medical education and careers. The Pathway program also gives medical students experience in fields of interest other than the one that is likely to be their career path. Medical students take both required courses and electives in the Pathway system. Six courses are required:

- Sub-internship in a core discipline
- Pathway-specific rotation
- Emergency medicine or critical care rotation
- Transition to residency
- Residency-immersion experience

Fourth-year medical students have opportunities to complete a variety of clinical elective rotations at hospitals and sites that are not Drexel clinical affiliates, including international rotations. In addition, during the fourth year, medical students may choose to leverage the expertise of one of Drexel's other colleges by studying for a graduate certificate in one of the Frontiers content areas. Alternatively, medical students may choose to conduct a scholarly project under the direction of a faculty member.

Dual Degree Programs

MD/PhD Program

The MD/PhD program is designed for a limited number of individuals who are strongly motivated toward a career in academic medicine and medically oriented research. The program trains individuals in the fundamental clinical aspects of medicine and offers advanced training in biochemistry, microbiology and immunology, molecular and cellular biology, neuroscience and pharmacology, as well as medical engineering. Physicians with extensive research training are uniquely positioned to advance medical care and to teach at the cutting edge of medical discovery. Tuition scholarships and stipends for medical school and graduate school are provided for a limited number of students.

MD/MPH

With Drexel's School of Public Health, the College of Medicine offers a joint five-year program for highly qualified students to pursue both the MD and the Master of Public Health degrees. Students are taught to be physicians with a public-health orientation to the development, planning, delivery, and evaluation of health care programs and policies.

MD/MBA

The MD/MBA degree meets a growing demand by physicians who wish to manage corporate medical practices, hospitals, and related organizations

and contribute to the development of health policy. The joint program prepares physicians to apply management principles to individual or group practices or to move into management positions at many types of organizations. Students receive training at both the College of Medicine and at Drexel's A.A.C.S.B. -accredited LeBow College of Business. The program lets students earn both degrees in five years.

MD/Healthcare Ethics MA

Drexel medical students may enter a combined degree pathway to receive a master's degree in health care ethics through St. Joseph's University. Students spend a year in residence at St. Joseph's University, usually after their second medical school year. They receive two course credits toward the master's degree from their medical school coursework.

For additional information, visit the College's Dual Degrees (<http://www.drexelmed.edu/Home/AcademicPrograms/MDProgram/AdditionalOpportunities/DualDegree.aspx>) page.

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. The School offers multidisciplinary instruction on a full- and part-time basis at the graduate level and full-time instruction at the undergraduate level. The faculty includes individuals with engineering, physics, mathematics, biostatistics, life science, medical, and clinical specialties. Multidisciplinary and translational research is carried out through collaboration among Drexel University faculty members and with medical schools and hospitals in the Philadelphia area.

The School offers MS programs in biomedical engineering, integrated biomedical engineering and business, and biomedical science. PhD programs are offered in biomedical engineering and biomedical science. Areas of specialization available include biomaterials and tissue engineering, neuroengineering, biosensors and devices, biomedical imaging, biostatistics, genome science and bioinformatics, systems biology, biomechanics, human factors and performance engineering.

The School offers certificate programs in bioinformatics, medical product design, and tissue engineering for professionals continuing their education.

Majors

- Biomedical Engineering (MS, PhD) (p. 306)
- Biomedical Science (MS, PhD) (p. 311)
- Integrated Biomedical Engineering and Business (MS) (p. 316)

Minors

- Bioinformatics (<http://catalog.drexel.edu/graduate/schoolofbiomedicalengineeringsscienceandhealthsystems/bioinformaticsgminor/>)
- **NEW:** Pediatric Engineering

Certificates

- Bioinformatics (p. 319)
- Medical Product Design and Device Development (<http://catalog.drexel.edu/graduate/schoolofbiomedicalengineeringsscienceandhealthsystems/medicalproductdesignanddevicedevelopmentpbc/>)
- Tissue Engineering (p. 319)

About the School

The vision of the School of Biomedical Engineering, Science, and Health Systems (the School) is to accelerate its role as the University's incubator for developing cutting-edge programs that enhance the University's position as a national leader in education and research. The School is a leader at Drexel University, regionally, and nationally in research and translation of discoveries that impact human health and well-being. It engages students across Drexel's campus in a unique combination of cooperative (Co-op) and experiential learning, multi-disciplinary research, entrepreneurship and international exposure. Faculty and students within School possess a spirit of innovation that is built on a deep understanding of fundamental scientific principles; hand-on experience both in the laboratory and in service to others; and recognition of the synergistic impact that occurs through partnerships, globally and locally, with industry, academia, policymakers, clinicians and social-service providers. The School will cultivate "Renaissance Biomedical Scientists and Engineers" who adapt easily to changing technologies, environments and problems.

The School's areas of academic thrust, 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. The School's multidisciplinary programs are built around a core curriculum with research opportunities in specialized areas. The core curriculum provides the technical and analytical training students need to apply their engineering skills or knowledge of the life sciences to current problems in biology and medicine. Various units at Drexel, such as the College of Engineering, the Dornsife School of Public Health, and the College of Arts and Sciences offer courses relevant to graduate students in biomedical engineering and biomedical science.

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 Drexel's 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.

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.

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.

Program Objectives

The overall objective of the graduate programs offered by the School of Biomedical Engineering, Science, and Health Systems is to provide multidisciplinary curricula with an instructional core and research opportunities for students. Graduate biomedical engineering students are typically individuals with undergraduate degrees in engineering, physical sciences, or mathematics. The core curriculum provides the

necessary training in life and medical sciences, modeling and simulation, and biomedical engineering applications to allow students to apply their engineering skills and perspective to solve current problems in biology and medicine. Areas in which students may focus their advanced studies and research attention include biomechanics and biomaterials, cellular and tissue engineering, biomedical sensing and imaging, human factors and performance engineering, neuroengineering, and bioinformatics. Students without an academic background in engineering or physical science who wish to enter the biomedical engineering program may enroll in the Crossover Program.

The core courses in the Biomedical Science program are designed to educate life-science students in quantitative analysis, mathematical modeling, systems analysis, and fundamental computational and informatics skills. Students are then encouraged to combine their knowledge of the life sciences with their newly acquired analytical skills to focus in such areas as tissue engineering and/or bioinformatics.

An agreement with the Drexel College of Medicine allows students to spend one year taking courses at the College of Medicine and their second year at the School of Biomedical Engineering, Science and Health Systems—leading to a Master's degree in Medical Science.

The School also offers an integrated master's degree in biomedical engineering and business, a collaboration with the LeBow College of Business and the Close School of Entrepreneurship, which offers early-career engineers a tech-savvy alternative to an MBA. Through this cross-disciplinary approach, students are able to acquire the advanced knowledge and skills necessary for graduate-level research and career specialization.

Programs are revised regularly to meet industry needs. For the most up-to-date list, please visit the School of Biomedical Engineering, Science, and Health Systems Graduate Admissions web page (<http://drexel.edu/grad/programs/biomed/>).

Admission Requirements

Acceptance for graduate study at Drexel's School of Biomedical Engineering, Science and Health Systems requires a four-year bachelor's degree from an accredited institution in the United States or equivalent international institution. Regular acceptance requires a minimal cumulative grade point average of 3.0 (B) on a 4.0 scale for the last two years of undergraduate work, and for any graduate level work undertaken. Drexel's School of Biomedical Engineering, Science and Health Systems normally requires a TOEFL score of at least 260. Verbal, analytical, and quantitative scores on the GRE General Test are recommended for admission and are required for financial assistantship consideration.

The School practices a rolling admissions policy--students are able to apply at any term during the year, but students are encouraged to matriculate in the fall to ensure proper sequence of coursework.

In addition to the School's requirements, students must satisfy the requirements of the Office of Research and Graduate Studies in matters such as academic standing, thesis, examinations, and time limits.

Financial Assistance

Financial support for qualified students pursuing studies toward the MS and PhD degrees is available in the form of research assistantships, teaching assistantships, graduate assistantships, and fellowships.

Dean's Fellowships are available for outstanding applicants to the School's Master programs and are renewable depending on the student's academic performance. Fellowship applicants must be seeking full-time study only at the master's level. Other requirements include a GPA of 3.5 or better in the student's bachelor's program and submission of GRE scores. For international students, a TOEFL score of 260 or better is required. For more information regarding international applicant requirements, view the International Students Admission Information (<http://www.drexel.edu/grad/resources/international/>) page.

Calhoun Graduate Assistantships are supported by the School's Calhoun Endowment and are available to outstanding applicants to the PhD program. To be considered for a fellowship, students must submit GRE scores along with all their application materials. The application deadline is February 28 for the following academic year.

For further assistance, students should contact the Office of Graduate Admissions (<https://drexel.edu/grad/>).

All applicants will automatically be considered for departmental assistantships. There is no additional paperwork to apply. Applicants interested in graduate assistantships must submit GRE scores. These awards are based on academic merit.

About Graduate Co-op

Drexel University's long tradition in the field of experiential learning has now been extended into many of its master's programs in science, business, and engineering.

This option, called Graduate Co-op (<http://www.drexel.edu/scdc/co-op/graduate/>), provides students with the opportunity to gain work experience directly related to their career goals while earning academic credit. Students who have earned a minimum of 24.0 credits with a GPA of at least 3.0 are eligible to participate. Employment typically lasts six months, during which students enroll in a special 3.0 credit GCP course coinciding with their term of employment. Students gain work experience while earning salaries. It is important to note that the GCP program does not guarantee a job. It is a market-driven process for the candidates as well as employers. GCP provides the tools and contacts; the student must qualify for the job on the basis of merit, qualifications, and skills.

Further information on the GCP program is available at the Drexel Steinbright Career Development Center. (<http://www.drexel.edu/scdc/>)

Biomedical Engineering

Major: Biomedical Engineering

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS) or 90.0 (PhD)

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional Programs (CIP) code: 14.0501

Standard Occupational Classification (SOC) code: 17-2031

About the Program

The curriculum develops graduates who can identify and address unmet clinical, diagnostic, and healthcare needs by using their knowledge of modern theories, engineering systems, and mathematical and engineering tools. Biomedical engineers require the analytical tools and broad knowledge of modern engineering and science, fundamental

understanding of the biological or physiological system, and familiarity with recent technological breakthroughs.

Master students can choose to include a 6 months graduate co-op cycle as part of their studies. Students may also choose to enroll in a concentration in Biomedical Device Development, or specialize in biomaterials and tissue engineering, biomechanics, neuroengineering, imaging and devices or bioinformatics, or may pursue a dual-degree MS option. Graduating students work in industry in such fields as medical devices, health care, pharmaceuticals and biotechnology, continue academic careers (PhD), or continue to medical schools.

Additional Information

Natalia Broz

Associate Director for Graduate Programs

School of Biomedical Engineering, Science and Health Systems

Email: njb33@drexel.edu

Andres Kriete, PhD

Associate Director for Graduate Studies

School of Biomedical Engineering, Science and Health Systems

Email: ak3652@drexel.edu

For more information, visit the The School of Biomedical Engineering, Science, and Health Systems (<http://www.biomed.drexel.edu/>) website.

Degree Requirements (MS)

The core requirements for the master's in biomedical engineering encompass approximately 45.0 course credits (most courses carry three credits each). Students who choose the non-thesis option cannot register for thesis or research credits.

The curriculum includes room for specialization in several areas of biomedical engineering, as well as a concentration in biomedical technology development.

Core Courses

BMES 501	Medical Sciences I	3.0
BMES 502	Medical Sciences II	3.0
BMES 510	Biomedical Statistics	4.0
BMES 538	Biomedical Ethics and Law	3.0
BMES 546	Biocomputational Languages	4.0
or BMES 550	Advanced Biocomputational Languages	
BMES 672	Biosimulation I	3.0
BMES 673	Biosimulation II	3.0
BMES 864	Seminar (Must be taken 3 times)	0.0
BMES Electives - Select a minimum of 13 credits from the list below		13.0-18.0
BMES 503	Medical Sciences III	
BMES 508	Cardiovascular Engineering	
BMES 509	Entrepreneurship for Biomedical Engineering and Science	
BMES 515	Experimental Design in Biomedical Research	
BMES 517	Intermediate Biostatistics	
BMES 518	Interpretation of Biomedical Data	
BMES 524	Introduction to Biosensors	
BMES 528	Pediatric Engineering I	
BMES 529	Pediatric Engineering II	
BMES 531	Chronobioengineering I	
BMES 532	Chronobioengineering II	
BMES 534	Design Thinking for Biomedical Engineers	
BMES 535	Introduction to Product Design for Biomedical Engineers	
BMES 541	Nano and Molecular Mechanics of Biological Materials	
BMES 543	Quantitative Systems Biology	

BMES 544	Genome Information Engineering
BMES 548	Structural Bioinformatics and Drug Design
BMES 549	Genomic and Sequencing Technologies
BMES 551	Biomedical Signal Processing
BMES 588	Medical Device Development
BMES 604	Pharmacogenomics
BMES 611	Biological Control Systems I
BMES 621	Medical Imaging Systems I
BMES 622	Medical Imaging Systems II
BMES 623	Medical Imaging Systems III
BMES 631	Tissue Engineering I
BMES 632	Tissue Engineering II
BMES 641	Biomedical Mechanics I
BMES 642	Biomedical Mechanics II
BMES 651	Transport Phenomena in Living Systems I
BMES 660	Biomaterials I
BMES 661	Biomaterials II
BMES 675	Biomaterials and Tissue Engineering III
BMES 685	Experimental Methods in Neuroengineering
BMES 710	Neural Signals
BMES 711	Principles in Neuroengineering
BMES 722	Neural Aspects of Posture and Locomotion I
BMES 821	Medical Instrumentation
BMES 822	Medical Instrumentation II
BMES 825	Hospital Administration

General Electives in the fields of science, engineering, or medicine including additional BMES classes **9.0-12.0**

The sum of electives, core credits, and/or thesis credits must total 45.0 credits. Elective choices would depend upon the student's area(s) of focus or concentration but must be within the fields of science, engineering, or medicine. A concentration may substitute for elective credits. A minimum of 15 credits of BMES elective courses are required.

Thesis Option **0.0-9.0**

BMES 897	Research
BMES 898	Master's Thesis

Total Credits 45.0-62.0

* The research for the thesis may include work carried out during an internship.

Biomedical Technology Development Concentration (Optional)

Students enrolled in this concentration will develop an understanding of critical regulatory, economic, and legal issues in addition to the project management skills that facilitate the development of new medical devices and positive working relationships with intellectual property lawyers, insurance companies, and the federal government.

Core Courses

BMES 509	Entrepreneurship for Biomedical Engineering and Science	3.0
BMES 534	Design Thinking for Biomedical Engineers	3.0
BMES 538	Biomedical Ethics and Law	3.0
BMES 588	Medical Device Development	3.0
BMES 596	Clinical Practicum III	3.0
Total Credits		15.0

Biomaterials and Tissue Engineering Concentration (Optional)

This concentration is designed to provide students with advanced training in cellular and molecular biology relevant to tissue engineering and behavior of materials used in biomedical applications

Core Courses

BMES 631	Tissue Engineering I	4.0
BMES 632	Tissue Engineering II	4.0
BMES 660	Biomaterials I	4.0
BMES 661	Biomaterials II	4.0
BMES 675	Biomaterials and Tissue Engineering III	4.0
Total Credits		20.0

Bioinformatics Concentration (Optional)

This concentration emphasizes a systems engineering approach to provide a foundation in systems biology and pathology informatics. Students are provided students with hands-on experience in the application of genomic, proteomic, and other large-scale information to biomedical engineering as well as experience in advanced computational methods used in systems biology: pathway and circuitry, feedback and control, cellular automata, sets of partial differential equations, stochastic analysis, and biostatistics.

BMES 543	Quantitative Systems Biology	4.0
BMES 544	Genome Information Engineering	4.0
BMES 547	Machine Learning in Biomedical Applications	3.0
or BMES 549	Genomic and Sequencing Technologies	
BMES 551	Biomedical Signal Processing	3.0
BMES 604	Pharmacogenomics	3.0
Total Credits		17.0

Pediatric Engineering Concentration (Optional)

This concentration aims to train students: 1) to develop a fundamental understanding of childhood injury and disease, healthcare, and treatment, and 2) to apply scientific and engineering concepts, methods, and approaches to address healthcare challenges with direct relevance to pediatric patients.

BMES 528	Pediatric Engineering I	3.0
BMES 529	Pediatric Engineering II	3.0
BMES 538	Biomedical Ethics and Law	3.0
BMES 509	Entrepreneurship for Biomedical Engineering and Science	3.0
Total Credits		12.0

Sample Plan of Study (MS)**First Year**

Fall		Credits
BMES 501	Medical Sciences I	3.0
BMES 510	Biomedical Statistics	4.0
BMES 546 or 550	Biocomputational Languages Advanced Biocomputational Languages	4.0
BMES 864	Seminar	0.0
Term Credits		11.0
Winter		
BMES 502	Medical Sciences II	3.0
BMES 672	Biosimulation I	3.0
BMES 864	Seminar	0.0
BMES Elective		3.0-4.0
Term Credits		9.0-10.0
Spring		
BMES 673	Biosimulation II	3.0
BMES 538	Biomedical Ethics and Law (can be taken in any term)	3.0
BMES 864	Seminar	0.0
BMES Elective		3.0
Term Credits		9.0

Second Year

Fall		
Elective Courses and/or Thesis *	9.0-12.0	
Term Credits		9.0-12.0
Winter		
Elective Courses and/or Thesis **	7.0-12.0	
Term Credits		7.0-12.0

Total Credit: 45.0-54.0

* Can include BMES 897.

** Can include BMES 897 and BMES 898.

PhD in Biomedical Engineering Degree Requirements

To be awarded the PhD degree, students must complete 90.0 required credits and fulfill the one-year residency requirement.

The following milestones have to be satisfied during the course of the program:

- Students must successfully pass the candidacy examination.
- Students must submit a PhD dissertation proposal and successfully defend it.
- Students must write a dissertation and successfully pass final oral defense.

Post-Baccalaureate Requirements and Post-Master's Requirements

Both post-baccalaureate and post-master's students are admitted into the doctoral program in Biomedical Engineering, but have slightly differing sets of requirements.

For **post-master's students**, 45.0 of the credits that they earned toward their Master's degree may be applied toward the PhD. If coming from the Master's program in Biomedical Engineering at Drexel University, those courses they took would apply. For non-Drexel students who have completed their master's elsewhere, there may be exceptions made. If these students believe that they have covered the material of the required courses in another program, they must show evidence of such material and obtain a formal waiver of this requirement from the Graduate Advisor.

For **post-baccalaureate students**, students must complete a minimum of 90.0 credits and a research thesis. These 90.0 credits include the core courses required by Drexel's MS in Biomedical Engineering.

Core Courses

BMES 501	Medical Sciences I	3.0
BMES 502	Medical Sciences II	3.0
BMES 672	Biosimulation I	3.0
BMES 673	Biosimulation II	3.0
BMES 864	Seminar	0.0
BMES 897	Research	57.0
Additional Courses *		
BMES 510	Biomedical Statistics	4.0
BMES 538	Biomedical Ethics and Law	3.0
BMES 546	Biocomputational Languages	4.0
or BMES 550	Advanced Biocomputational Languages	
BMES Electives		10.0
Total Credits		90.0

* In addition to the required courses, post-baccalaureate PhD students must take at least 21.0 more credits in courses approved by their academic advisor. The balance may be taken as research and/or thesis/dissertation credits.

For post-master's students, 45.0 of the credits that they earned toward their Master's degree may be applied toward the PhD. If coming from the Master's program in Biomedical Engineering at Drexel University, those courses they took would apply. For non-Drexel students who have completed their master's elsewhere, there may be exceptions made. If these students believe that they have covered the material of the required courses in another program, they must show evidence of such material and obtain a formal waiver of this requirement from the Graduate Advisor.

In addition to the required courses, post-baccalaureate PhD students must take at least 21.0 more credits in courses. This balance may be taken as research and/or thesis/dissertation credits.

Thesis Advisor/Plan of Study

During the first year of the program all Doctoral students are required to identify a Thesis Advisor and complete a plan of study. The student's Thesis Advisor and the Graduate Advisor will guide the student in developing this plan of study. Each plan of study is individually tailored to the student, and includes a combination of research and course credits most beneficial and complimentary to the student's chosen thesis topic.

The Candidacy Examination

Doctoral students must successfully pass a candidacy examination, preferably at the end of the first year of their study.

The overall objective of the candidacy examination is to test the student's basic knowledge and preparedness to proceed toward a PhD in Biomedical Engineering. After a satisfactory performance on the candidacy examination the student is awarded the Doctoral Candidate status. Candidates must submit a Thesis Proposal by the end of the second year and defend it in an oral presentation to a committee of five faculty members.

Thesis Defense

After the student has successfully completed all the necessary research and composed a thesis manuscript, in accordance with the guidelines specified by the Office of Research and Graduate Studies, he or she then must formally defend their thesis. A formal thesis defense includes an oral presentation of research accomplishments in front of a committee of faculty members. The thesis defense is open to the general public.

Prospective PhD students are welcome to contact the school to discuss their research interests. For a more detailed description of the PhD requirements, please visit the School of Biomedical Engineering and Health Systems' Biomedical Engineering (<http://drexel.edu/biomed/>) web site.

Sample Plan of Study

Term 1		Credits
BMES 501	Medical Sciences I	3.0
BMES 510	Biomedical Statistics	4.0
BMES 546 or 550	Biocomputational Languages Advanced Biocomputational Languages	4.0
BMES 864	Seminar	0.0
	Term Credits	11.0
Term 2		
BMES 502	Medical Sciences II	3.0
BMES 672	Biosimulation I	3.0

BMES 864	Seminar	0.0
BMES Elective		3.0
	Term Credits	9.0
Term 3		
BMES 538	Biomedical Ethics and Law	3.0
BMES 673	Biosimulation II	3.0
BMES 864	Seminar	0.0
BMES Elective		3.0
	Term Credits	9.0
Term 4		
BMES 897	Research	5.0
BMES Elective		4.0
	Term Credits	9.0
Term 5		
BMES 897	Research	9.0
	Term Credits	9.0
Term 6		
BMES 897	Research	9.0
	Term Credits	9.0
Term 7		
BMES 897	Research	9.0
	Term Credits	9.0
Term 8		
BMES 897	Research	9.0
	Term Credits	9.0
Term 9		
BMES 897	Research	9.0
	Term Credits	9.0
Term 10		
BMES 897	Research	7.0
	Term Credits	7.0
Total Credit: 90.0		

Areas of Specialization

Areas of specialization can be pursued within the Biomedical Engineering graduate program. Students can plan their own focus area that will give them strength in a particular sub-discipline. Alternatively, the student can specialize by conducting research and writing a thesis.

Biomaterials and Tissue Engineering

Biomaterials and tissue engineering is designed to provide students with advanced training in cellular and molecular biology relevant to tissue engineering and behavior of materials used in biomedical applications.

Biomedical Technology Development

Students pursuing the concentration will develop an understanding of critical regulatory, economic, and legal issues in addition to the project management skills that facilitate the development of new medical devices and positive working relationships with intellectual property lawyers, insurance companies, and the federal government. (This is a formal concentration with specific course requirements.)

Bioinformatics

Bioinformatics emphasizes a systems engineering approach to provide a foundation in systems biology and pathology informatics. Students are provided with hands-on experience in the application of genomic, proteomic, and other large-scale information to biomedical engineering as well as experience in advanced computational methods used in systems biology: pathway and circuitry, feedback and control, cellular automata, sets of partial differential equations, stochastic analysis, and biostatistics.

Biomechanics and Human Performance Engineering

Biomechanics and human performance engineering is designed to meet two objectives: to acquaint students with the responses of biological tissues to mechanical loads as well as with the mechanical properties of living systems and to provide students with the background and skills needed to create work and living environments which improve human health and enhance performance. Biomechanics and human performance also involves the study of orthopedic appliances and the broader aspect of rehabilitation engineering and the management of disability.

Biomedical Systems and Imaging

Biomedical systems and 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 well biomedical instrumentation and product development.

Neuroengineering

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.

Biomedical Engineering, Science and Health Systems Faculty

Fred D. Allen, PhD (*University of Pennsylvania*) Associate Dean for Undergraduate Education. Teaching 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. 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*) Senior Associate Dean, Associate Dean for Research. 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.

Paul Brandt-Rauf, MD, DrPH (*Columbia University*) Dean. Distinguished University Professor. Environmental health, particularly the molecular biology and molecular epidemiology of environmental carcinogenesis, and protein engineering for the development of novel peptide therapies for the treatment and prevention of cancer.

Donald Buerk, PhD (*Northwestern University*). Research Professor. Biotechnology, physiology, systems biology, blood flow, microcirculation, nitric oxide, oxygen transport

Jamie Dougherty, PhD (*Drexel University*). Associate Teaching Professor. Brain-computer interface, neural encoding, electrophysiological signal acquisition and processing.

Lin Han, PhD (*Massachusetts Institute of Technology*). Associate 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.

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

Andres Kriete, PhD (*University in Bremen Germany*) Associate Dean of Academic Affairs. Teaching Professor. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Steven Kurtz, PhD (*Cornell University*). Part-time 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.

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.

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.

Christopher Rodell, PhD (*University of Pennsylvania*). Assistant Professor. Biomaterials, supramolecular chemistry, and drug delivery. Therapeutic applications including the etiology of disease, organ injury, cardiovascular engineering, immune engineering, and biomedical imaging.

Ahmet Sacan, PhD (*Middle East Technical University*). Associate Teaching 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*). Teaching Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

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 (fNIRS) and electroencephalography (EEG) and methodology and research design.

Adrian C. Shieh, PhD (*Rice University*). Associate Teaching 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*). Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (*Drexel University*). Associate 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

Bhandawat Vikas, PhD (*Johns Hopkins School of Medicine*). Associate Professor. Sensorimotor integration, whole-cell patch clamp and imaging in behaving animals, optogenetics, neuromechanics, locomotion.

Bhandawat Vikas Associate Professor. Sensorimotor integration, whole-cell patch clamp and imaging in behaving animals, optogenetics, neuromechanics, locomotion

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

Dov Jaron, PhD (*University of Pennsylvania*) *Calhoun Distinguished Professor of Engineering in Medicine*. Professor Emeritus. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Rahamim Seliktar, PhD (*University of Strathclyde, Glasgow*). Professor Emeritus. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Hun H. Sun, PhD (*Cornell University*). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Biomedical Science

Major: Biomedical Science

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS) or 90.0 (PhD)

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional Programs (CIP) code: 26.0102

Standard Occupational Classification (SOC) code: 19-1042

About the Program

The Biomedical Science program at the School of Biomedical Engineering, Science and Health Systems applies fundamental biological research, analysis and technology to human health. The program educates students whose undergraduate education is in basic life sciences (e.g., biology) or paramedical disciplines in quantitative data analysis, mathematical modeling, systems analysis and informatics.

For students entering with degrees in physics, mathematics, and/or computer science, the School, in close collaboration with the Department of Biology, provides the coursework needed to acquire proficiency in the life sciences.

Master students can choose to include a 6 months co-op cycle as part of their studies. Students may also choose to enroll in concentrations such as biomedical technology development, biomaterials and tissue engineering, or bioinformatics. They can also specialize in neuroengineering, biomechanics or imaging and devices. Students who graduate with a master's degree from the biomedical science program often continue clinical training in medicine, dentistry, or veterinary medicine; pursue further graduate study toward the PhD degree; or work in industry in such fields as health care, pharmaceuticals, biotechnology, medical devices, etc.

The Biomedical Science program has an articulation with Intensive Medical Sciences (IMS) program at the Drexel College of Medicine, which can be pursued after taking one year of required classes. The IMS program is a rigorous one-year graduate program designed to help students develop strong academic portfolios and become attractive candidates for medical school.

Additional Information

Natalia Broz

Associate Director for Graduate Programs
School of Biomedical Engineering, Science and Health Systems
Email: njb33@drexel.edu

Andres Kriete, PhD

Associate Dean for Academic Affairs
School of Biomedical Engineering, Science and Health Systems
Email: ak3652@drexel.edu

For more information, visit the The School of Biomedical Engineering, Science, and Health Systems (<https://drexel.edu/biomed/>) website.

Master of Science in Biomedical Science Degree Requirements

The core requirements for the master's in biomedical science encompass approximately 45.0 course credits (most courses carry three credits each). Students who choose the non-thesis option cannot register for thesis or research credits.

The curriculum includes room for specialization in several areas in biomedical engineering, as well as concentrations in biomaterials and tissue engineering, bioinformatics and biomedical technology development.

Concentrations

Three concentrations are available:

- **Biomaterials and Tissue Engineering**

Biomaterials and tissue engineering is designed to provide students with advanced training in cellular and molecular biology relevant to tissue engineering and behavior of materials used in biomedical applications.

- **Bioinformatics**

This specialization emphasized a systems engineering approach to provide a foundation in systems biology and pathology informatics. Students are provided with hands-on experience in the application of genomic, proteomic, and other large-scale information to biomedical engineering as well as experience in advanced computational methods used in systems biology: pathway and circuitry, feedback and control, machine learning, stochastic analysis, and biostatistics.

- **Biomedical Technology Development**

This concentration area aims to provide engineers with the comprehensive education and training necessary to succeed in careers in business, industry, non-profit organizations, and government agencies involving biomedical technology development.

Required Courses

BMES 505	Mathematics for Biomedical Sciences I	3.0
BMES 506	Mathematics for Biomedical Sciences II	3.0
BMES 507	Mathematics for Biomedical Sciences III	3.0
BMES 510	Biomedical Statistics	4.0
BMES 511	Principles of Systems Analysis Applied to Biomedicine I	3.0
BMES 512	Principles of Systems Analysis Applied to Biomedicine II	3.0-4.0
or BMES 543	Quantitative Systems Biology	
or BMES 611	Biological Control Systems I	
BMES 515	Experimental Design in Biomedical Research	4.0
BMES 538	Biomedical Ethics and Law	3.0
BMES 546	Biocomputational Languages	4.0
or BMES 550	Advanced Biocomputational Languages	

BMES 864	Seminar (Must be taken 3 times)	0.0
----------	---------------------------------	-----

BMES Electives - Select a minimum of 9.0 credits from the list below	9.0-15.0
---	-----------------

BMES 508	Cardiovascular Engineering
BMES 509	Entrepreneurship for Biomedical Engineering and Science
BMES 517	Intermediate Biostatistics
BMES 518	Interpretation of Biomedical Data
BMES 524	Introduction to Biosensors
BMES 525	Advanced Biosensors
BMES 528	Pediatric Engineering I
BMES 529	Pediatric Engineering II
BMES 531	Chronobioengineering I
BMES 532	Chronobioengineering II
BMES 534	Design Thinking for Biomedical Engineers
BMES 535	Introduction to Product Design for Biomedical Engineers
BMES 541	Nano and Molecular Mechanics of Biological Materials
BMES 543	Quantitative Systems Biology
BMES 544	Genome Information Engineering
BMES 547	Machine Learning in Biomedical Applications
BMES 548	Structural Bioinformatics and Drug Design
BMES 549	Genomic and Sequencing Technologies
BMES 551	Biomedical Signal Processing
BMES 588	Medical Device Development
BMES 604	Pharmacogenomics
BMES 621	Medical Imaging Systems I
BMES 622	Medical Imaging Systems II
BMES 623	Medical Imaging Systems III
BMES 631	Tissue Engineering I
BMES 632	Tissue Engineering II
BMES 641	Biomedical Mechanics I
BMES 642	Biomedical Mechanics II
BMES 651	Transport Phenomena in Living Systems I
BMES 660	Biomaterials I
BMES 661	Biomaterials II
BMES 672	Biosimulation I
BMES 673	Biosimulation II
BMES 685	Experimental Methods in Neuroengineering
BMES 710	Neural Signals
BMES 711	Principles in Neuroengineering
BMES 722	Neural Aspects of Posture and Locomotion I
BMES 821	Medical Instrumentation
BMES 822	Medical Instrumentation II
BMES 823	Medical Instrument Laboratory
BMES 825	Hospital Administration

General Electives in the fields of science, engineering, or medicine including additional BMES classes	6.0-12.0
---	-----------------

The sum of electives, core credits, and/or thesis credits must total 45.0 credits. Elective choices would depend upon the student's area(s) of focus or concentration but must be within the fields of science, engineering, or medicine. A concentration may substitute for elective credits. A minimum of 15 credits of BMES elective courses are required.

Thesis	0.0-9.0
---------------	----------------

BMES 897	Research
BMES 898	Master's Thesis

Total Credits	45.0-67.0
---------------	-----------

Biomedical Technology Development Concentration (Optional)

Students enrolled in this concentration will develop an understanding of critical regulatory, economic, and legal issues in addition to the project management skills that facilitate the development of new medical devices and positive working relationships with intellectual property lawyers, insurance companies, and the federal government.

BMES 509	Entrepreneurship for Biomedical Engineering and Science	3.0
BMES 534	Design Thinking for Biomedical Engineers	3.0
BMES 538	Biomedical Ethics and Law	3.0
BMES 588	Medical Device Development	3.0
BMES 596	Clinical Practicum III	3.0
Total Credits		15.0

Biomaterials and Tissue Engineering Concentration (Optional)

This concentration is designed to provide students with advanced training in cellular and molecular biology relevant to tissue engineering and behavior of materials used in biomedical applications

BMES 631	Tissue Engineering I	4.0
BMES 632	Tissue Engineering II	4.0
BMES 660	Biomaterials I	4.0
BMES 661	Biomaterials II	4.0
BMES 675	Biomaterials and Tissue Engineering III	4.0
Total Credits		20.0

Bioinformatics Concentration (Optional)

This concentration emphasizes a systems engineering approach to provide a foundation in systems biology and pathology informatics. Students are provided students with hands-on experience in the application of genomic, proteomic, and other large-scale information to biomedical engineering as well as experience in advanced computational methods used in systems biology: pathway and circuitry, feedback and control, cellular automata, sets of partial differential equations, stochastic analysis, and biostatistics.

BMES 543	Quantitative Systems Biology	4.0
BMES 544	Genome Information Engineering	4.0
BMES 551	Biomedical Signal Processing	3.0
BMES 604	Pharmacogenomics	3.0
BMES 547	Machine Learning in Biomedical Applications	3.0
or BMES 549	Genomic and Sequencing Technologies	
Total Credits		17.0

Pediatric Engineering Concentration (Optional)

This concentration aims to train students: 1) to develop a fundamental understanding of childhood injury and disease, healthcare, and treatment, and 2) to apply scientific and engineering concepts, methods, and approaches to address healthcare challenges with direct relevance to pediatric patients.

BMES 528	Pediatric Engineering I	3.0
BMES 529	Pediatric Engineering II	3.0
BMES 538	Biomedical Ethics and Law	3.0
BMES 509	Entrepreneurship for Biomedical Engineering and Science	3.0
Total Credits		12.0

Sample Plan of Study (MS)

First Year		
Fall		Credits
BMES 505	Mathematics for Biomedical Sciences I	3.0
BMES 510	Biomedical Statistics	4.0
BMES 546	Biocomputational Languages	4.0
or 550	Advanced Biocomputational Languages	
BMES 864	Seminar	0.0
Term Credits		11.0
Winter		

BMES 506	Mathematics for Biomedical Sciences II	3.0
BMES 511	Principles of Systems Analysis Applied to Biomedicine I	3.0
BMES 515	Experimental Design in Biomedical Research	4.0
BMES 864	Seminar	0.0
Term Credits		10.0

Spring

BMES 507	Mathematics for Biomedical Sciences III	3.0
BMES 538	Biomedical Ethics and Law	3.0
BMES 864	Seminar	0.0
Choose one of the following courses		3.0

BMES 512	Principles of Systems Analysis Applied to Biomedicine II
BMES 543	Quantitative Systems Biology
BMES 611	Biological Control Systems I

Term Credits		9.0
--------------	--	-----

Second Year

Fall

Elective Courses and/or Research*	9.0-12.0	
Term Credits		9.0-12.0

Winter

Elective Courses and/or Thesis**	6.0-9.0	
Term Credits		6.0-9.0

Total Credit: 45.0-51.0

* Can include BMES 897.

** Can include BMES 897 and BMES 898.

PhD in Biomedical Science Degree Requirements

Students with training in natural science or engineering, as well as individuals with academic or professional degrees in the medical science disciplines will be considered for admission to the doctoral program.

To be awarded the PhD degree, students must complete 90.0 required credits and fulfill a one-year residency requirement.

The following milestones have to be satisfied during the course of the program:

- Students must successfully pass the candidacy examination.
- Students must submit a PhD dissertation proposal and successfully defend it.
- Students must write a dissertation and successfully pass final oral defense.

Post-Baccalaureate Requirements and Post-Master's Requirements

Both post-baccalaureate and post-master's students are admitted into the doctoral program in Biomedical Science, but have slightly differing sets of requirements.

For **post-master's students**, 45.0 of the credits that they earned toward their Master's degree may be applied toward the PhD. If coming from the Master's program in Biomedical Science at the School of Biomedical Engineering, those courses they took would apply.

For **post-baccalaureate students**, students must complete a minimum of 90.0 credits and a research thesis. These 90.0 credits include the core courses required by Drexel's MS in Biomedical Science.

In addition to the required courses, post-baccalaureate PhD students must take at least 21.0 more credits in courses. This balance may be taken as research and/or thesis/dissertation credits.

Thesis Advisor/Plan of Study

During the first year of the program all Doctoral students are required to identify a Thesis Advisor and complete a plan of study. The student's Thesis Advisor and the Graduate Advisor will guide the student in developing this plan of study. Each plan of study is individually tailored to the student, and includes a combination of research and course credits most beneficial and complimentary to the student's chosen thesis topic.

The Candidacy Examination

Doctoral students must successfully pass a candidacy examination, preferably at the end of the first year of their study.

The overall objective of the candidacy examination is to test the student's basic knowledge and preparedness to proceed toward a PhD in Biomedical Science. After a satisfactory performance on the candidacy examination the student is awarded the Doctoral Candidate status. Candidates must submit a Thesis Proposal by the end of the second year and defend it in an oral presentation to a committee of five faculty members.

Thesis Defense

After the student has successfully completed all the necessary research and composed a thesis manuscript, in accordance with the guidelines specified by the Office of Research and Graduate Studies, he or she then must formally defend their thesis. A formal thesis defense includes an oral presentation of research accomplishments in front of a committee of faculty members. The thesis defense is open to the general public.

Prospective PhD students are welcome to contact the school to discuss their research interests. For a more detailed description of the PhD requirements, please visit the School of Biomedical Engineering and Health Systems' Biomedical Science (<http://drexel.edu/biomed/>) web site.

For more information, visit the School's web site and click on Graduate Programs (<http://drexel.edu/biomed/academics/graduate-programs/>).

Intensive Medical Sciences Pathway to the MS in Biomedical Science

The School of Biomedical Engineering, Science and Health Systems collaborates with the Drexel College of Medicine, specifically with the Intensive Medical Sciences program (IMS), to offer a unique pathway to a Masters in Biomedical Science degree. Students take one year of studies in the MS Biomedical Science program and another year in the IMS program (described below). This involves completing the core sequence and a thesis or taking a non-thesis option with additional coursework.

Intensive Medical Sciences Program Curriculum

The IMS curriculum involves a full-time commitment to rigorous coursework with strong academic requirements. Six major medical school equivalent courses are taken over two semesters. These include Medical Biochemistry, Medical Physiology, Medical Microanatomy, Medical Immunology, Medical Neuroanatomy, and Medical Nutrition. The courses are taught by the medical school faculty and students are guided by advisors when completing their medical school applications.

In addition to rigorous science courses, students also take a medical ethics course in the fall semester, followed by a professionalism course in the spring. The campuses are approximately five miles apart, and a University shuttle provides free transportation between the two.

Additionally, course conferences and laboratory components for IMS students are conducted at the Health Sciences Campus where the program is based. The IMS curriculum allows exposure to both medical school lectures and individual attention from medical school professors in small group conferences.

For more information, visit Drexel's College of Medicine's Intensive Medical Sciences program (<https://drexel.edu/medicine/academics/graduate-school/intensive-medical-sciences/>) web page.

Biomedical Engineering, Science and Health Systems Faculty

Fred D. Allen, PhD (*University of Pennsylvania*) Associate Dean for Undergraduate Education. Teaching 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. 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*) Senior Associate Dean, Associate Dean for Research. 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.

Paul Brandt-Rauf, MD, DrPH (*Columbia University*) Dean. Distinguished University Professor. Environmental health, particularly the molecular biology and molecular epidemiology of environmental carcinogenesis, and protein engineering for the development of novel peptide therapies for the treatment and prevention of cancer.

Donald Buerk, PhD (*Northwestern University*). Research Professor. Biotechnology, physiology, systems biology, blood flow, microcirculation, nitric oxide, oxygen transport

Jamie Dougherty, PhD (*Drexel University*). Associate Teaching Professor. Brain-computer interface, neural encoding, electrophysiological signal acquisition and processing.

Lin Han, PhD (*Massachusetts Institute of Technology*). Associate 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.

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

Andres Kriete, PhD (*University in Bremen Germany*) Associate Dean of Academic Affairs. Teaching Professor. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Steven Kurtz, PhD (*Cornell University*). Part-time 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.

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.

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.

Christopher Rodell, PhD (*University of Pennsylvania*). Assistant Professor. Biomaterials, supramolecular chemistry, and drug delivery. Therapeutic applications including the etiology of disease, organ injury, cardiovascular engineering, immune engineering, and biomedical imaging.

Ahmet Sacan, PhD (*Middle East Technical University*). Associate Teaching 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*). Teaching Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

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 (fNIRS) and electroencephalography (EEG) and methodology and research design.

Adrian C. Shieh, PhD (*Rice University*). Associate Teaching 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*). Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (*Drexel University*). Associate 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

Bhandawat Vikas, PhD (*Johns Hopkins School of Medicine*). Associate Professor. Sensorimotor integration, whole-cell patch clamp and imaging in behaving animals, optogenetics, neuromechanics, locomotion.

Bhandawat Vikas Associate Professor. Sensorimotor integration, whole-cell patch clamp and imaging in behaving animals, optogenetics, neuromechanics, locomotion

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

Dov Jaron, PhD (*University of Pennsylvania*) *Calhoun Distinguished Professor of Engineering in Medicine*. Professor Emeritus. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Rahamim Seliktar, PhD (*University of Strathclyde, Glasgow*). Professor Emeritus. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Hun H. Sun, PhD (*Cornell University*). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Integrated Biomedical Engineering and Business

Major: Integrated Biomedical Engineering and Business
Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 46.0

Co-op Option: Available for full-time on-campus master's-level students

Classification of Instructional Programs (CIP) code: 14.0501

Standard Occupational Classification (SOC) code: 17-2031

About the Program

The Master of Science in Integrated Biomedical Engineering and Business is designed for engineers pursuing Business/Management oriented careers in Biomedical Engineering. The program is open for students with previous undergraduate degrees in an engineering discipline. The program provides participants with a biomedical engineering training, but combines it with a multifaceted and transferable skill set of a manager and technology entrepreneur. Participants will complete specific courses and have experiences that promote the development of their business skills in terms of management, finance, leadership, communications and marketing skills, thus helping to ensure graduates' professional success.

In addition, the program requires a minimum of 46.0 quarter credits (40.0 credits in class; 3.0 or 6.0 co-op and/or 3.0-6.0 elective credits). It is a non-thesis program and can be completed in 1.5 years as a full time student, or it can be taken on a part-time basis.

Additional Information

Natalia Broz

Associate Director for Graduate Programs

School of Biomedical Engineering, Science and Health Systems

Email: njb33@drexel.edu

Andres Kriete, PhD

Associate Dean for Academic Affairs

School of Biomedical Engineering, Science and Health Systems

Email: ak3652@drexel.edu

For more information, visit the The School of Biomedical Engineering, Science, and Health Systems (<https://drexel.edu/biomed/>) website.

Admission Requirements

Acceptance into the MS in Integrated Biomedical Engineering and Business program requires a four-year bachelor's degree in engineering from a regionally accredited institution in the United States or an

equivalent international institution. Regular acceptance typically requires a minimum cumulative grade point average of 3.0 for the last two years of undergraduate work. The average for any graduate work must be at least 3.0.

Applicants must also fulfill the following requirements for consideration:

- # Official transcripts from all colleges and universities attended;
- # Official test scores from Graduate Record Examination (GRE);
- # References from at least two instructors or professionals;
- # Essay and Resume

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL). An evaluation by World Education Services (WES) is required for transcripts from institutions outside the United States.

Online applications are accepted all year round, but all admitted students initiate their studies in the following fall term. Students are encouraged to apply no later than July 1 for consideration for admission the following fall term. Students may defer admission by one year.

Program Contact Information:

For questions about how to apply to the program, please contact:

Carolyn Riley

Associate Director of Professional Programs and Graduate Advising
School of Biomedical Engineering, Science and Health Systems
Email: cr63@drexel.edu

Andres Kreite, PhD

Associate Dean for Academic Operations

School of Biomedical Engineering, Science and Health Systems
Email: ak3652@drexel.edu

Degree Requirements

Required Biomedical Engineering Core

BMES 501	Medical Sciences I	3.0
BMES 510	Biomedical Statistics	4.0
BMES 511	Principles of Systems Analysis Applied to Biomedicine I	3.0
BMES 534	Design Thinking for Biomedical Engineers	3.0
BMES 538	Biomedical Ethics and Law	3.0
BMES 588	Medical Device Development	3.0

Required Business Classes

BUSN 501	Measuring and Maximizing Financial Performance	3.0
BUSN 502	Essentials of Economics	3.0
MGMT 601	Managing the Total Enterprise	3.0
MKTG 601	Marketing Strategy & Planning	3.0
ORGB 625	Leadership and Professional Development	3.0

Required Entrepreneurial Classes

BMES 509	Entrepreneurship for Biomedical Engineering and Science	3.0
ENTP 540	Methods of Entrepreneurship	3.0

Biomedical Engineering Elective Courses (Choose 6-10 credits) **6.0-10.0**

BMES 604	Pharmacogenomics	
BMES 631	Tissue Engineering I	
BMES 641	Biomedical Mechanics I	
BMES 660	Biomaterials I	
BMES 710	Neural Signals	
BMES 821	Medical Instrumentation	

BMES 825	Hospital Administration	
BMES 1799	Independent Study in BMES	
Total Credits		46.0-50.0

Sample Plan of Study

First Year

Fall		Credits
BMES 501	Medical Sciences I	3.0
BMES 510	Biomedical Statistics	4.0
MGMT 601	Managing the Total Enterprise	3.0
Term Credits		10.0

Winter		Credits
BMES 511	Principles of Systems Analysis Applied to Biomedicine I	3.0
BMES 534	Design Thinking for Biomedical Engineers	3.0
BUSN 501	Measuring and Maximizing Financial Performance	3.0
Term Credits		9.0

Spring		Credits
BMES 538	Biomedical Ethics and Law	3.0
BMES 588	Medical Device Development	3.0
BUSN 502	Essentials of Economics	3.0
Term Credits		9.0

Summer		Credits
BMES 1799,	Independent Study in BMES	3.0-6.0
COOP 501,	Co-op Experience for Master's Degree Students	
or COOP 601	Advanced Co-op Guidance for Master's Degree Students	
Term Credits		3.0-6.0

Second Year		Credits
Fall		
BMES 509	Entrepreneurship for Biomedical Engineering and Science	3.0
ORGB 625	Leadership and Professional Development	3.0
BMES Elective / Specialization Course (Choose One)		3.0-4.0
BMES 631	Tissue Engineering I	
BMES 641	Biomedical Mechanics I	
BMES 660	Biomaterials I	
BMES 821	Medical Instrumentation	
Term Credits		9.0-10.0
Winter		
ENTP 540	Methods of Entrepreneurship	3.0
MKTG 601	Marketing Strategy & Planning	3.0
Term Credits		6.0

Total Credit: 46.0-50.0

First Year		Credits
Fall		
BMES 501	Medical Sciences I	3.0
BMES 510	Biomedical Statistics	4.0
MGMT 601	Managing the Total Enterprise	3.0
Term Credits		10.0
Winter		
BMES 511	Principles of Systems Analysis Applied to Biomedicine I	3.0
BMES 534	Design Thinking for Biomedical Engineers	3.0
BUSN 501	Measuring and Maximizing Financial Performance	3.0
Term Credits		9.0
Spring		
BMES 538	Biomedical Ethics and Law	3.0
BMES 588	Medical Device Development	3.0
BUSN 502	Essentials of Economics	3.0
Term Credits		9.0
Summer		

COOP 501	Co-op Experience for Master's Degree Students	0.0
Term Credits		0.0

Second Year

Fall		Credits
BMES 1799	Independent Study in BMES	3.0
Term Credits		3.0

Winter		Credits
ENTP 540	Methods of Entrepreneurship	3.0
MKTG 601	Marketing Strategy & Planning	3.0
BMES Elective / Specialization Course (Choose One)		3.0
BMES 604	Pharmacogenomics	
BMES 710	Neural Signals	
BMES 825	Hospital Administration	
Term Credits		9.0

Spring		Credits
BMES 509	Entrepreneurship for Biomedical Engineering and Science	3.0
ORGB 625	Leadership and Professional Development	3.0
Term Credits		6.0

Total Credit: 46.0

Biomedical Engineering, Science and Health Systems Faculty

Fred D. Allen, PhD (*University of Pennsylvania*) Associate Dean for Undergraduate Education. Teaching 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. 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*) Senior Associate Dean, Associate Dean for Research. 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.

Paul Brandt-Rauf, MD, DrPH (*Columbia University*) Dean. Distinguished University Professor. Environmental health, particularly the molecular biology and molecular epidemiology of environmental carcinogenesis, and protein engineering for the development of novel peptide therapies for the treatment and prevention of cancer.

Donald Buerk, PhD (*Northwestern University*). Research Professor. Biotechnology, physiology, systems biology, blood flow, microcirculation, nitric oxide, oxygen transport

Jamie Dougherty, PhD (*Drexel University*). Associate Teaching Professor. Brain-computer interface, neural encoding, electrophysiological signal acquisition and processing.

Lin Han, PhD (*Massachusetts Institute of Technology*). Associate 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.

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

Andres Kriete, PhD (*University in Bremen Germany*) Associate Dean of Academic Affairs. Teaching Professor. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Steven Kurtz, PhD (*Cornell University*). Part-time 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.

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.

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.

Christopher Rodell, PhD (*University of Pennsylvania*). Assistant Professor. Biomaterials, supramolecular chemistry, and drug delivery. Therapeutic applications including the etiology of disease, organ injury, cardiovascular engineering, immune engineering, and biomedical imaging.

Ahmet Sacan, PhD (*Middle East Technical University*). Associate Teaching 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*). Teaching Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

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 (fNIRS) and electroencephalography (EEG) and methodology and research design.

Adrian C. Shieh, PhD (*Rice University*). Associate Teaching 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*). Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (*Drexel University*). Associate 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

Bhandawat Vikas, PhD (*Johns Hopkins School of Medicine*). Associate Professor. Sensorimotor integration, whole-cell patch clamp and imaging in behaving animals, optogenetics, neuromechanics, locomotion.

Bhandawat Vikas Associate Professor. Sensorimotor integration, whole-cell patch clamp and imaging in behaving animals, optogenetics, neuromechanics, locomotion

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

Dov Jaron, PhD (*University of Pennsylvania*) *Calhoun Distinguished Professor of Engineering in Medicine*. Professor Emeritus. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Rahamim Seliktar, PhD (*University of Strathclyde, Glasgow*). Professor Emeritus. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Hun H. Sun, PhD (*Cornell University*). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Advanced Certificate in Bioinformatics

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 14.0

Instructional Delivery: Campus

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 26.1103

Standard Occupational Classification (SOC) Code: 15-1111

About the Program

The certificate in bioinformatics program emphasizes a systems engineering approach to provide a foundation in systems biology and pathology informatics. Students are provided with hands-on experience in the application of genomic, proteomic, and other large-scale information to biomedical engineering as well as experience in advanced computational methods used in systems biology: pathway and circuitry, feedback and control, machine learning, and biostatistics.

Required Courses

BMES 546	Biocomputational Languages	4.0
or BMES 550	Advanced Biocomputational Languages	
BMES 544	Genome Information Engineering	4.0
Select Two of the Following Electives		6.0-9.0
BMES 543	Quantitative Systems Biology	
BMES 548	Structural Bioinformatics and Drug Design	
BMES 547	Machine Learning in Biomedical Applications	
BMES 545	Biosystems Modeling	
BMES 549	Genomic and Sequencing Technologies	
BMES 551	Biomedical Signal Processing	
BMES 604	Pharmacogenomics	

Total Credits

14.0-17.0

Advanced Certificate in Tissue Engineering

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Campus

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 14.0501

Standard Occupational Classification (SOC) Code: 17-2031

About the Program

The certificate in tissue engineering is designed to provide advanced training in cellular and molecular biology relevant to tissue engineering and behavior of materials used in biomedical applications.

Required Courses

BMES 631	Tissue Engineering I	4.0
BMES 632	Tissue Engineering II	4.0
BMES 660	Biomaterials I	4.0
Total Credits		12.0

The School of Education

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. The School's goal is to improve human understanding through programs and activities that emphasize creative uses of human effort, technology, leadership, and problem solving.

The school offers an extensive and comprehensive array of diverse graduate, doctoral, and certificate programs that encompass all aspects of the educational field. Students graduate from Drexel prepared for successful careers in a variety of non-traditional fields of education through master's degree programs such as Applied Behavior Analysis, Creativity and Innovation, Educational Administration, Education Improvement and Transformation, Global and International Education, Higher Education, Learning Technologies, Mathematics Learning and Teaching, and Sport Coaching Leadership .

The School also offers Pennsylvania Department of Education-approved programs to certify students who already hold bachelor's degrees to be teachers in elementary education (grades PreK-4 with an emphasis on STEM subjects), secondary education (in biology, chemistry, earth and space science, English, general science, mathematics, physics or social studies), and K-12 (instructional technology specialist). Special education, teaching English as a second language, reading specialist, Wilson Language[®] Level 1, principal and superintendent certifications are also available. Individuals who complete the minimum requirements receive a PA Instructional I teaching certificate and have the option to continue coursework to fulfill requirements in the graduate Science of Instruction or teaching learning and curriculum (initial certification track) master's degree programs.

Other master's degree programs are also available to those who already have teacher certification and/or do not wish to obtain a teaching certificate. Students who would like to pursue the teaching English as a second language, reading specialist special education, principal or superintendent certification must already have Pennsylvania Instructional I certification, satisfactory professional school experience on a state-issued certificate appropriate for the assignment, or appropriate equivalent.

Majors

- Applied Behavior Analysis (MS) (p. 321)
- Applied Behavior Analysis and Special Education (MS) (<http://catalog.drexel.edu/graduate/schoolofeducation/appliedbehavioranalysisandspecialeducation/>)
- Creativity and Innovation (MS) (p. 323)
- Education (PhD) (<http://catalog.drexel.edu/graduate/schoolofeducation/educationphd/>)
- Educational Administration (MS) (p. 330)
- Education Improvement and Transformation (MS) (p. 326)
- Educational Leadership and Management (EdD) (p. 336)
- Global and International Education (MS) (p. 341)
- Higher Education (MS) (p. 345)
- Human Resource Development (MS) (<http://catalog.drexel.edu/graduate/schoolofeducation/humanresourcedevelopment/>)
- Learning Technologies (MS) (p. 348)
- Mathematics Learning and Teaching (MS) (p. 351)

- Special Education (MS) (p. 354)
- Sport Coaching Leadership (MS) (<http://catalog.drexel.edu/graduate/schoolofeducation/sportcoachingleadership/>)
- Teaching, Learning and Curriculum (MS) (p. 359)

Minors

- Creativity and Innovation (<http://catalog.drexel.edu/graduate/schoolofeducation/creativityandinnovationminor/>)
- Global and International Education (<http://catalog.drexel.edu/graduate/schoolofeducation/globalandinternationaleducationminor/>)
- Higher Education (<http://catalog.drexel.edu/graduate/schoolofeducation/highereducationminor/>)

Certificates

- Advanced Teaching and Curriculum (p. 367)
- Applied Behavior Analysis (p. 368)
- Autism Spectrum Disorders (p. 369)
- Collaborative Special Education Law and Process (p. 369)
- Community College Administration and Leadership (p. 370)
- Creativity and Innovation (p. 370)
- E-Learning Leadership (p. 371)
- Education Policy (p. 371)
- Instructional Design (p. 372)
- Instructional Technology Specialist (p. 373)
- K-12 Virtual School Leadership (<http://catalog.drexel.edu/graduate/schoolofeducation/k12virtualschoolleadershipbc/>)
- Math Leadership & Coaching (p. 373)
- Mathematics Learning and Teaching (p. 374)
- **NEW:** Middle Level (grades 4-8) Certification
- Multisensory Reading Instruction Level I (p. 374)
- Post-Baccalaureate Teaching: Elementary (p. 375)
- Post-Baccalaureate Teaching: Secondary (p. 376)
- Reading Specialist Certification (p. 381)
- School Principal Certificate (p. 374)
- **NEW:** Social, Emotional & Behavioral Wellness
- Special Education 7-12 (p. 380)
- Special Education PreK-8 (p. 382)
- Special Education Leadership (p. 382)
- STEM Education Certificate (p. 383)
- Student Development and Affairs (p. 384)
- Teaching Certificate: Graduate Intern Program (p. 381)
- Teaching English as a Second Language (p. 384)

Resources for Students

The School of Education provides a variety of resources designed to help students achieve optimal success in their area of study. Each distinct entity provides programming, services and, resources designed to creatively meet student's individual needs.

The Field Placement Office (FPO) (<http://drexel.edu/soe/resources/field-placement-office/>) within the School of Education is responsible for accepting and evaluating placement requests for all stages of clinical experiences within the Teacher Education Program. The FPO works with university partnering schools and school districts to coordinate appropriate

and carefully matched placements ensuring that students are exposed to a variety of cultures, economic backgrounds, and diverse settings.

The Early Career Practitioner Institute (ECPI) (<http://drexel.edu/soe/resources/early-career-practitioner-institute/>) is designed to provide ongoing professional development and classroom-based support to Drexel Teacher Certification candidates for a period of two years after they complete their certification program. This support initiative was constructed as a commitment to our graduates, and is provided at no additional cost to the alumni.

Early Childhood Education teachers can earn a significant discount on tuition through the T.E.A.C.H. Early Childhood (<http://drexel.edu/soe/resources/TEACH/>)[®] **Pennsylvania Scholarship**. Drexel University School of Education is a proud partner of T.E.A.C.H. to help students earn preK-4 teacher certification through our Bachelors of Education, Post-Bachelors Teaching Certificate and MS in Teaching, Learning and Curriculum.

The (http://goodwin.drexel.edu/centers_tc.php) **Torrance Center for Creative Studies** was established as an outgrowth of the research of E. Paul Torrance, internationally renowned authority on creativity. The Center's primary purpose is the identification and nurturance of creative potential. For more information, please call Dr. Fredricka Reisman at 215.895.6771 or email freddie@drexel.edu (%20freddie@drexel.edu).

The School of Education's Global Education Colloquium (<http://drexel.edu/soe/resources/event-series/gec/>) series allows all School of Education Students, including those in the MS in Global and International Education, the opportunity to hear research presentations from world-renowned scholars in the field of Global Education. The topics presented are the result of research spanning the full range of learning, teaching and training topics including international studies, higher education, peace education, social justice, inequality, politics of knowledge, policy, leadership and organizational change.

The Critical Conversations in Urban Education Lecture Series (<http://drexel.edu/soe/resources/event-series/ccue/>) is the School of Education's vehicle for critical dialogue and continuing education on issues important to the education of youth in urban settings, including Philadelphia. The series seeks to connect the academic and broader communities together for collaboration, understanding, and support that empower urban schools, educators, families, and students.

Students in Drexel University's School of Education EdD and PhD programs have the opportunity to present preliminary research for their dissertation at our monthly Doctoral Student Colloquiums (<http://drexel.edu/soe/research/student-research/>). Each month, one Drexel University School of Education PhD student and one EdD student present their research before an audience of Drexel students, faculty and professional staff. Students also submit a research brief that is included in a journal created by the School of Education.

Applied Behavior Analysis

Major: Applied Behavior Analysis

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 46.5

Co-op Option: None

Classification of Instructional Programs (CIP) code: 42.2814

Standard Occupational Classification (SOC) code: 19-3031

About the Program

Behavior analysis is a widely accepted and validated scientific approach to the investigation and manipulation of the environmental arrangements that occasion behavior. Extensive research with proven methods and impressive findings has helped develop the technology now called applied behavior analysis. Behavior analytic clinical and research advances have led to significant contributions in educational programming, and mental health and behavioral health assessment and treatment approaches.

The Master of Science in Applied Behavior Analysis will prepare clinical and educational leaders in the field of evidence-based approaches using behavior analytic principles and techniques. Graduates from this program will be highly successful candidates for institutions searching for knowledgeable and skilled behavior analysts serving in a variety of roles in behavior analytic settings. Interested students will also be prepared to transition to PhD programs in Applied Behavior Analysis and related fields.

The Behavior Analyst Certification Board, Inc. (<http://www.bacb.com/>)[®] has verified the Master's Core Applied Behavior Analysis course sequence as meeting the coursework requirements for eligibility to take the Board Certified Behavior Analyst Examination[®]. Applicants will have to meet additional experience and supervision requirements.

Additional Information

For more information about this program, contact:

Kyra Dukes, MS
Program Manager
Applied Behavior Analysis
kat353@drexel.edu

Admission Requirements

Applicants for the program will follow the university standards for admission to graduate study. Prospective students must have earned a bachelor's degree from an accredited institution and have an undergraduate GPA of 3.0 or higher to be considered for admission (graduate degree GPAs will be considered along with the undergraduate GPA).

In addition, prospective students are required to submit the following:

- Completed Application Form including official transcripts from all universities or colleges attended
- Two letters of recommendation
- Personal essay
- Resume

The admissions committee will evaluate the applicant's potential and commitment to succeed in graduate study. The applicant's potential to contribute to the overall quality of the program of study will also be considered.

Interviews, in person or by phone, may be conducted by the admissions committee with those applicants who meet Graduate Admission's standard admissions criteria.

Decisions will be made using dates corresponding to the regular university schedule for rolling admissions in Graduate Admissions.

The online program admits students both in the Fall and Spring Terms, while the on-campus and DC Residency program only admits students in the Fall.

Additional Information

For more information about this program, contact:

Kyra Dukes, MS
Program Manager
Applied Behavior Analysis
kat353@drexel.edu

Degree Requirements

Requirements

Core Applied Behavior Analysis Courses

EDEX 630	Fundamental Elements of Behavior Change	4.5
EDEX 631	Measurement and Experimental Design	4.5
EDEX 632	Behavioral Assessment and Functional Analysis	4.5
EDEX 633	Behavioral Interventions	4.5
EDEX 634	Consultation, Systems Change and Supervision	4.5
EDEX 635	Ethical Considerations and Professional Conduct	4.5
EDEX 636	Applications of Fundamental Elements of Behavior Analysis	4.5

Select one of the following concentration options: 9.0

Option 1: Autism Spectrum Disorders Concentration

(select 3 of the following)

EDEX 555	Teaching Students with Autism Spectrum Disorder	
EDEX 556	Characteristics & Methods: Autism	
EDEX 558	Characteristics & Methods: High Functioning Autism	
EDEX 560	Communication & Language Interventions: Autism Spectrum Disorders	
EDEX 562	Behavior & Sensory Support: Autism Spectrum Disorders	

Option 2: Fieldwork Concentration

EDEX 701	Field Experience in Applied Behavior Analysis	
EDEX 640	An Analysis of Verbal Behavior	

Option 3: Social Emotional and Behavior Wellness

(select 3 of the following)

EDEX 580	Social Emotional Wellness and Evidence-Based Preventative School Practices	
EDEX 581	Understanding Social Emotional Disorders	
EDEX 582	Evidence-Based School Interventions and Trauma Informed Education/Care	
EDEX 583	Collaboration and Community Based Practices to Promote Social Emotion Wellness	

Capstone Courses 6.0-7.5

Students have the option to select one of the following capstone tracks.

Thesis

EDUT 780	Thesis Capstone Course I	
EDUT 781	Thesis Capstone Course II	

Practitioner

EDUP 780	Practitioner Capstone Course I	
EDUP 781	Practitioner Capstone Course II	

Total Credits 46.5-48.0

* If the Fieldwork Concentration option is selected, students take EDEX 701 two times to reach 6.0 credits.

The Behavior Analyst Certification Board, Inc.® (<http://www.bacb.com/>) has approved the Core Applied Behavior Analysis course sequence as meeting the coursework requirements for eligibility to take the Board Certified Behavior Analyst Examination®. Applicants will have to meet additional requirements to qualify.

Sample Plan of Study

MS Applied Behavior Analysis with Fieldwork Concentration Plan of Study

Term 1		Credits
EDEX 630	Fundamental Elements of Behavior Change	4.5
EDEX 632	Behavioral Assessment and Functional Analysis	4.5
Term Credits		9.0
Term 2		Credits
EDEX 633	Behavioral Interventions	4.5
EDEX 640	An Analysis of Verbal Behavior	3.0
Term Credits		7.5
Term 3		Credits
EDEX 634	Consultation, Systems Change and Supervision	4.5
EDEX 635	Ethical Considerations and Professional Conduct	4.5
Term Credits		9.0
Term 4		Credits
EDEX 631	Measurement and Experimental Design	4.5
EDEX 636	Applications of Fundamental Elements of Behavior Analysis	4.5
Term Credits		9.0
Term 5		Credits
EDUP 780 or EDUT 780	Practitioner Capstone Course I Thesis Capstone Course I	3.0
EDEX 701	Field Experience in Applied Behavior Analysis	3.0
Term Credits		6.0
Term 6		Credits
EDUP 781 or EDUT 781	Practitioner Capstone Course II Thesis Capstone Course II	3.0-4.5
EDEX 701	Field Experience in Applied Behavior Analysis	3.0
Term Credits		6.0-7.5

Total Credit: 46.5-48.0

MS Applied Behavior Analysis with Social Emotional and Behavioral Wellness Concentration Plan of Study

Term 1		Credits
EDEX 630	Fundamental Elements of Behavior Change	4.5
EDEX 632	Behavioral Assessment and Functional Analysis	4.5
Term Credits		9.0
Term 2		Credits
EDEX 633	Behavioral Interventions	4.5
EDEX 636	Applications of Fundamental Elements of Behavior Analysis	4.5
Term Credits		9.0
Term 3		Credits
EDEX 634	Consultation, Systems Change and Supervision	4.5
EDEX 635	Ethical Considerations and Professional Conduct	4.5
Term Credits		9.0
Term 4		Credits
EDEX 580, 581, 582, or 583	Social Emotional Wellness and Evidence-Based Preventative School Practices Understanding Social Emotional Disorders Evidence-Based School Interventions and Trauma Informed Education/Care Collaboration and Community Based Practices to Promote Social Emotion Wellness	3.0
EDEX 631	Measurement and Experimental Design	4.5
Term Credits		7.5
Term 5		Credits

EDEX 580, 581, 582, or 583	Social Emotional Wellness and Evidence-Based Preventative School Practices Understanding Social Emotional Disorders Evidence-Based School Interventions and Trauma Informed Education/Care Collaboration and Community Based Practices to Promote Social Emotion Wellness	3.0
EDUP 780 or EDUT 780	Practitioner Capstone Course I Thesis Capstone Course I	3.0
Term Credits		6.0
Term 6		
EDEX 580, 581, 582, or 583	Social Emotional Wellness and Evidence-Based Preventative School Practices Understanding Social Emotional Disorders Evidence-Based School Interventions and Trauma Informed Education/Care Collaboration and Community Based Practices to Promote Social Emotion Wellness	3.0
EDUP 781 or EDUT 781	Practitioner Capstone Course II Thesis Capstone Course II	3.0-4.5
Term Credits		6.0-7.5
Total Credit: 46.5-48.0		

MS Applied Behavior Analysis with Autism Concentration Plan of Study

		Credits
Term 1		
EDEX 630	Fundamental Elements of Behavior Change	4.5
EDEX 632	Behavioral Assessment and Functional Analysis	4.5
Term Credits		9.0
Term 2		
EDEX 555, 556, 558, 560, or 562	Teaching Students with Autism Spectrum Disorder Characteristics & Methods: Autism Characteristics & Methods: High Functioning Autism Communication & Language Interventions: Autism Spectrum Disorders Behavior & Sensory Support: Autism Spectrum Disorders	3.0
EDEX 633	Behavioral Interventions	4.5
Term Credits		7.5
Term 3		
EDEX 634	Consultation, Systems Change and Supervision	4.5
EDEX 635	Ethical Considerations and Professional Conduct	4.5
Term Credits		9.0
Term 4		
EDEX 631	Measurement and Experimental Design	4.5
EDEX 636	Applications of Fundamental Elements of Behavior Analysis	4.5
Term Credits		9.0
Term 5		
EDEX 555, 556, 558, 560, or 562	Teaching Students with Autism Spectrum Disorder Characteristics & Methods: Autism Characteristics & Methods: High Functioning Autism Communication & Language Interventions: Autism Spectrum Disorders Behavior & Sensory Support: Autism Spectrum Disorders	3.0
EDUP 780 or EDUT 780	Practitioner Capstone Course I Thesis Capstone Course I	3.0
Term Credits		6.0
Term 6		
EDEX 555, 556, 558, 560, or 562	Teaching Students with Autism Spectrum Disorder Characteristics & Methods: Autism Characteristics & Methods: High Functioning Autism Communication & Language Interventions: Autism Spectrum Disorders Behavior & Sensory Support: Autism Spectrum Disorders	3.0

EDUP 781 or EDUT 781	Practitioner Capstone Course II Thesis Capstone Course II	3.0-4.5
Term Credits		6.0-7.5
Total Credit: 46.5-48.0		

Applied Behavior Analysis MS Faculty

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Christina Vorndran, PhD (*Louisiana State University*) *Program Director, Applied Behavior Analysis and Special Education.* Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Creativity and Innovation

Major: Creativity and Innovation
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0 - 46.5
Co-op Option: None
Classification of Instructional Programs (CIP) code: 13.9999
Standard Occupational Classification (SOC) code: 11-9199

About the Program

It is essential in today's world of increasing complexity, change, and competition that school and business leaders, as well as teachers and employees within their schools and organizations, engage in creative problem solving and new idea generation to solve evolving issues that arise within their work settings. They also need the skill sets to present their innovations to key decision makers within their schools/organizations for implementation. The MS in Creativity & Innovation (C&I) provides principals, CEOs, teachers, managers and other employees with creativity content and competencies to do just that. By internalizing the spirit of creativity and the principles of creative problem solving, program participants are transformed into change leaders capable of overcoming the status quo to implement their innovations and inspire new directions and visions.

Creativity is multidisciplinary – it is in all professional fields from chemistry to engineering, from education to computer science, and from sociology to business. Upon successful completion of this master's degree program, students will be able to create solutions to address problematic situations within various settings. Program completers will also enable

their organizations to foster creative and innovative environments while developing other creative problem-solvers within their workplaces.

For more information, visit Drexel University Online's MS in Creativity and Innovation (<http://online.drexel.edu/online-degrees/business-degrees/ms-creativity-innovation/>) website.

Degree Requirement

Required Courses

Students will complete a total of 45 credit hours consisting of eight core courses, a capstone sequence, and four concentration courses in an approved or customized area.

CRTV 501	Foundations in Creativity	3.0
CRTV 502	Tools and Techniques in Creativity	3.0
CRTV 503	Creativity in the Workplace	3.0
CRTV 610	Creativity and Change Leadership	3.0
CRTV 630	Global Perspectives on Creativity	3.0
CRTV 640	Creativity & Innovation: 1500-Present	3.0
CRTV 650	Current Trends in Creativity & Innovation	3.0
CRTV 660	Diagnostic Creative Intervention	3.0

Capstone 9.0-10.5

EDU 780 Capstone Research

Students have the option to select from one of the following capstone tracks.

Practitioner Track

EDUP 780 Practitioner Capstone Course I

EDUP 781 Practitioner Capstone Course II

Thesis Track

EDUT 780 Thesis Capstone Course I

EDUT 781 Thesis Capstone Course II

Lesson Study Track

EDUL 780 Lesson Study Capstone Course I

EDUL 781 Lesson Study Capstone Course II

Concentration Course Options (See listing of possible concentrations below). 12.0

Human Resource Development

EHRD 500 Foundations of Human Resources Development

EHRD 601 Leading and Evaluating Change

EHRD 602 Coaching and Mentoring for Sustainable Learning

EHRD 604 Development of Human Resources

or EHRD 66 Principles of Adult Learning

Global & International Education

EDGI 500 Introduction to Global, International & Comparative Education

EDGI 504 History and Theory of Comparative Education

EDGI 510 Culture, Society & Education in Comparative Perspective

EDGI 512 Globalization and Educational Change

or EDGI 514 Education and National Development

Higher Education

EDHE 500 Foundations of Higher Education

EDHE 510 Governance, Management & Administration in Higher Education

EDHE 530 Higher Education Law

or EHRD 66 Principles of Adult Learning

EDHE 606 Higher Education Career Development

Learning Technologies

EDLT 536 Learning Sciences and Instructional Design

or EDLT 53 Technologies for Performance Support

EDLT 550 Introduction to Instructional Design

EDLT 532 Designing Virtual Communities for Staff Development - Non-Field Experience

or EDLT 81 Designing and Developing Multimedia Applications For Learning

ELL 501 The Purpose and Business of E-Learning

Learning in Game-Based Environments

EDLT 541 Foundations of Game-Based Learning

EDLT 542 Research in Motivation & Game-based Learning

EDLT 543 Play & Learning in a Participatory Culture

EDLT 544 Integrating Games & Pedagogical Content Knowledge

Custom-Designed Concentration

A custom-designed concentration will consist of 12 professional electives that will be selected in consultation with the Program Director and/or Advisor. You may also choose to declare a Graduate Minor.

Total Credits 45.0-46.5

Sample Plan of Study

Term	Credits
Term 1	
CRTV 501	Foundations in Creativity 3.0
CRTV 503	Creativity in the Workplace 3.0
	Term Credits 6.0
Term 2	
CRTV 640	Creativity & Innovation: 1500-Present 3.0
	Concentration Course or Professional Elective 3.0
	Term Credits 6.0
Term 3	
CRTV 650	Current Trends in Creativity & Innovation 3.0
	Concentration Course or Professional Elective 3.0
	Term Credits 6.0
Term 4	
CRTV 502	Tools and Techniques in Creativity 3.0
CRTV 630	Global Perspectives on Creativity 3.0
	Term Credits 6.0
Term 5	
CRTV 660	Diagnostic Creative Intervention 3.0
	Concentration Course or Professional Elective 3.0
	Term Credits 6.0
Term 6	
EDU 780	Capstone Research 3.0
	Concentration Course or Professional Elective 3.0
	Term Credits 6.0
Term 7	
EDUP 780, EDUT 780, or EDUL 780	Practitioner Capstone Course I, Thesis Capstone Course I, or Lesson Study Capstone Course I 3.0
CRTV 610	Creativity and Change Leadership 3.0
	Term Credits 6.0
Term 8	
EDUP 781, EDUT 781, or EDUL 781	Practitioner Capstone Course II, Thesis Capstone Course II, or Lesson Study Capstone Course II 3.0-4.5
	Term Credits 3.0-4.5

Total Credit: 45.0-46.5

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy , English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research*. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) *Program Director*. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as innovative problem-setting, thinking qualitatively about school reform. thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) *Department Chair for Teaching, Learning & Curriculum*. Associate Clinical Professor. Special Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) *Senior Associate Dean of Academic Affairs*. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) *Associate Dean of Teacher Education and Undergraduate Affairs*. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) *Program Director, Applied Behavior Analysis and Special Education*. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Education Improvement and Transformation

Major: Education Improvement and Transformation

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 13.9999

Standard Occupational Classification (SOC) code: 11-9032

About the Program

One of the great challenges of our time is the improvement of the American education system from pre-school through retirement. Once the envy of the world, there are cracks in the education crucible which must be repaired or reformed. The system has endured social, intellectual, and economic challenges beyond its capacity to respond in a way that provides a sound foundation for all Americans, while keeping our country safe and competitive for the future.

The MS in Education Improvement and Transformation program is designed to prepare professional educators—as well as other professionals whose career interests lie in leading significant change in education—in the process of initiating transformative (reform) in formal and informal education sectors.

The program is comprised of "Professional Development Concentrations" (PDC), each focusing on specific topics pertaining to the improvement and transformation of education. Each PDC is comprised of nine credits (or 3 courses) of focused course work in a specific area, i.e.:

- Creativity and Innovation
- E-Learning Leadership
- Educational Policy
- Entrepreneurship
- Evaluation and Assessment
- Instructional Design
- Leadership in Educational Settings
- Learning in Game-based Environments
- Learning Technologies
- Special Education Leadership
- Special Education Law and Process
- Urban Education

Students may opt to create their own PDC with the advisement of the Program Manager for the MS in Education Improvement and Transformation program.

After students complete four PDC's, totaling a minimum of 36.0 credits, they will finish the program by enrolling in three courses (9.0 additional credits) that jointly form a capstone project to provide a real-life, hands-on experience in being an agent for change in transformative education. The combination of the 4 PDC's and the three capstone courses provides the student with the 45.0 credits required for the MS degree.

Additional Information

For additional information, visit Drexel University's Master of Science Program's in Education (<http://www.drexel.edu/soe/academics/graduate/>) page.

Degree Requirements

The Master of Science in Education Improvement and Transformation program is comprised of 15 courses. The core of the program is made up of four "Professional Development Concentrations" in strategic education improvement areas and topics for 36 credits.

These concentrations include areas such as assessment, strategic partnership, change leadership, educational policy, disabilities, virtual schools, charter schooling, homeschooling, community engagement & development, urban education, school boards, and financing education. Additional concentrations may be developed on a topical needs or special population-based basis.

Students also complete one research course and two capstone courses for a total of 9 credits and have the option to select their own capstone track-- practitioner, thesis or lesson study.

Degree Requirements

Students select four professional development concentration (PDC) areas from the list below for 36.0 credits and 9-10.5 credits of capstone courses for a total of 45-46.5 credits.

Choose four concentrations from the list below: * 36.0

Creativity & Innovation (PDCR)	
CRTV 502	Tools and Techniques in Creativity
CRTV 503	Creativity in the Workplace
CRTV 650	Current Trends in Creativity & Innovation
Educational Policy (PDEP)	
EDPO 620	Education Policy: Concepts, Issues, and Applications
EDPO 628	American Educational Policy and U.S. Competitiveness
EDPO 632	Ethics in Educational Policy Making
E-Learning Leadership (PDEL)	

ELL 501	The Purpose and Business of E-Learning
ELL 504	Learning Technologies & Disabilities
EDLT 554	Learning with Social Media and Mobiles
Entrepreneurship (PDEN)	
ENTP 501	Entrepreneurship Essentials
ENTP 535	Social Entrepreneurship
ENTP 611	Learning from Failure
Evaluation & Assessment (PDEA)	
EDAM 722	Evaluation & Assessment Competencies
EDHE 680	Foundations of Evaluation
EDUC 804	Program Evaluation in Organizations
Instructional Design (PDID)	
EDLT 551	Instructional Design Methods
EDLT 552	Instructional Design: Project Management
EDLT 553	Instructional Design: Special Topics
Leadership in Educational Settings (PDLI)	
CRTV 610	Creativity and Change Leadership
EDAM 702	School Leadership & Decision Making
EDAM 712	School and Community Partnerships and Relations
or EDAM 722	Mentoring and Collaborative Leadership
Learning in Game-based Environments (PDLG)	
EDLT 541	Foundations of Game-Based Learning
EDLT 543	Play & Learning in a Participatory Culture
EDLT 561	Design-Based Research Methods
Learning Technologies (PDLT)	
EDLT 512	Using and Integrating Learning Technologies
EDLT 537	Technologies for Performance Support
EDLT 554	Learning with Social Media and Mobiles
Special Education Law & Process (PDLP)	
EDEX 600	Family, School and Community Engagement in Special Education
EDEX 601	Special Education Advocacy
EDEX 602	Special Education Dispute Resolution and Skills Training
Special Education Leadership (PDSL)**	
EDEX 710	School Law & Policy in Special Education
EDEX 712	Instructional & Curriculum Leadership in Special Education
EDEX 714	Development, Supervision, & Support: Special Education Leadership
Urban Education (PDUE)	
EDUC 516	Diversity and Today's Teacher
EDAM 700	Leading in Urban, Rural and Suburban Settings
EDAM 701	Resource Management, Allocation and Entrepreneurship
or EDGI 530	Peace Education
Capstone Courses 9.0-10.5	
EDU 780	Capstone Research
Students have the option to select one of the following capstone tracks:	
Practitioner	
EDUP 780	Practitioner Capstone Course I
EDUP 781	Practitioner Capstone Course II
Thesis	
EDUT 780	Thesis Capstone Course I
EDUT 781	Thesis Capstone Course II
Lesson Study	
EDUL 780	Lesson Study Capstone Course I
EDUL 781	Lesson Study Capstone Course II
Total Credits	45.0-46.5

* Students have the option to choose three PDCs and create a fourth, 9.0 credit, non-transcribed, individually designed PDC with assistance from an academic advisor.

** Courses have classroom observation and require field placement application and appropriate clearances before enrolling. Contact the School of Education Field Placement Office at StuTeach@drexel.edu (StuTeach@Drexel.edu) for details.

Sample Plan of Study

Term	Credits
Term 1	
Concentration Course 1	3.0
Concentration Course 2	3.0
Term Credits	6.0
Term 2	
Concentration Course 3	3.0
Concentration Course 4	3.0
Term Credits	6.0
Term 3	
Concentration Course 5	3.0
Concentration Course 6	3.0
Term Credits	6.0
Term 4	
Concentration Course 7	3.0
Concentration Course 8	3.0
Term Credits	6.0
Term 5	
Concentration Course 9	3.0
Concentration Course 10	3.0
Term Credits	6.0
Term 6	
Concentration Course 11	3.0
EDU 780 Capstone Research	3.0
Term Credits	6.0
Term 7	
Concentration Course 12	3.0
EDUP 780, EDUT Practitioner Capstone Course I	3.0
780, Thesis Capstone Course I	
or EDUL 780 Lesson Study Capstone Course I	
Term Credits	6.0
Term 8	
EDUP 781, EDUT Practitioner Capstone Course II	3.0-4.5
781, Thesis Capstone Course II	
or EDUL 781 Lesson Study Capstone Course II	
Term Credits	3.0-4.5
Total Credit: 45.0-46.5	

Students have the option to select from the Practitioner, Thesis or Lesson Study Capstone track during term 7 and 8.

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy, English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research*. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) *Program Director*. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as innovative problem-setting, thinking qualitatively about school reform. thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) *Department Chair for Teaching, Learning & Curriculum*. Associate Clinical Professor. Special Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) *Senior Associate Dean of Academic Affairs*. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) Associate Dean of Teacher Education and Undergraduate Affairs. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) Program Director, *Applied Behavior Analysis and Special Education*. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) Director of the *Torrance Center for Creativity and Innovation*. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Educational Administration

Major: Educational Administration

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 13.0401

Standard Occupational Classification (SOC) code: 11-9032

About the Program

The MS in Educational Administration program is designed to prepare and mentor future leaders using state and national leadership standards with the practical skills, knowledge, and internship experiences to become effective leaders in rural, urban, and suburban schools. The vision of the program is to create a collaborative and mentoring community of school leaders who contribute to a "research of practice" that significantly improves learning for all students.

Using state and national leadership standards, this master's degree is designed to prepare and mentor future elementary and secondary educational leaders with the practical skills, knowledge and internship experiences to become effective leaders in rural, city and suburban schools. This program is ideal for prospective students holding a teaching or counseling certificate who wish to advance into school administration with principal certification.

The program is designed as a part-time cohort model, and can be completed in two years with or without certification. View the degree requirements (p. 331) for more detailed information about the courses.

Educational Administration Program Options

- MS in Educational Administration

Concentrations:

- School Principal Certificate*
- Special Education Leadership & Principal (K-12) Certificate**
- Special Education Leadership Certificate (without Principal Certificate)**
- School Principal Certificate only*

*Requires a state-issued teacher certificate

**Requires a state-issued special education teacher certificate

Program Objectives

Graduates of the MS in Educational Administration program will be prepared to:

- Meet Pennsylvania certification standards
- Facilitate the development, articulation, implementation, and stewardship of a school/district vision of learning that is shared and supported by the school community
- Advocate, nurture, and sustain a school culture and instructional program conducive to student learning and staff professional growth
- Ensure management of the organization, operations, and resources for a safe, efficient, and effective learning environment
- Collaborate with families and community members, responding to diverse community interests and needs, and mobilizing community resources
- Act with integrity, fairness, and in an ethical manner
- Understand, respond to, and influence the larger political, social, economic, legal, and cultural context
- Monitor and evaluate students' achievements and programs on challenging standards for external and internal accountability goals
- Build teacher leadership capacity and mentor principal interns
- Conduct and share action research that documents sustainability in meeting school accountability goals and has practical, immediate, and useful application for other educators

For additional information, visit the School of Education's MS in Educational Administration (<http://drexel.edu/soe/academics/graduate/educational-administration/>) web page or the Drexel University Online (<http://online.drexel.edu/online-degrees/education-degrees/ms-ed-admin/>) web site.

Admission Requirements

Acceptance for graduate study in Drexel University's School of Education requires:

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate degree GPAs will be considered along with the undergraduate GPA).
- Complete graduate school application (<http://online.drexel.edu/online-degrees/education-degrees/ms-ed-admin/#apply>) (<http://www.drexel.com/online-degrees/education-degrees/ms-ed-admin/apply.aspx>).

- Official transcripts from *all universities or colleges and other post-secondary educational institutions (including trade schools)* attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online (use our email address, applyDUonline@drexel.edu). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts. Use the Transcript Lookup Tool (<http://online.drexel.edu/support/supporting-documents.aspx>) to assist you in contacting your previous institutions. If a college or university that you attended offers the option to send transcripts in a secure, password-protected electronic format, you may have the transcript sent to applyDUonline@drexel.edu.
- Two letters of recommendation, either professional or academic.
 - Drexel University Online now accepts electronic letters of recommendation. Please use the online letter of recommendation service (https://deptapp08.drexel.edu/em/LOR/Default.aspx?_ga=1.12981950.807833177.1437483903). If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
 - One letter of recommendation must come from the principal of the school where the applicant has worked. (Recommendation must include applicant's presentation skills and experiences in a leadership role as well as the skills observed that would have a strong bearing on the applicant's success as a school leader and administrator.)
- An essay describing why the applicant is interested in pursuing graduate study in this field.
 - Applicant must include two paragraphs briefly describing their educational philosophy and explaining how principals shape learning in K-12 schools.
- State-issued certification
 - Email a copy to applyDUonline@drexel.edu
- International Students (<http://online.drexel.edu/support/international-students.aspx>): must submit a TOEFL score of 550 or higher. Students with transcripts from non-US institutions should have such transcripts evaluated by World Education Service (WES). The TOEFL examination is required for some non-citizens.

Degree Requirements

Core Courses

EDCR 510	Leadership in Educational Contexts and Systems	3.0
EDAM 700	Leading in Urban, Rural and Suburban Settings	3.0
EDAM 701	Resource Management, Allocation and Entrepreneurship	3.0
EDAM 705	School Law and Politics	3.0
EDAM 708	Integration of Technology with School Instruction and Management	3.0
EDAM 710	School Finance and Facilities	3.0
EDAM 712	School and Community Partnerships and Relations	3.0
EDAM 714	Instructional and Curriculum Leadership	3.0
EDAM 722	Evaluation & Assessment Competencies	3.0
EDAM 724	Mentoring and Collaborative Leadership	3.0

Principal Internship Courses

EDAM 715	School Principal Internship: Technology	1.5
EDAM 716	School Principal Internship: Finance	1.5
EDAM 717	School Principal Internship: Leadership	1.5
EDAM 718	School Principal Internship: Relations	1.5
Capstone Courses		9.0-10.5
EDU 780	Capstone Research	
Students have the option to select one of the following capstone tracks:		
Practitioner		
EDUP 780	Practitioner Capstone Course I	
EDUP 781	Practitioner Capstone Course II	
Thesis		
EDUT 780	Thesis Capstone Course I	
EDUT 781	Thesis Capstone Course II	
Lesson Study		
EDUL 780	Lesson Study Capstone Course I	
EDUL 781	Lesson Study Capstone Course II	
Total Credits		45.0-46.5

Performances

The performances for meeting Pennsylvania leadership standards and National Leadership Standards include a Leadership Portfolio. The Leadership Portfolio includes:

- Four Log Reflections -- explaining growth in log reflection over each term
- Evidence of 600 hours across four terms logged in the Internship
- Logs over 48 weeks
- Four term Goal Statements and Reflections on accomplishments
- Two to three artifacts on each of the ELCC standards totaling 14 to 21 or more artifacts
- An explanation of how each artifact shows applications of skill on each identified standard
- Four evaluations on the ELCC Standards and Drexel Competencies completed by the school site supervising principal

In addition, students must meet the current state minimum score on the appropriate PRAXIS Exam.

Sample Plan of Study

MS degree with Principal Certification

Term 1		Credits
EDAM 700	Leading in Urban, Rural and Suburban Settings	3.0
EDCR 510	Leadership in Educational Contexts and Systems	3.0
Term Credits		6.0
Term 2		Credits
EDAM 712	School and Community Partnerships and Relations	3.0
EDAM 718	School Principal Internship: Relations	1.5
Term Credits		4.5
Term 3		Credits
EDAM 714	Instructional and Curriculum Leadership	3.0
EDAM 717	School Principal Internship: Leadership	1.5
Term Credits		4.5
Term 4		Credits
EDAM 708	Integration of Technology with School Instruction and Management	3.0
EDAM 715	School Principal Internship: Technology	1.5
Term Credits		4.5
Term 5		Credits
EDAM 710	School Finance and Facilities	3.0

EDAM 716	School Principal Internship: Finance	1.5
	Term Credits	4.5
Term 6		
EDAM 701	Resource Management, Allocation and Entrepreneurship	3.0
EDAM 722	Evaluation & Assessment Competencies	3.0
	Term Credits	6.0
Term 7		
EDAM 724	Mentoring and Collaborative Leadership	3.0
EDU 780	Capstone Research	3.0
	Term Credits	6.0
Term 8		
EDAM 705	School Law and Politics	3.0
EDUP 780, EDUL 780, or EDUT 780	Practitioner Capstone Course I Lesson Study Capstone Course I Thesis Capstone Course I	3.0
	Term Credits	6.0
Term 9		
EDUP 781, EDUL 781, or EDUT 781	Practitioner Capstone Course II Lesson Study Capstone Course II Thesis Capstone Course II	3.0-4.5
	Term Credits	3.0-4.5

Total Credit: 45.0-46.5

Special Education Leadership Concentration Program Requirements

The Special Education Leadership concentration within the MS in Educational Administration leads to the Supervisor of Special Education Certification. The concentration is designed to produce educators who are equipped with the advanced skills, knowledge and competencies they will need to collaboratively lead programs that meet the needs of students at risk and with disabilities in multiple settings. The 46.0 credit program fulfills the requirements for the Pennsylvania Department of Education approved certification and a master's degree in Educational Leadership.

Candidates are required to complete 300 internship hours for the Supervisor of Special Education Certification. Eligibility for PA Special Education Leadership certificate requires verification that the candidate has completed five years of satisfactory professional school experience on a state-issued certificate appropriate for the assignment. All courses must be completed with a B or better.

Core Courses

EDAM 700	Leading in Urban, Rural and Suburban Settings	3.0
EDAM 701	Resource Management, Allocation and Entrepreneurship	3.0
EDAM 722	Evaluation & Assessment Competencies	3.0
EDAM 724	Mentoring and Collaborative Leadership	3.0

Core Certification Courses

EDAM 708	Integration of Technology with School Instruction and Management	3.0
EDAM 710	School Finance and Facilities	3.0
EDEX 710	School Law & Policy in Special Education	3.0
EDEX 712	Instructional & Curriculum Leadership in Special Education	3.0
EDEX 714	Development, Supervision, & Support: Special Education Leadership	3.0
EDEX 716	Organization & Administration of Special Education	3.0
EDEX 721	Supervisor of Special Education Internship: Special Education Leadership	1.0
EDEX 722	Supervisor of Special Education Internship: Instructional Leadership	1.0
EDEX 723	Supervisor of Special Education Internship: Collaboration & Personnel	1.0
EDEX 724	Supervisor of Special Education Internship: Finance & Management	1.0

Elective Course		3.0
Capstone Courses		9.0
EDU 780	Capstone Research	
Students have the option to select one of the following capstone tracks		
Practitioner		
EDUP 780	Practitioner Capstone Course I	
EDUP 781	Practitioner Capstone Course II	
Thesis		
EDUT 780	Thesis Capstone Course I	
EDUT 781	Thesis Capstone Course II	
Lesson Study		
EDUL 780	Lesson Study Capstone Course I	
EDUL 781	Lesson Study Capstone Course II	
Total Credits		46.0

* To satisfy the elective portion of the MS in Educational Administration with Special Education Leadership option, it is suggested that the candidate enroll in a course from the School of Education's Educational Policy or the Special Education Law and Process certificate programs. The following would be appropriate although any graduate course that the candidate has interest and is eligible to enroll may be considered with approval of the candidate's academic advisor:

- EDEX 600: Family, School and Community Engagement in Special Education
- EDEX 601: Special Education Advocacy
- EDEX 602: Special Education Dispute Resolution and Skills Training
- EDPO 620: Education Policy: Concepts, Issues and Applications
- EDPO 624: The Shaping of American Education Policy: Global Forces, Interest Groups and Politics

Sample Plan of Study

Term	Courses	Credits
Term 1	EDCR 510 Leadership in Educational Contexts and Systems	3.0
	EDEX 712 Instructional & Curriculum Leadership in Special Education	3.0
	Term Credits	6.0
Term 2	EDAM 712 School and Community Partnerships and Relations	3.0
	EDAM 718 School Principal Internship: Relations	1.5
	EDEX 723 Supervisor of Special Education Internship: Collaboration & Personnel	1.0
	Term Credits	5.5
Term 3	EDAM 714 Instructional and Curriculum Leadership	3.0
	EDAM 717 School Principal Internship: Leadership	1.5
	EDEX 721 Supervisor of Special Education Internship: Special Education Leadership	1.0
	Term Credits	5.5
Term 4	EDAM 708 Integration of Technology with School Instruction and Management	3.0
	EDAM 715 School Principal Internship: Technology	1.5
	EDEX 716 Organization & Administration of Special Education	3.0
	Term Credits	7.5
Term 5	EDAM 710 School Finance and Facilities	3.0
	EDAM 716 School Principal Internship: Finance	1.5
	EDEX 722 Supervisor of Special Education Internship: Instructional Leadership	1.0
	Term Credits	5.5
Term 6	EDAM 722 Evaluation & Assessment Competencies	3.0

EDEX 714	Development, Supervision, & Support: Special Education Leadership	3.0
Term Credits		6.0
Term 7		
EDEX 710	School Law & Policy in Special Education	3.0
EDU 780	Capstone Research	3.0
Term Credits		6.0
Term 8		
EDAM 705	School Law and Politics	3.0
EDEX 724	Supervisor of Special Education Internship: Finance & Management	1.0
EDUP 780, EDUT 780, or EDUL 780	Practitioner Capstone Course I Thesis Capstone Course I Lesson Study Capstone Course I	3.0
Term Credits		7.0
Term 9		
EDUP 781, EDUT 781, or EDUL 781	Practitioner Capstone Course II Thesis Capstone Course II Lesson Study Capstone Course II	3.0-4.5
Term Credits		3.0-4.5
Total Credit: 52.0-53.5		

Students have the option to select from the Practitioner, Thesis, or Lesson Study Capstone track during term 8 and 9.

Special Education Leadership Concentration Sample Plan of Study

		Credits
Term 1		
EDAM 700	Leading in Urban, Rural and Suburban Settings	3.0
EDAM 710	School Finance and Facilities	3.0
Term Credits		6.0
Term 2		
EDAM 701	Resource Management, Allocation and Entrepreneurship	3.0
EDEX 714	Development, Supervision, & Support: Special Education Leadership	3.0
Term Credits		6.0
Term 3		
EDEX 710	School Law & Policy in Special Education	3.0
EDEX 721	Supervisor of Special Education Internship: Special Education Leadership	1.0
Term Credits		4.0
Term 4		
EDAM 708	Integration of Technology with School Instruction and Management	3.0
EDEX 724	Supervisor of Special Education Internship: Finance & Management	1.0
Term Credits		4.0
Term 5		
EDEX 712	Instructional & Curriculum Leadership in Special Education	3.0
EDEX 722	Supervisor of Special Education Internship: Instructional Leadership	1.0
Term Credits		4.0
Term 6		
EDAM 722	Evaluation & Assessment Competencies	3.0
EDEX 723	Supervisor of Special Education Internship: Collaboration & Personnel	1.0
Term Credits		4.0
Term 7		
EDAM 724	Mentoring and Collaborative Leadership	3.0
EDU 780	Capstone Research	3.0
Term Credits		6.0
Term 8		
EDEX 716	Organization & Administration of Special Education	3.0

EDUP 780, EDUT 780, or EDUL 780	Practitioner Capstone Course I Thesis Capstone Course I Lesson Study Capstone Course I	3.0
Term Credits		6.0
Term 9		
EDUP 781, EDUT 781, or EDUL 781	Practitioner Capstone Course II Thesis Capstone Course II Lesson Study Capstone Course II	3.0
Elective		3.0
Term Credits		6.0
Total Credit: 46.0		

School Principal Certificate & Special Education Leadership Concentration

Program Requirements

The School Principal Certificate and Special Education Leadership concentration within the MS in Educational Administration leads to the Supervisor of Special Education Certification and Principal Certification. The concentration is designed to prepare future leaders with the tools and knowledge to collaboratively address special education programs and issues within a school setting. The 49.0 credit dual certification program fulfills the requirements for both Pennsylvania Department of Education approved certifications and a master's degree.

Candidates are required to complete 300 internship hours for the Supervisor of Education Certification and 400 internship hours for Principal Certification.

Eligibility for PA Special Education Leadership certificate requires verification that the candidate has completed five years of satisfactory professional school experience on a state-issued certificate appropriate for the assignment.

Eligibility for the PA Principal certificate requires verification that the candidate has completed three years of satisfactory professional school experience on a state-issued certificate appropriate for the assignment and appropriate Praxis exam. All courses must be completed with a B or better.

Principal Certification Courses

EDCR 510	Leadership in Educational Contexts and Systems	3.0
EDAM 705	School Law and Politics	3.0
EDAM 708	Integration of Technology with School Instruction and Management	3.0
EDAM 710	School Finance and Facilities	3.0
EDAM 712	School and Community Partnerships and Relations	3.0
EDAM 714	Instructional and Curriculum Leadership	3.0
EDAM 715	School Principal Internship: Technology	1.5
EDAM 716	School Principal Internship: Finance	1.5
EDAM 717	School Principal Internship: Leadership	1.5
EDAM 718	School Principal Internship: Relations	1.5

Special Education Leadership Certification Courses

EDEX 710	School Law & Policy in Special Education	3.0
EDEX 712	Instructional & Curriculum Leadership in Special Education	3.0
EDEX 714	Development, Supervision, & Support: Special Education Leadership	3.0
EDEX 716	Organization & Administration of Special Education	3.0
EDEX 721	Supervisor of Special Education Internship: Special Education Leadership	1.0
EDEX 722	Supervisor of Special Education Internship: Instructional Leadership	1.0
EDEX 723	Supervisor of Special Education Internship: Collaboration & Personnel	1.0

EDEX 724	Supervisor of Special Education Internship: Finance & Management	1.0
Core Course		
EDAM 722	Evaluation & Assessment Competencies	3.0
Capstone Courses		9.0-10.5
EDU 780	Capstone Research	
Students have the option to select one of the following capstone tracks:		
Practitioner		
EDUP 780	Practitioner Capstone Course I	
EDUP 781	Practitioner Capstone Course II	
Thesis		
EDUT 780	Thesis Capstone Course I	
EDUT 781	Thesis Capstone Course II	
Lesson Study		
EDUL 780	Lesson Study Capstone Course I	
EDUL 781	Lesson Study Capstone Course II	
Total Credits		52.0-53.5

School Principal Certificate & Special Education Leadership Concentration Sample Plan of Study

Term		Credits	
Term 1	EDCR 510	Leadership in Educational Contexts and Systems	3.0
	EDEX 712	Instructional & Curriculum Leadership in Special Education	3.0
	Term Credits		6.0
Term 2	EDAM 712	School and Community Partnerships and Relations	3.0
	EDAM 718	School Principal Internship: Relations	1.5
	EDEX 723	Supervisor of Special Education Internship: Collaboration & Personnel	1.0
	Term Credits		5.5
Term 3	EDAM 714	Instructional and Curriculum Leadership	3.0
	EDAM 717	School Principal Internship: Leadership	1.5
	EDEX 721	Supervisor of Special Education Internship: Special Education Leadership	1.0
	Term Credits		5.5
Term 4	EDAM 708	Integration of Technology with School Instruction and Management	3.0
	EDAM 715	School Principal Internship: Technology	1.5
	EDEX 716	Organization & Administration of Special Education	3.0
	Term Credits		7.5
Term 5	EDAM 710	School Finance and Facilities	3.0
	EDAM 716	School Principal Internship: Finance	1.5
	EDEX 722	Supervisor of Special Education Internship: Instructional Leadership	1.0
	Term Credits		5.5
Term 6	EDAM 722	Evaluation & Assessment Competencies	3.0
	EDEX 714	Development, Supervision, & Support: Special Education Leadership	3.0
	Term Credits		6.0
Term 7	EDEX 710	School Law & Policy in Special Education	3.0
	EDU 780	Capstone Research	3.0
	Term Credits		6.0
Term 8	EDAM 705	School Law and Politics	3.0
	EDEX 724	Supervisor of Special Education Internship: Finance & Management	1.0

EDUP 780, EDUT 780, or EDUL 780	Practitioner Capstone Course I Thesis Capstone Course I Lesson Study Capstone Course I	3.0
Term Credits		7.0
Term 9		
EDUP 781, EDUT 781, or EDUL 781	Practitioner Capstone Course II Thesis Capstone Course II Lesson Study Capstone Course II	3.0-4.5
Term Credits		3.0-4.5
Total Credit: 52.0-53.5		

Students have the option to select from the Practitioner, Thesis, or Lesson Study Capstone track during term 8 and 9.

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy, English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research*. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) *Program Director*. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight

and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as innovative problem-setting, thinking qualitatively about school reform. thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-

sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) *Department Chair for Teaching, Learning & Curriculum*. Associate Clinical Professor. Special Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) *Senior Associate Dean of Academic Affairs*. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) *Associate Dean of Teacher Education and Undergraduate Affairs*. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) *Program Director, Applied Behavior Analysis and Special Education*. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Educational Leadership and Management

Major: Educational Leadership and Management

Degree Awarded: Doctor of Education (EdD)

Calendar Type: Quarter

Total Credit Hours: 60.0

Classification of Instructional Programs (CIP) code: 13.0401

Standard Occupational Classification (SOC) code: 11-9033

About the Program

The Doctor of Education degree in Educational Leadership and Management program is designed to prepare future leaders with the necessary skills and experience for senior administration and management positions.

Students can specialize in Educational Administration (with or without Pennsylvania Letter of Eligibility), Higher Education, Educational Policy, Human Resource Development, Special Education Leadership, Athletic Administration, Learning Technology, Global and International Education or Creativity & Innovation. Regardless of chosen concentration, the program focuses equally on the understanding and critical analysis of both practice and theory.

Mission

The mission of the EdD program in Educational Leadership and Management is to prepare graduates with the foremost education and business skills related to administration, management, finance, and strategic planning to successfully lead public school districts, universities and colleges, national foundations and organizations, corporations, and government agencies. The EdD program will prepare graduates for leadership roles in improving educational practice and applying management skills to the field of education.

About the Curriculum

The EdD program incorporates an interdisciplinary approach into the curriculum through the collaborative partnerships. The EdD program integrates education and business practices, skills, knowledge and theory into the curriculum, courses and instructional strategies. Students engaged in best practices, current research, and innovations in technology for enhanced instruction.

Recognizing that all practice has a theoretical dimension and all theory springs from questions identified through practice, the students in the EdD program will critically examine their own practices and the practices of their colleagues from a variety of theoretical perspectives.

The program is offered in two formats: Hybrid and Online. The hybrid program format is offered through a blended delivery system combining both on-campus classes and online education. Students meet once a month in an executive weekend format, in addition to an online component. The other option is a fully online program format.

For additional information about this program, visit the School of Education's EdD in Educational Leadership and Management (<https://drexel.edu/soe/academics/doctoral/edd-in-educational-leadership-management/>) web site.

Admission Requirements

Application Requirements for New Applicants

For details regarding the items below please review the Admission Application Checklist (<http://www.drexel.edu/grad/apply/checklist/>).

- *Transcripts* from all colleges and universities attended verifying completion of a master's degree (with 3.5 GPA or better) in education or an appropriate field and undergraduate degree in an appropriate major
- *Résumé* indicating at least 3 years of work experience relevant to applicant's professional goals
- *Three letters of recommendation*: Use the Electronic Letter of Recommendation (<https://deptapp08.drexel.edu/em/LOR/>) form to submit recommendation letters

Submission Part 1: (300 word maximum)

- Discuss your professional goals and aspirations, including how your current skills, along with your study of educational leadership will support your attainment of these goals.

Submission Part 2: A problem of practice (750 words maximum)

- In the Drexel Ed.D program, our students identify a *problem of practice* that becomes central to their dissertation research. While the final dissertation topic and the dissertation document evolve over time, generally, our students arrive with one or more ideas for a *problem of practice* they have an interest in studying.
- In this essay, you are asked to identify and describe a *problem of practice* relevant to your current (or a former) context of professional practice.
- Describe the significance of this problem to this organization.
- Based on your present understanding of the problem, discuss the potential underlying causes and contributing factors that have created the current challenges.
- What questions could be explored to learn more about the problem that may help to create potential solutions.

Submission Part 3: Writing Sample (5-30 page)

- Submit a 5 to 30-page writing sample that demonstrates your *academic writing abilities*. It is suggested that academic papers from prior coursework or journal articles (both that cite from peer reviewed articles) will represent you best in the admissions process. If a prior academic paper is not available, you are requested to create an academic paper 5 to 8 pages in length on a topic of your choice. Alternatively you may provide a writing sample where you are the solo author; this may be a work-based report that evidences your critical thinking and writing skills.

Supplemental Application Materials for New Applicants

To make your application more competitive, applicants are encouraged to submit two (2) or more of the following items:

- Detailed statement describing sustained Leadership Activities
- Detailed statement describing significant Creative Activities/Products
- Detailed statement describing significant Research Activities/Publications

Additional information about how to apply is available on the Graduate Admissions at Drexel University (<http://www.drexel.edu/grad/programs/edu/educational-leadership-and-management/>) website.

Degree Requirements

Students in the EdD program are required to complete core courses including education courses and MBA courses. Students complete courses within their areas of specialization prior to completing required research courses. At that point, students begin the dissertation phase of the EdD program.

EdD Candidacy Requirements

In summary, the sequence of events leading to the EdD candidacy include the following:

- All courses must be passed with a grade of B or better.
- In the fifth quarter, the comprehensive exam must be passed.
- In the ninth quarter, the dissertation proposal must be approved by committee (proposal hearings; filing of the D4 and 4A forms upon approval. At this point students have completed 54.0 of the 60.0 credits required in the program.)
- In terms 10-12, students register for Dissertation. As per the current policy, students pay one credit of tuition but register for multiple credits. A minimum of two credits are needed in the twelfth quarter to accrue the needed 60.0 credits.

Required Courses

Core Courses

EDUC 800	Educational Leadership & Change	3.0
EDUC 801	Creative Strategies For Educational Leaders	3.0
EDUC 802	Using and Integrating Learning Technologies	3.0
EDUC 804	Program Evaluation in Organizations	3.0
EDUC 845	Transformative Leadership: Finding One's Source	3.0

Concentration Course Options (See listing of possible concentrations listed below) **15.0-16.0**

Research Courses

EDUC 803	Educational Research Design I	3.0
EDUC 810	Educational Research Design II	3.0
EDUC 815	Writing for Research, Publication and Funding in Education	3.0
EDUC 818	Applied Research Study	3.0
EDUC 835	Quantitative Research Methods and Data Analysis	4.0
EDUC 836	Qualitative Research Methods and Data Analysis	4.0
EDUC 837	Advanced Qualitative Methods and Data Analysis	3.0
EDUC 880	Doctoral Seminar	1.0-1.5

EdD Candidacy Courses

EDUC 997	Doctoral Dissertation	6.0
Total Credits		60.0-61.5

Higher Education Concentration A *

EDHE 500	Foundations of Higher Education	3.0
EDHE 510	Governance, Management & Administration in Higher Education	3.0
EDHE 530	Higher Education Law	3.0
EDHE 669	Diversity in Higher Education	3.0
EDGI 506	Comparative Higher Education Systems	3.0
Total Credits		15.0

* For candidates entering the program without previous formal study in the area of Higher Education.

Higher Education Concentration B (alternative) **

EDHE 640	Foundations of Institutional Research	3.0
EDHE 662	Critical Issues in Student Affairs	3.0
EDHE 664	Strategies for Educational Success	3.0
EDHE 669	Diversity in Higher Education	3.0
EDGI 506	Comparative Higher Education Systems	3.0
Total Credits		15.0

** For candidates entering the program who have a strong background in the area of Higher Education and who seek to extend their previous studies in this area.

Educational Administration Concentration (Pennsylvania Superintendent Certification) †

EDAM 817	Curriculum Models	3.0
EDAM 820	School Superintendency	3.0
EDAM 824	Parents and Schools	3.0
EDAM 827	School Superintendent's Internship: Curriculum Models	1.0
EDAM 828	School Superintendent's Internship: Parents and Schools	1.0
EDAM 829	School Superintendent's Internship: Budget and Finance	1.0
EDAM 830	School Superintendent's Internship: Human Resource Development	1.0
EDEX 712	Instructional & Curriculum Leadership in Special Education	3.0
Total Credits		16.0

† For students with the background and interest in seeking PA School Superintendent Certification. **Any student required to participate in a program field experiences and/or internship as a component of their coursework, will be required to submit all required documents with regard to background checks/clearance(s) and field placement applications.**

Educational Administration Concentration (Non-certification Track)

EDAM 817	Curriculum Models	3.0
EDAM 820	School Superintendency	3.0
EDAM 824	Parents and Schools	3.0
EDEX 712	Instructional & Curriculum Leadership in Special Education	3.0
Education Policy course (EDPO) ***		3.0
Total Credits		15.0

*** Educational Policy course to be determined by Program Manager

Athletic Administration Concentration

SMT 615	Introduction to the College Sport Industry	3.0
SMT 618	NCAA Compliance	3.0
SMT 648	Gender Equity in High School & College Sports	3.0
Pick two of the following courses:		6.0
SMT 612	Development & Fundraising Strategies in Sport	
SMT 630	Sports Industry Practicum	
SMT 635	Sport Facilities & Event Management	
SMT 642	Administration of Interscholastic Sports	
Total Credits		15.0

Creativity and Innovation

CRTV 501	Foundations in Creativity	3.0
CRTV 502	Tools and Techniques in Creativity	3.0
CRTV 503	Creativity in the Workplace	3.0
CRTV 620	Research Methods and Assessment of Creative and Innovative Thinking	3.0
CRTV 630	Global Perspectives on Creativity	3.0

Educational Policy Concentration

EDPO 620	Education Policy: Concepts, Issues, and Applications	3.0
----------	--	-----

EDPO 624	The Shaping of American Education Policy: Global Forces, Interest Groups, and Politics	3.0
EDPO 628	American Educational Policy and U.S. Competitiveness	3.0
EDPO 632	Ethics in Educational Policy Making	3.0
EDPO 636	Access & Equity in Educational Policy Making	3.0
Total Credits		15.0

Global and International Education Concentration

EDGI 500	Introduction to Global, International & Comparative Education	3.0
EDGI 504	History and Theory of Comparative Education	3.0
EDGI 510	Culture, Society & Education in Comparative Perspective	3.0
EDGI 512	Globalization and Educational Change	3.0
EDGI 514	Education and National Development	3.0
Total Credits		15.0

Human Resource Development Concentration ††

EHRD 500	Foundations of Human Resources Development	3.0
EHRD 601	Leading and Evaluating Change	3.0
EHRD 602	Coaching and Mentoring for Sustainable Learning	3.0
EHRD 604	Development of Human Resources	3.0
EHRD 606	Human and Organizational Performance	3.0

†† A 3.0 credit substitute course will be identified to replace EHRD 500 for students who have already earned a master's degree in Human Resource Development

Learning Technologies

EDLT 532	Designing Virtual Communities for Staff Development - Non-Field Experience	3.0
EDLT 537	Technologies for Performance Support	3.0
EDLT 543	Play & Learning in a Participatory Culture	3.0
EDLT 550	Introduction to Instructional Design	3.0
ELL 501	The Purpose and Business of E-Learning	3.0

Special Education Leadership Concentration ****

EDEX 710	School Law & Policy in Special Education	3.0
EDEX 712	Instructional & Curriculum Leadership in Special Education	3.0
EDEX 714	Development, Supervision, & Support: Special Education Leadership	3.0
EDEX 716	Organization & Administration of Special Education	3.0

Supervisor of Special Education Internship Courses

EDEX 721	Supervisor of Special Education Internship: Special Education Leadership	1.0
EDEX 722	Supervisor of Special Education Internship: Instructional Leadership	1.0
EDEX 723	Supervisor of Special Education Internship: Collaboration & Personnel	1.0
EDEX 724	Supervisor of Special Education Internship: Finance & Management	1.0

Total Credits		16.0
---------------	--	------

**** Any student participating in field experience and/or internship placement related to a Drexel University – School of Education course will be required to submit all required documents with regard to clearance(s) and placement.

Creativity & Innovation Concentration

CRTV 501	Foundations in Creativity	3.0
CRTV 502	Tools and Techniques in Creativity	3.0
CRTV 503	Creativity in the Workplace	3.0
CRTV 620	Research Methods and Assessment of Creative and Innovative Thinking	3.0

CRTV 630	Global Perspectives on Creativity	3.0
Total Credits		15.0

Sample Plan of Study

Term 1		Credits
EDUC 800	Educational Leadership & Change	3.0
EDUC 802	Using and Integrating Learning Technologies	3.0
Term Credits		6.0
Term 2		Credits
EDUC 801	Creative Strategies For Educational Leaders	3.0
EDUC 804	Program Evaluation in Organizations	3.0
Term Credits		6.0
Term 3		Credits
EDUC 803	Educational Research Design I	3.0
EDUC 845	Transformative Leadership: Finding One's Source	3.0
Term Credits		6.0
Term 4		Credits
EDUC 810	Educational Research Design II	3.0
Concentration Course 1		3.0
Term Credits		6.0
Term 5		Credits
EDUC 835	Quantitative Research Methods and Data Analysis	4.0
Concentration Course 2		3.0
Term Credits		7.0
Term 6		Credits
EDUC 836	Qualitative Research Methods and Data Analysis	4.0
Concentration Course 3		3.0
Term Credits		7.0
Term 7		Credits
EDUC 837	Advanced Qualitative Methods and Data Analysis	3.0
Concentration Course 4		3.0
Term Credits		6.0
Term 8		Credits
EDUC 815	Writing for Research, Publication and Funding in Education	3.0
Concentration Course 5		3.0
Term Credits		6.0
Term 9		Credits
EDUC 818	Applied Research Study	3.0
EDUC 880	Doctoral Seminar	1.0-1.5
Term Credits		4.0-4.5
Term 10		Credits
EDUC 997	Doctoral Dissertation	2.0
Term Credits		2.0
Term 11		Credits
EDUC 997	Doctoral Dissertation	2.0
Term Credits		2.0
Term 12		Credits
EDUC 997	Doctoral Dissertation	2.0
Term Credits		2.0

Total Credit: 60.0-60.5

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/ design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy , English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research*. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) *Program Director*. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as innovative problem-setting, thinking qualitatively about school reform. thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) *Department Chair for Teaching, Learning & Curriculum*. Associate Clinical Professor. Special Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) *Senior Associate Dean of Academic Affairs*. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) Associate Dean of Teacher Education and Undergraduate Affairs. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) Program Director, Applied Behavior Analysis and Special Education. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) Director of the Torrance Center for Creativity and Innovation. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Global and International Education

Major: Global and International Education

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 13.1319

Standard Occupational Classification (SOC) code: 25-2062

About the Program

The MS in Global and International Education is designed to prepare students to be leaders with the skills and knowledge necessary to work effectively within the complex economic, political, cultural, and social contexts that influence education and learning in diverse parts of the world. In addition to being aware of the global trends and issues of diverse approaches to education, students will develop the attitudes necessary to support learners and learning within and beyond mainstream educational systems.

Program Objectives

As a result of pursuing this program, students will be able to:

- Develop, analyze and implement new educational policies in a variety of multi-cultural settings, both public and private
- Critique international, comparative, and educational research
- Help lead educational, development, and other organizations through application of their understanding of current educational trends, educational interventions, and global forces
- Understand the global and multi-level politics of education policy
- Understand theories and perspectives on the relationship between education, national development, and societal change, with emphasis on contexts outside the US

Graduates of this program will be qualified to pursue careers in, among other fields and occupations, higher education, ESL programs, education abroad programs, law firms, international education associations, accreditation agencies, local community international outreach centers, US government, international development or human service agencies, and various non-governmental agencies, as well as act as administrators, managers, and researchers in national and international organizations, foundations, associations, and corporations.

Graduates of this program will lead their organizations in addressing the dramatic change in society and culture due to globalization and how these influence education.

The program is designed as a part-time cohort model and can be completed in two years. View the degree requirements for more detailed information about the courses.

Additional Information

For additional information, visit the School of Education's MS in Global and International Education (<http://drexel.edu/soe/academics/graduate/global-and-international-education/>) web page or contact us at gie@drexel.edu.

Admission Requirements

Admission to this program requires:

- **Bachelor's degree** from a regionally accredited institution
- An undergraduate **GPA of 3.0 or higher** (graduate degree GPAs will be considered along with the undergraduate GPA).
- **Graduates of foreign schools** must also have of 550 or higher in the Test of English as a Foreign Language (TOEFL).
- Completed **Application Form**.
- **Official transcripts** from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, applicants may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online (send to: applyDUonline@drexel.edu).

Applicants must supply transcripts regardless of the number of credits earned or the type of school attended. If an applicant does not list all post-secondary institutions on the application and these are listed on transcripts received from other institutions, processing of the application will be delayed until all remaining transcripts have been submitted the remaining transcripts.

Use our Transcript Lookup Tool (<http://online.drexel.edu/support/supporting-documents.aspx>) to assist contact with previous

institutions. If a college or university offers the option to send transcripts in a secure, password-protected electronic format, have the transcript sent to applyDUonline@drexel.edu.

- **Two letters of recommendation** - professional or academic.
 - Drexel University Online now accepts electronic letters of recommendation. Please access the following web page for instructions regarding their submission: <http://www.drexel.edu/apply/recommend> (<http://www.drexel.edu/apply/recommend/>). If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
- **Personal Essay**
- **Resume.**
- **International Students** (<http://online.drexel.edu/support/international-students.aspx>) must submit a TOEFL score of 550 or higher. Students with transcripts from non-US institutions should have such transcripts evaluated by World Education Service (WES). The TOEFL examination is required for some non-citizens. Applicants whose native language is English (who list themselves as born in or citizens of the following countries: American Samoa, Australia, Bahamas, Barbados, Belize, Bermuda, Botswana, British West Indies, Brunei Darussalam, Canada, England, Ghana, Guam, Ireland, Jamaica, Lesotho, Liberia, Malawi, Malta, Mauritius, New Zealand, Papua New Guinea, Puerto Rico, Scotland, Sierra Leone, South Africa, Swaziland, Tanzania, Trinidad/Tobago, Uganda, Virgin Islands, Wales, Zimbabwe) are exempt from the TOEFL. Applicants whose native language is not English are exempt from the TOEFL if the applicant completed 4 years of high school in the United States or completed English 101 and English 102 with a grade of C or better from a US domestic accredited institution. Applicants who received an undergraduate or graduate degree from an academic institution located in the US, UK or Canada are also exempt from the TOEFL.

Please refer to Drexel University Online's Master of Science in Global and International Education Admissions (<http://online.drexel.edu/online-degrees/education-degrees/ms-global/#admissionscriteria>) page for additional information.

Degree Requirements

A Master of Science in Global and International Education is a part-time online program. Students complete six core courses, three primary concentration courses, three secondary concentration or elective courses, and a three course capstone sequence.

Core Courses

EDGI 500	Introduction to Global, International & Comparative Education	3.0
EDGI 504	History and Theory of Comparative Education	3.0
EDGI 510	Culture, Society & Education in Comparative Perspective	3.0
EDGI 512	Globalization and Educational Change	3.0
EDGI 520	Political Economy of Education Reform	3.0
EDHE 680	Foundations of Evaluation	3.0

Primary Concentration Courses

EDGI 506	Comparative Higher Education Systems	3.0
EDGI 514	Education and National Development	3.0
EDGI 518	Analysis of Policy Issues in Global & International Education	3.0

Capstone Requirement

EDU 780	Capstone Research	3.0
---------	-------------------	-----

Students have the option to select from the Practitioner, Thesis, or Lesson Plan capstone track.

EDUP 780	Practitioner Capstone Course I	3.0
or EDUT 780	Thesis Capstone Course I	
or EDUL 780	Lesson Study Capstone Course I	

EDUP 781	Practitioner Capstone Course II	3.0-4.5
or EDUT 781	Thesis Capstone Course II	
or EDUL 781	Lesson Study Capstone Course II	

Select one of the following Secondary Concentrations: 9.0

Secondary Peace Education Concentration *

EDGI 530	Peace Education
EDGI 532	International Organizations in International Education
EDGI 534	Conflict Resolution in an International Context

Secondary Higher Education Concentration

Select 3 of the following Higher Education courses:

EDHE 500	Foundations of Higher Education
EDHE 510	Governance, Management & Administration in Higher Education
EDHE 520	Student Development & Customer Service Management
EDHE 530	Higher Education Law

Secondary E-Learning Leadership Concentration

Select 3 of the following E-Learning Leadership courses:

ELL 501	The Purpose and Business of E-Learning
ELL 502	E-Learning Technologies
ELL 503	Teaching and Learning Issues in E-Learning
ELL 504	Learning Technologies & Disabilities

Secondary Education Policy Concentration **

Select 3 of the following Education Policy courses

EDPO 620	Education Policy: Concepts, Issues, and Applications
EDPO 624	The Shaping of American Education Policy: Global Forces, Interest Groups, and Politics
EDPO 632	Ethics in Educational Policy Making
EDPO 636	Access & Equity in Educational Policy Making

Secondary Learning Technology Concentration

Select 3 of the following:

EDLT 532	Designing Virtual Communities for Staff Development - Non-Field Experience
EDLT 535	Researching & Evaluating Instructional Technology
EDLT 537	Technologies for Performance Support
EDLT 538	New Media Literacies

Sample Electives

Students can select courses as additional electives from within the School of Education or a course (with School of Education approval) from another Drexel University program, such as international business administration, foreign languages, women's and gender studies, or science/technology/society.

EDGI 600	Study Abroad Experience
EDGI 610	International Ecotourism & Education

Total Credits 45.0-46.5

* As an alternative secondary concentration, students may create a customized area of study from other Drexel University departments/programs such as International Business Administration, Women's and Gender Studies, or Science/Technology/Society.

** To complete the Drexel Educational Policy Certificate, students complete 2 additional 3-credit courses: EDPO 628 and EDPO 640.

Sample Plan of Study

Term 1		Credits
EDGI 500	Introduction to Global, International & Comparative Education	3.0
EDGI 504	History and Theory of Comparative Education	3.0
Term Credits		6.0
Term 2		Credits
EDGI 514	Education and National Development	3.0

EDGI 510	Culture, Society & Education in Comparative Perspective	3.0
	Term Credits	6.0
Term 3		
EDGI 512	Globalization and Educational Change	3.0
EDGI 520	Political Economy of Education Reform	3.0
	Term Credits	6.0
Term 4		
	Secondary Concentration Course	3.0
EDGI 518	Analysis of Policy Issues in Global & International Education	3.0
	Term Credits	6.0
Term 5		
EDGI 506	Comparative Higher Education Systems	3.0
EDHE 680	Foundations of Evaluation	3.0
	Term Credits	6.0
Term 6		
	Secondary Concentration Course	3.0
EDU 780	Capstone Research	3.0
	Term Credits	6.0
Term 7		
	Secondary Concentration Course	3.0
EDUP 780, EDUT 780, or EDUL 780	Practitioner Capstone Course I Thesis Capstone Course I Lesson Study Capstone Course I	3.0
	Term Credits	6.0
Term 8		
EDUP 781, EDUT 781, or EDUL 781	Practitioner Capstone Course II Thesis Capstone Course II Lesson Study Capstone Course II	3.0-4.5
	Term Credits	3.0-4.5

Total Credit: 45.0-46.5

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy , English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) Program Director. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as

innovative problem-setting, thinking qualitatively about school reform. thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) Department Chair for Teaching, Learning & Curriculum. Associate Clinical Professor. Special Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) Senior Associate Dean of Academic Affairs. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) Associate Dean of Teacher Education and Undergraduate Affairs. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) Program Director, Applied Behavior Analysis and Special Education. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Higher Education

Major: Higher Education

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 13.0406

Standard Occupational Classification (SOC) code: 11-9033

About the Program

The Master of Science in Higher Education program is designed specifically to prepare highly skilled and knowledgeable practitioners for administrative and leadership positions in higher education. Graduates will be qualified to pursue careers as professionals in colleges and universities and national and international organizations, foundations, associations, and corporations.

Program Objectives

Students graduating with an MS in Higher Education will possess outstanding leadership, organizational, interpersonal and advocacy skills, including the ability to communicate effectively with internal and external groups. Students will be provided with in-depth knowledge regarding both public and private (non-profit and for-profit) institutions, as well as small and large institutions and multi-campus institutions.

About the Curriculum

The program consists of 45.0 credits earned across 15 courses: 5 core courses, 4 courses in the primary concentration of administration and leadership (in which all students are enrolled), 3 elective courses, and 3 courses that comprise the capstone experience. Students may take 3 elective courses of their choice or they may complete a secondary concentration by selecting 3 elective courses from the following areas:

- community college administration and leadership
- education policy
- enrollment management
- global and international education
- learning technologies and instructional design
- neuroscience, learning and online instruction
- student development and affairs

The curriculum incorporates an interdisciplinary approach, and course delivery integrates leading learning strategies and instructional technologies. Courses introduce students to best practices, current

research, software applications and database management systems. Students demonstrate knowledge and skills through both individual and group projects.

The program is designed as a part-time program and may be completed in two years.

Additional Information

For additional information, visit Drexel University's Master of Science in Higher Education (<http://drexel.edu/soe/academics/graduate/higher-education/>) page or contact us at he@drexel.edu.

Admission Requirements

Requirements for admission include:

- Bachelor's degree from a regionally accredited institution
- Undergraduate GPA of 3.0 or higher (graduate degree GPA will be considered along with the undergraduate GPA). Note: Provisional admission may be granted with a GPA between 2.80 to 2.99.

Prospective students must apply through Drexel University Online (<http://online.drexel.edu/>). Required documents include:

- Completed application
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended
- Two professional letters of recommendation
- Personal essay
- Resume
- Additional requirements for International Students (<http://online.drexel.edu/support/international-students.aspx>)

For additional information about the application process, please visit Drexel University Online's Master of Science in Higher Education admissions (<http://online.drexel.edu/online-degrees/education-degrees/ms-he/#admissionscriteria>) web page. For additional information about graduate admissions, please visit the Graduate Admissions at Drexel University (<http://www.drexel.edu/grad/programs/edu/higher-education/>) web page. For additional information about the program, please visit Drexel University's Master of Science in Higher Education (<http://drexel.edu/soe/academics/graduate/higher-education/>) page or contact us at he@drexel.edu.

Degree Requirements

This Master of Science in Higher Education program consists of 15 courses: 5 core courses, 4 primary concentration courses, 3 elective courses or secondary concentration courses, and 3 courses that comprise the capstone experience.

Core Courses

EDHE 500	Foundations of Higher Education	3.0
EDHE 510	Governance, Management & Administration in Higher Education	3.0
EDHE 520	Student Development & Customer Service Management	3.0
EDHE 530	Higher Education Law	3.0
EDHE 602	Managing Campus Operations	3.0

Capstone

EDU 780	Capstone Research	3.0
Students have the option to select from the Practitioner, Thesis, or Lesson Plan capstone track.		
EDUP 780	Practitioner Capstone Course I	3.0

or EDUT 780	Thesis Capstone Course I	
or EDUL 780	Lesson Study Capstone Course I	
EDUP 781	Practitioner Capstone Course II	3.0-4.5
or EDUT 781	Thesis Capstone Course II	
or EDUL 781	Lesson Study Capstone Course II	

Primary Concentration in Higher Education Administration and Leadership

Students complete four of the following courses for the primary concentration:

EDHE 540	Outcomes, Assessments & Continuous Improvement	3.0
EDHE 601	Strategic Planning & Evaluation	3.0
EDHE 606	Higher Education Career Development	3.0
or EDHE 608	Leadership for Learning	
EDHE 669	Diversity in Higher Education	3.0
or EDGI 506	Comparative Higher Education Systems	

Electives or Secondary Concentration (See Below) 9.0

Students select either any three elective courses (from offerings within the School of Education) or three courses within the secondary concentrations offered. Courses within a student's primary concentration do not count as electives.

Total Credits	45.0-46.5
---------------	-----------

Electives or Secondary Concentration

Secondary Concentration in Global and International Education

Select three of the following:

EDGI 500	Introduction to Global, International & Comparative Education	3.0
EDGI 506	Comparative Higher Education Systems	3.0
EDGI 510	Culture, Society & Education in Comparative Perspective	3.0
EDGI 512	Globalization and Educational Change	3.0
EDGI 518	Analysis of Policy Issues in Global & International Education	3.0

Secondary Concentration in Education Policy

EDPO 620	Education Policy: Concepts, Issues, and Applications	3.0
----------	--	-----

Select two of the following:

EDPO 624	The Shaping of American Education Policy: Global Forces, Interest Groups, and Politics	3.0
EDPO 632	Ethics in Educational Policy Making	3.0
EDPO 636	Access & Equity in Educational Policy Making	3.0
EDPO 640	Educational Policy-Making Tactics & Influence	3.0

Secondary Concentration in Community College Administration and Leadership

Select three of the following:

EDHE 634	Proposal Writing & Sponsored Project Management	3.0
EDHE 664	Strategies for Educational Success	3.0
EDHE 668	Transformational Leadership	3.0
EDHE 669	Diversity in Higher Education	3.0

Secondary Concentration in Enrollment Management

Select three of the following:

EDHE 650	Introduction to Enrollment Management	3.0
EDHE 652	Enrollment Marketing, Recruitment & Retention	3.0
EDHE 654	Financial Aid & Enrollment Management	3.0
EDHE 656	Enrollment Management Database Systems & Management	3.0

Secondary Concentration in Learning Technologies and Instructional Design

Select three of the following:

EDLT 532	Designing Virtual Communities for Staff Development - Non-Field Experience	3.0
EDLT 536	Learning Sciences and Instructional Design	3.0
EDLT 537	Technologies for Performance Support	3.0
EDLT 550	Introduction to Instructional Design	3.0
ELL 502	E-Learning Technologies	3.0

Secondary Concentration in Student Development and Affairs

Select three of the following:

EDHE 652	Enrollment Marketing, Recruitment & Retention	3.0
EDHE 662	Critical Issues in Student Affairs	3.0
EDHE 663	Safety and Crisis Management	3.0
EDHE 664	Strategies for Educational Success	3.0

EDHE 669	Diversity in Higher Education	3.0
----------	-------------------------------	-----

Secondary Concentration in Neuroscience, Learning & Online Instruction

Select three of the following:

IPS 553	Neuroscience of Learning	3.0
IPS 554	Online Neuropedagogy, Regulations & Online Instruction	3.0
IPS 600	Capstone: Applying Neurobiology to Instruction	3.0

Sample Plan of Study

Sample Plan of Study

Term 1		Credits
EDHE 500	Foundations of Higher Education	3.0
EDHE 510	Governance, Management & Administration in Higher Education	3.0
Term Credits		6.0
Term 2		
EDHE 520	Student Development & Customer Service Management	3.0
EDHE 530	Higher Education Law	3.0
Term Credits		6.0
Term 3		
EDHE 540	Outcomes, Assessments & Continuous Improvement	3.0
EDHE 602	Managing Campus Operations	3.0
Term Credits		6.0
Term 4		
EDHE 601	Strategic Planning & Evaluation	3.0
EDHE 606 or 608	Higher Education Career Development Leadership for Learning	3.0
Term Credits		6.0
Term 5		
EDHE 669 or EDGI 506	Diversity in Higher Education Comparative Higher Education Systems	3.0
EDU 780	Capstone Research	3.0
Term Credits		6.0
Term 6		
EDUP 780, EDUT 780, or EDUL 780	Practitioner Capstone Course I Thesis Capstone Course I Lesson Study Capstone Course I	3.0
Secondary Concentration course		3.0
Term Credits		6.0
Term 7		
EDUP 781, EDUT 781, or EDUL 781	Practitioner Capstone Course II Thesis Capstone Course II Lesson Study Capstone Course II	3.0-4.5
Term Credits		3.0-4.5
Term 8		
Secondary Concentration courses		6.0
Term Credits		6.0
Total Credit: 45.0-46.5		

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy, English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research*. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) *Program Director*. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as innovative problem-setting, thinking qualitatively about school reform. thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) *Department Chair for Teaching, Learning & Curriculum*. Associate Clinical Professor. Special Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) *Senior Associate Dean of Academic Affairs*. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) *Associate Dean of Teacher Education and Undergraduate Affairs*. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) *Program Director, Applied Behavior Analysis and Special Education*. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Learning Technologies

Major: Learning Technologies

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0-46.5

Co-op Option: None

Classification of Instructional Programs (CIP) code: 13.0501

Standard Occupational Classification (SOC) code: 25-9031

About the Program

The School of Education offers an MS in Learning Technologies program to prepare graduate students to meet the leadership challenges facing schools, higher education, corporate, non-profit, and government organizations related to learning using advanced technologies.

The MS in Learning Technologies program is nationally recognized for its strength in technology, the learning sciences, instructional design & development, online learning, and game-based learning environments. Students are expected to maintain a continuous registration and will be encouraged to take one to two courses per term until completion of their program of study.

Courses are offered in a convenient leading-edge online format, although blended learning enhancements are integrated into the program. Coursework is enriched and supplemented by hands-on learning activities leading to the creation of a product portfolio, interactive communications between faculty, students, and practitioners, connections with employers, and opportunities for collaborative research and writing. The program also features an annual online conference for presentation of program participant research papers and projects, as well as invited keynote

speakers, workshops, and poster sessions. There are also occasional on-campus events, with web-cast access.

Additional Information

For additional information about this program, contact the Program Manager or visit Drexel University Online's MS in Learning Technologies (<https://drexel.edu/soe/academics/graduate/learning-technologies/>) website.

Andrea Guy
 Program Manager
 School of Education
 aes68@drexel.edu
 215-571-4471

Admission Requirements

Each candidate to the MS in Learning Technologies will submit the following application materials:

- Completed application form
- Transcripts (must be provided for every institution attended)
- Personal essay, providing commitment to program's unique features
- Professional resume
- Two letters of recommendation

Admission to the MS in Learning Technologies program will follow the University standards for admission to graduate study including the receipt of a Bachelor's degree from an accredited college or university with an earned GPA of 3.0 or better on a 4.0 scale.

Information about how to apply is available on the Graduate Admissions at Drexel University (<http://www.drexel.edu/grad/apply/overview/>) website.

Degree Requirements

Students pursuing the MS in Learning Technologies will complete the following course requirements.

Core Courses

EDCR 512	Using and Integrating Learning Technologies	3.0
EDLT 503	The Learning Sciences	3.0
EDLT 537	Technologies for Performance Support	3.0
EDLT 541	Foundations of Game-Based Learning	3.0
EDLT 543	Play & Learning in a Participatory Culture	3.0
EDLT 551	Instructional Design Methods	3.0
EDLT 552	Instructional Design: Project Management	3.0
EDLT 553	Instructional Design: Special Topics	3.0
EDLT 554	Learning with Social Media and Mobiles	3.0
EDLT 561	Design-Based Research Methods	3.0
ELL 501	The Purpose and Business of E-Learning	3.0
ELL 504	Learning Technologies & Disabilities	3.0

Capstone Courses

EDU 780	Capstone Research	3.0
Students have the option to select from the Practitioner, Thesis or Lesson Study Capstone tracks:		
EDUP 780	Practitioner Capstone Course I	3.0
or EDUT 780	Thesis Capstone Course I	
or EDUL 780	Lesson Study Capstone Course I	
EDUP 781	Practitioner Capstone Course II	3.0-4.5
or EDUT 781	Thesis Capstone Course II	
or EDUL 781	Lesson Study Capstone Course II	

Total Credits	45.0-46.5
---------------	-----------

Sample Plan of Study

Sample Plan of Study

Term 1		Credits
EDLT 551	Instructional Design Methods	3.0
EDCR 512	Using and Integrating Learning Technologies	3.0
Term Credits		6.0
Term 2		
EDLT 503	The Learning Sciences	3.0
EDLT 552	Instructional Design: Project Management	3.0
Term Credits		6.0
Term 3		
EDLT 553	Instructional Design: Special Topics	3.0
EDLT 561	Design-Based Research Methods	3.0
Term Credits		6.0
Term 4		
ELL 501	The Purpose and Business of E-Learning	3.0
ELL 504	Learning Technologies & Disabilities	3.0
Term Credits		6.0
Term 5		
EDLT 537	Technologies for Performance Support	3.0
EDLT 541	Foundations of Game-Based Learning	3.0
Term Credits		6.0
Term 6		
EDLT 543	Play & Learning in a Participatory Culture	3.0
EDU 780	Capstone Research	3.0
Term Credits		6.0
Term 7		
EDLT 554	Learning with Social Media and Mobiles	3.0
EDUP 780, EDUT 780, or EDUL 780	Practitioner Capstone Course I Thesis Capstone Course I Lesson Study Capstone Course I	3.0
Term Credits		6.0
Term 8		
EDUP 781, EDUT 781, or EDUL 781	Practitioner Capstone Course II Thesis Capstone Course II Lesson Study Capstone Course II	3.0-4.5
Term Credits		3.0-4.5

Total Credit: 45.0-46.5

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/ design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy, English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research*. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) *Program Director*. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as innovative problem-setting, thinking qualitatively about school reform. thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) *Department Chair for Teaching, Learning & Curriculum*. Associate Clinical Professor. Special Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) *Senior Associate Dean of Academic Affairs*. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) *Associate Dean of Teacher Education and Undergraduate Affairs*. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) *Program Director, Applied Behavior Analysis and Special Education*. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Mathematics Learning & Teaching

Major: Mathematics Learning and Teaching

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 13.1311

Standard Occupational Classification (SOC) code: 25-2022

About the Program

Note: This program of study does not lead to teacher certification.

The MS in Mathematics Learning and Teaching is designed for current middle and high school mathematics teachers as well as mathematically inclined elementary teachers. The program is intended to support teachers in teaching mathematics where students learn with understanding, including supporting students in reasoning through the variety of complex mathematical situations that they encounter in the school mathematics curriculum. The Mathematics Learning and Teaching program includes courses with explicit focus on the use of technology in teaching and unpacking, and re-conceptualizing the mathematics of middle and high school curricula. In particular, the program of study involves courses that model best practices in mathematics education, including collaborative problem solving, reflection on practice, and student-centered instruction.

The mathematics education core courses are divided into two sets of courses: introductory (500-level) and advanced (600-level) courses. The introductory courses emphasize content-based and informed pedagogy, representation and communication, connections between multiple representations and multiple solution methods. The advanced courses emphasize common student conceptions, misconceptions and difficulties, diagnosing student thinking, addressing particular students'

needs effectively, scaling "individualized instruction," and collaborative instructional design and analysis.

All courses in this program are in an online format.

Additional Information

For additional information about this program, contact the School of Education (<http://www.drexel.edu/soe/>).

Admission Requirements

Note: This program of study does not lead to teacher certification.

Each candidate will submit the following application materials:

- Completed application form
- Transcripts (must be provided for every institution attended)
- Personal essay, providing commitment to program's unique features
- Professional resume

Admission to the MS in Mathematics Learning & Teaching program will follow the University standards for admission to graduate study including the receipt of a Bachelor's degree from an accredited college or university with an earned GPA of 3.0 on a 4.0 scale.

The Mathematics Learning and Teaching (MLT) program is built around the importance of the integration of research and practice and the importance of connecting school teaching practices with university coursework. As a result, there will be a fieldwork component for some courses. These courses require university students to interact with school-aged students, document their activity (ideally with video-recordings), and bring the results of their work back to the university class for collective analysis and reflection. MS and certificate students who are not current classroom teachers will need to obtain the appropriate Child Abuse and Criminal Record clearances for their state to work with school-aged students in schools during the school day. Such program candidates are also advised to talk with area schools in advance of entering one of the MLT programs to obtain the process for arranging the fieldwork components of the MLT courses.

Additional requirements for the MS in Mathematics Learning and Teaching program include:

- Completion of at least two semesters (or three quarters) of university calculus and at least one university mathematics course beyond university calculus. This additional course must be offered by the mathematics department and cannot include courses on the fundamentals of mathematics, college algebra, or mathematics for elementary school teachers. Exceptions to this requirement will be considered on an individual basis by the program director or the program admissions committee.
- All students must provide evidence of a current teaching position or must secure a site for field placement and complete the Child Abuse and Criminal Record Clearance by the end of the winter term in the first year in the program.

For additional information, contact the School of Education (<http://www.drexel.edu/soe/>). Additional information about how to apply is available on the Graduate Admissions at Drexel University (<http://www.drexel.edu/grad/programs/edu/mathematics-learning-and-teaching/>) website.

Degree Requirements

Education Core Courses

EDUC 522	Evaluation of Instruction	3.0
EDUC 524	Current Research in Curriculum & Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0

Mathematics Education Core Courses

MTED 501	Proportional and Algebraic Reasoning	3.0
MTED 502	Geometry & Spatial Reasoning	3.0
MTED 503	Data Analysis and Probabilistic & Statistical Reasoning	3.0
MTED 511	Functions through the Curriculum	3.0
MTED 601	Diagnosing Student Mathematical Thinking	3.0
MTED 611	Virtual Field Experience I - Online Mentoring	1.5
MTED 612	Virtual Field Experience II - Online Mentoring	1.5
MTED 651	Problem Solving Strategies	3.0

Capstone Courses

EDU 780	Capstone Research	3.0
Students have the option to select from the Practitioner, Thesis or Lesson Study Capstone tracks:		
EDUP 780	Practitioner Capstone Course I	3.0
or EDUT 780	Thesis Capstone Course I	
or EDUL 780	Lesson Study Capstone Course I	
EDUP 781	Practitioner Capstone Course II	3.0-4.5
or EDUT 781	Thesis Capstone Course II	
or EDUL 781	Lesson Study Capstone Course II	

Electives		6.0
Total Credits		45.0-46.5

Sample Plan of Study

		Credits
Term 1		
EDUC 524	Current Research in Curriculum & Instruction	3.0
MTED 502	Geometry & Spatial Reasoning	3.0
Term Credits		6.0
Term 2		
EDUC 522	Evaluation of Instruction	3.0
MTED 501	Proportional and Algebraic Reasoning	3.0
Term Credits		6.0
Term 3		
MTED 511	Functions through the Curriculum	3.0
Elective		3.0
Term Credits		6.0
Term 4		
EDUC 525	Multi-Media Instructional Design	3.0
MTED 503	Data Analysis and Probabilistic & Statistical Reasoning	3.0
Term Credits		6.0
Term 5		
EDU 780	Capstone Research	3.0
MTED 601	Diagnosing Student Mathematical Thinking	3.0
Term Credits		6.0
Term 6		
EDUP 780, EDUT 780, or EDUL 780	Practitioner Capstone Course I Thesis Capstone Course I Lesson Study Capstone Course I	3.0
MTED 611	Virtual Field Experience I - Online Mentoring	1.5
Term Credits		4.5
Term 7		
EDUP 781, EDUT 781, or EDUL 781	Practitioner Capstone Course II Thesis Capstone Course II Lesson Study Capstone Course II	3.0-4.5
MTED 612	Virtual Field Experience II - Online Mentoring	1.5
Term Credits		4.5-6.0
Term 8		

MTED 651	Problem Solving Strategies (Elective)	3.0
Elective		3.0
Term Credits		6.0
Total Credit: 45.0-46.5		

This plan of study is for Fall Term start students only. Please see your advisor if you are beginning this program in the Winter term. While we show the Lesson Study Capstone track above, you can also choose to take the Thesis track or the Practitioner track classes.

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy, English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research*. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) *Program Director*. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as innovative problem-setting, thinking qualitatively about school reform. Thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) *Department Chair for Teaching, Learning & Curriculum*. Associate Clinical Professor. Special Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) *Senior Associate Dean of Academic Affairs*. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (Rtl); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) *Associate Dean of Teacher Education and Undergraduate Affairs*. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) *Program Director, Applied Behavior Analysis and Special Education*. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Special Education

Major: Special Education

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 46.5

Co-op Option: None

Classification of Instructional Programs (CIP) code: 13.1001
 Standard Occupational Classification (SOC) code: 25-2051; 25-2052;
 25-2053; 25-2054; 25-2059

About the Program

The Master of Science in Special Education program is intended for those interested in gaining greater skills and expertise in the area of Special Education and/or a teaching certificate in the area of special education. Candidates seeking Pennsylvania special education certification must have an active Pennsylvania Instructional I or II teaching certificate.

The courses address all required state and federal regulations as well as the Pennsylvania General Standards for Special Education and the competencies and standards outline by the Council of Exceptional Children (CEC).

The Master of Science in Special Education produces professionals who are equipped with the fundamental skills, knowledge, and competencies they need to meet the needs of students with disabilities or those at risk for of developing disabilities. The program is a flexible, part-time graduate program consisting of 45.0 credits: 27.0 credits in Core Special Education Certification courses, 12.0 credits in concentration courses, and 9.0 credits in research. Most courses have a field component that has the student apply what they are learning to classroom experiences. The program culminates with each potential graduate completing an action research project and an ePortfolio that demonstrates the student's mastery of core content.

The Pennsylvania Department of Education (PDE) is currently in the process of restructuring its requirements for Special Education Certification, grades PK-8 and grades 7-12. While the requirements are mandated by the PDE, the School of Education is committed to working with both current and new students to fulfill the competencies as required.

For additional information, please contact the School of Education's undergraduate Academic Advising Department at 215-895-6770.

Available Concentrations

Autism Spectrum Disorders

Within the past decade, the number of children diagnosed with Autism or Asperger's Syndrome has increased drastically. Consequently, the need for professionals trained in this specialized area has significantly increased. This concentration is designed for those who seek additional expertise in this critical need area. It will provide knowledge and skills for working with students with Autism Spectrum Disorder as well as effective teaching methods, interventions, and supports. Students who have an active PA Instructional I or Instructional II teaching certificate are eligible to apply for the PA Autism Spectrum Disorders endorsement upon completion of EDEX 555 and the concentration courses.

Collaborative Special Education Law and Process

Meeting the needs of children with disabilities through school-family-community collaboration is an ambitious goal of educational policy in the United States. An implementing objective is to develop highly qualified special education teachers and administrators in schools and the community, as well as to offer special education collaborative knowledge and practical skills training to parents and advocates, whose cooperative partnership is imperative to support the provisions for the successful learning of all students as incorporated and mandated in legislation such as No Child Left Behind (NCLB) and the Individuals with Disabilities Education Improvement Act of 2004 (IDEA).

Multisensory Reading Instruction Level I with WILSON® Level 1 Certification

It is estimated that up to 20% of school age children experience difficulty with some aspect of literacy. This course sequence gives teachers the necessary skills to provide direct instruction in a multisensory phonetic-based program to students with decoding deficits. With successful completion of the coursework, students are eligible for WILSON® Level 1 Certification. The Wilson Reading System® is recognized nationwide and is a highly desirable certification to have in Special Education.

Special Education Leadership

The courses in the Special Education Leadership concentration focus on change, finance, evaluation and assessment, and technology. Students must complete all courses and meet the prerequisite standards established by the PA Dept. of Education for recommendation for the PA supervisor of Special Education certification.

Applied Behavior Analysis

The ABA concentration prepares candidates with the background and knowledge related to applying behavior therapies in schools with a focus on behavior assessment, change and intervention.

Social Emotional Behavioral Wellness

Social Emotional Learning is an empirically-based approach to the non-academic barriers that students face in order to achieve a set of positive goals. Research shows that 1 in 5 students will experience some type of mental health issue during their time in school. This certificate is designed to help teachers and prospective teachers learn how to create positive classroom environments and how to execute evidence-based, age-appropriate strategies to foster social, emotional, and behavior wellness in PreK-12 students within a multi-tiered system of support. Students who have an active PA Instructional I or Instructional II teaching certificate are eligible to apply for the PA Social Emotional Behavioral endorsement.

Customized Concentration

Students who already possess a special education certification or who are not interested in obtaining a special education certification but want to enhance their skills in specific special education topic areas may choose to take two of the concentrations (24.0 credits) and 15.0 credits of their choosing from the special education certification core in addition to completing the research courses.

Additional Information

For more information about this program, contact the program manager:

Ms. Kyra Dukes, Program Manager
 kat353@drexel.edu

Admission Requirements

Applicants for the program will follow the university standards for admission to graduate study. Prospective students must have earned a bachelor's degree from an accredited institution and have an undergraduate GPA of 3.0 or higher to be considered for admission (graduate degree GPAs will be considered along with the undergraduate GPA). In addition, prospective students are required to submit the following:

- Completed Application Form including official transcripts from all universities or colleges attended
- Two letters of recommendation
- Personal essay

The admissions committee will evaluate the applicant's potential and commitment to succeed in graduate study in the online environment. The applicant's potential to contribute to the overall quality of the program of study will also be considered.

Interviews, in person or by phone, will be conducted by the admissions committee with those applicants who meet Graduate Admission's standard admissions criteria.

Decisions will be made using dates corresponding to the regular university schedule for rolling admissions in Graduate Admissions.

For more information about this program, contact the program manager:

Kyra Dukes
School of Education
Drexel University
215.895.3559
kat353@drexel.edu

Degree Requirements

The Master of Science in Special Education requires 45.0 credits consisting of 27.0 credits in core special education certification courses, 12.0 credits in concentration courses, and 9.0 credits in research. For a certification in special education, students must have completed 9 prerequisite credits in special education accommodations to apply for certification in Pennsylvania.

A field component is required in most courses.

Pre-Requisite Courses

Students must have the following courses in order to apply for a certification in special education. All students entering this master's program from an approved PA certification program after 2011 should have had these core courses in their initial certification program. If a student does not have these courses, they must complete them with a minimum grade of "B" in addition to the core certification offerings:

- EDEX 542: *Fundamentals of Special Education* (3 credits)
- EDEX 544: *The Inclusive Learner* (3 credits)
- EDEX 546: *Literacy and Content Skill Development PreK-8* or or EDEX 566: *Literacy and Content Skill Development 7-12* -- dependent on certification level desired (3 credits)

Required Courses

EDEX 543	Emotional and Behavioral Support of Individuals with Disabilities	3.0
EDEX 549	Teaching Individuals with High Incident Disabilities	3.0
EDEX 550	Teaching Individuals with Low Incident Disabilities	3.0
EDEX 552	Integrating Technology for Learning & Achievement	3.0
EDEX 555	Teaching Students with Autism Spectrum Disorder	3.0
Students will choose a concentration in Grades PreK-8 or Grades 7-12 based off of the certification they are seeking.		9.0
Concentration in Elementary Special Education (Grades PreK-8)		
EDEX 537	Special Education Law and Processes PreK-8	
EDEX 545	Teaching STEAM in an Inclusive Pre-K to 8 Environment	
EDEX 576	Special Education Practicum PreK-8	
Concentration in Secondary Special Education (Grades 7-12)		
EDEX 538	Special Education Law and Processes 7-12	
EDEX 565	Teaching Secondary Mathematics in an Inclusive Environment	
EDEX 577	Special Education Practicum 7-12	

Capstone Courses		
EDU 780	Capstone Research	3.0
Students have the option to select from the Practitioner, Thesis or Lesson Study Capstone tracks:		
EDUP 780	Practitioner Capstone Course I	3.0
or EDUT 780	Thesis Capstone Course I	
or EDUL 780	Lesson Study Capstone Course I	
EDUP 781	Practitioner Capstone Course II	3.0-4.5
or EDUT 781	Thesis Capstone Course II	
or EDUL 781	Lesson Study Capstone Course II	
Concentration Courses		12.0-31.5
Students complete courses from one of the concentrations listed below.		
Total Credits		45.0-66.0

Concentration Options		
Students must complete one of the following concentrations options:		
Autism Spectrum Disorders Concentration		12.0
EDEX 556	Characteristics & Methods: Autism	
EDEX 558	Characteristics & Methods: High Functioning Autism	
EDEX 560	Communication & Language Interventions: Autism Spectrum Disorders	
EDEX 562	Behavior & Sensory Support: Autism Spectrum Disorders	
Collaborative Special Education Law & Process		12.0
EDEX 600	Family, School and Community Engagement in Special Education	
EDEX 601	Special Education Advocacy	
EDEX 602	Special Education Dispute Resolution and Skills Training	
EDEX 710	School Law & Policy in Special Education	
Multisensory Reading Instruction Level **		12.0
EDLS 620	Applied Methods in Multisensory Reading Instruction	
EDLS 621	Multisensory Reading Instruction	
EDLS 622	Basic Word Study I	
EDLS 623	Basic Word Study II	
EDLS 624	Multisensory Practicum I	
EDLS 625	Multisensory Practicum II	
EDLS 626	Multisensory Practicum III	
Special Education Leadership		16.0
EDEX 710	School Law & Policy in Special Education	
EDEX 712	Instructional & Curriculum Leadership in Special Education	
EDEX 714	Development, Supervision, & Support: Special Education Leadership	
EDEX 716	Organization & Administration of Special Education	
EDEX 721	Supervisor of Special Education Internship: Special Education Leadership	
EDEX 722	Supervisor of Special Education Internship: Instructional Leadership	
EDEX 723	Supervisor of Special Education Internship: Collaboration & Personnel	
EDEX 724	Supervisor of Special Education Internship: Finance & Management	
Applied Behavior Analysis		31.5
EDEX 630	Fundamental Elements of Behavior Change	
EDEX 631	Measurement and Experimental Design	
EDEX 632	Behavioral Assessment and Functional Analysis	
EDEX 633	Behavioral Interventions	
EDEX 634	Consultation, Systems Change and Supervision	
EDEX 635	Ethical Considerations and Professional Conduct	
EDEX 636	Applications of Fundamental Elements of Behavior Analysis	
Social Emotional and Behavior Wellness		12.0
EDEX 580	Social Emotional Wellness and Evidence-Based Preventative School Practices	
EDEX 581	Understanding Social Emotional Disorders	
EDEX 582	Evidence-Based School Interventions and Trauma Informed Education/Care	

EDEX 583 Collaboration and Community Based Practices to Promote Social Emotion Wellness

** The multisensory reading instruction courses fulfill certain requirements (but not all) for the Wilson Language Level I certification.

Sample Plan of Study

Basic MS Special Education Program of Study

Candidates pursuing Special Education Leadership Concentration will enroll in additional 1 credit Internship Courses in First Year Term 3 (EDEX 721) and Term 4 (EDEX 722) and Second Year Term 1 (EDEX 723) and Term 2 (EDEX 724).

First Year			
Term 1			Credits
EDEX 537 or 538*	Special Education Law and Processes PreK-8 Special Education Law and Processes 7-12		3.0
EDEX 549	Teaching Individuals with High Incident Disabilities		3.0
Term Credits			6.0
Term 2			
EDEX 555	Teaching Students with Autism Spectrum Disorder		3.0
EDEX 543	Emotional and Behavioral Support of Individuals with Disabilities		3.0
Term Credits			6.0
Term 3			
EDEX 552	Integrating Technology for Learning & Achievement		3.0
Concentration Course			3.0
Term Credits			6.0
Term 4			
EDEX 550	Teaching Individuals with Low Incident Disabilities		3.0
EDU 780	Capstone Research		3.0
Term Credits			6.0
Second Year			
Term 1			
EDEX 545 or 565**	Teaching STEAM in an Inclusive Pre-K to 8 Environment Teaching Secondary Mathematics in an Inclusive Environment		3.0
EDUP 780, EDUL 780, or EDUT 780	Practitioner Capstone Course I Lesson Study Capstone Course I Thesis Capstone Course I		3.0
Concentration Course			3.0
Term Credits			9.0
Term 2			
EDUP 781, EDUL 781, or EDUT 781	Practitioner Capstone Course II Lesson Study Capstone Course II Thesis Capstone Course II		3.0
Concentration Course			3.0
Term Credits			6.0
Term 3			
EDEX 576 or 577***	Special Education Practicum PreK-8 Special Education Practicum 7-12		3.0
Concentration Course			3.0
Term Credits			6.0

Total Credit: 45.0

* Candidates pursuing Special Education PK-8 Certification enroll in EDEX 537. Those seeking Special Education 7-12 Certification enroll EDEX 538

** Candidates pursuing Special Education PK-8 Certification enroll in EDEX 545. Those seeking Special Education 7-12 Certification enroll EDEX 565

*** Candidates pursuing Special Education PK-8 Certification enroll in EDEX 576. Those seeking Special Education 7-12 Certification enroll EDEX 577

MS Special Education with Applied Behavior Analysis Concentration Plan of Study

First Year			
Term 1			Credits
EDEX 537 or 538*	Special Education Law and Processes PreK-8 Special Education Law and Processes 7-12		3.0
EDEX 549	Teaching Individuals with High Incident Disabilities		3.0
Term Credits			6.0
Term 2			
EDEX 555	Teaching Students with Autism Spectrum Disorder		3.0
EDEX 550	Teaching Individuals with Low Incident Disabilities		3.0
Term Credits			6.0
Term 3			
EDEX 552	Integrating Technology for Learning & Achievement		3.0
EDEX 630	Fundamental Elements of Behavior Change		4.5
Term Credits			7.5
Term 4			
EDEX 631	Measurement and Experimental Design		4.5
Term Credits			4.5
Second Year			
Term 1			
EDEX 545 or 565**	Teaching STEAM in an Inclusive Pre-K to 8 Environment Teaching Secondary Mathematics in an Inclusive Environment		3.0
EDEX 632	Behavioral Assessment and Functional Analysis		4.5
Term Credits			7.5
Term 2			
EDEX 633	Behavioral Interventions		4.5
EDEX 543	Emotional and Behavioral Support of Individuals with Disabilities		3.0
Term Credits			7.5
Term 3			
EDEX 576 or 577***	Special Education Practicum PreK-8 Special Education Practicum 7-12		3.0
EDEX 634	Consultation, Systems Change and Supervision		4.5
Term Credits			7.5
Term 4			
EDU 780	Capstone Research		3.0
Term Credits			3.0
Third Year			
Term 1			
EDEX 635	Ethical Considerations and Professional Conduct		4.5
EDUP 780, EDUT 780, or EDUL 780	Practitioner Capstone Course I Thesis Capstone Course I Lesson Study Capstone Course I		3.0
Term Credits			7.5
Term 2			
EDUP 781, EDUT 781, or EDUL 781	Practitioner Capstone Course II Thesis Capstone Course II Lesson Study Capstone Course II		3.0-4.5
EDEX 636	Applications of Fundamental Elements of Behavior Analysis		4.5
Term Credits			7.5-9.0

Total Credit: 64.5-66.0

* Candidates pursuing Special Education PK-8 Certification enroll in EDEX 537. Those seeking Special Education 7-12 Certification enroll EDEX 538

** Candidates pursuing Special Education PK-8 Certification enroll in EDEX 545. Those seeking Special Education 7-12 Certification enroll EDEX 565

*** Candidates pursuing Special Education PK-8 Certification enroll in EDEX 576. Those seeking Special Education 7-12 Certification enroll EDEX 577

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring

and leader development, workplace incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy, English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research*. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) *Program Director*. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as innovative problem-setting, thinking qualitatively about school reform. thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) *Department Chair for Teaching, Learning & Curriculum*. Associate Clinical Professor. Special

Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) *Senior Associate Dean of Academic Affairs*. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) *Associate Dean of Teacher Education and Undergraduate Affairs*. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) *Program Director, Applied Behavior Analysis and Special Education*. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Teaching, Learning and Curriculum

Major: Teaching, Learning, and Curriculum

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0-48.0

Instructional Delivery: Track I and Track III Online or On Campus; Track II Online only

Co-op Option: None

Classification of Instructional Programs (CIP) code: 13.1399

Standard Occupational Classification (SOC) code: 11-9039

About the Program

The MS in Teaching, Learning, and Curriculum program provides three options: (Track I) earning a master's degree while completing requirements to pursue initial Pennsylvania teacher certification for grade level PreK-4, 4 - 8 or a variety of secondary subject areas (grades 7 - 12); (Track II) earning a master's degree to enhance an existing career as a classroom teacher, preparation for additional certifications or for advanced research degrees such as EdD and PhD or (Track III) earning a master's degree while completing requirements to pursue initial Pennsylvania teacher certification in a variety of secondary subject areas and Special Education certification (level 7-12).

Track I: Initial Pennsylvania Teacher Certification

This track incorporates current research on teaching and provides in-depth preparation in pedagogy, curriculum development, teaching students with special needs, implications of learner and task characteristics for instructional design, scaffolding instruction for diverse learners, the latest techniques in evaluation of instruction, and use of interactive technology in instruction. Students are required to synthesize theoretical and practical knowledge through field study in an approved PreK-12 school setting. All candidates are also required to complete supervised field experiences, including a full-time student teaching experience for a minimum of 12 consecutive weeks.

Successful completion of the core pedagogy courses, satisfactory participation in all required field based experiences, subject area content knowledge requirements and state licensure exams allows for recommendation for PA Instructional I certification.

Program Goals

Graduates of the MS in Teaching, Learning and Curriculum (Track I) will:

- Demonstrate independent and creative academic teacher leadership skills that can be applied in the classroom, school community and the profession
- Understand the changing role of the educator in an increasingly diverse society from both an urban and a global perspective, and applies this understanding of best practice supported by educational research
- Demonstrate the ability to reflect upon professional practice during engagement in experiential learning and against a framework of understanding of best practice supported by educational research
- Demonstrate a strong academic background in all subject areas that meet Pennsylvania Department of Education (PDE) content requirements with emphasis on STEM, and can effectively integrate tools of technology in curriculum, assessment and instruction to enhance PK-12 student learning
- Demonstrate the ability to create and maintain a positive and democratic classroom climate that supports and facilitates learning for all students.

Track II: Advanced Studies in Teaching, Learning and Curriculum

This track is designed to provide students with advanced teaching knowledge and skills well beyond that required for initial Pennsylvania certification. Graduates will be prepared to function in a variety of roles

as instructors, instructional leaders or researchers in local, state, national and international organizations, foundations, associations, corporations and private educational institutions.

Program Goals

Graduates of the MS in Teaching, Learning and Curriculum (Track II) will:

- Possess advanced knowledge related to effective instruction in a variety of educational settings.
- Demonstrate skills in developing, analyzing, implementing, and evaluating existing and new instructional strategies and practices in a variety of educational institutions/organizations.
- Exhibit outstanding leadership, organizational, cross cultural, interpersonal and advocacy skills including the ability to communicate effectively with internal and external groups.
- Have in-depth knowledge of both public and private (non-profit and for-profit) institutions as well as small and large institutions.

Students in Track II complete 15 credits in Core Courses, 6 credits in Policy, Law & Organization courses, 9-10.5 credits in a Capstone Course sequence which includes a Research course and the choice of one of the three Capstone Course sequences (Practitioner Capstone 1 & 2, Lesson Study Capstone 1 & 2, or Thesis Capstone 1 & 2) and select a 15-16 credit area of concentration from among a variety of options, providing an opportunity for intensive study in teaching, learning, and curriculum.

Concentration options include Adult Education and Organization Development, Autism Spectrum Disorders, Creativity and Innovation, Education Policy, Global and International Education, Higher Education, Learning Technologies and Multisensory Reading Instruction Level I. If candidates possess a PA Instructional I certification, they can choose an add-on state certification concentration such as including Reading Specialist or Teaching English as a Second Language (TESL).

Students may also customize a concentration including professional electives from other academic departments or can declare a graduate minor based on their interests and professional goals.

Track III: Dual Certification - Secondary Subject Areas with Special Education (7-12)

This track incorporates current research on teaching and provides in-depth preparation in pedagogy, curriculum development, teaching students with special needs, implications of learner and task characteristics for instructional design, scaffolding instruction for diverse learners, the latest techniques in evaluation of instruction, and use of interactive technology in instruction. Students are required to synthesize theoretical and practical knowledge through field study in an approved PreK-12 school setting. All candidates are also required to complete supervised field experiences, including multiple practicum experiences (up to 70 hours) and a full-time student teaching experience for a minimum of 12 consecutive weeks. Clearances must be submitted prior to participation in course work with classroom-based field components.

Successful completion of the Teacher Education core pedagogy courses, Special Education Core Pedagogy and all Secondary Education content knowledge requirements along with qualifying scores on all required state licensing examinations permits Drexel to recommend the candidate for an initial PA Instructional teaching credential and 7-12 Special Education certification.

Program Goals

Graduates of the MS in Teaching, Learning and Curriculum (Track III) will:

- Demonstrate independent and creative academic teacher leadership skills that can be applied in the classroom, school community and the profession
- Understand the changing role of the educator in an increasingly diverse society from both an urban and a global perspective, and apply this understanding of best practice supported by educational research
- Demonstrate the ability to reflect upon professional practice during engagement in experiential learning and against a framework of understanding of best practice supported by educational research
- Demonstrate a strong academic background in all subject areas that meet Pennsylvania Department of Education (PDE) content requirements with emphasis on STEM, and can effectively integrate tools of technology in curriculum, assessment and instruction to enhance PK-12 student learning
- Demonstrate the ability to create and maintain a positive and democratic classroom climate that supports and facilitates learning for all students.
- Exhibit competencies in selecting and executing evidence based behavioral instructional and technology strategies to address the needs of all students
- Create and support inclusive learning environments where all learners are welcomed, challenged and held to high expectations

Admission Requirements

Admission to the MS in Teaching, Learning and Curriculum will follow the University standards for admission to graduate study including receipt of a bachelor's degree from an accredited college or university with an earned GPA of 3.0 on a 4.0 scale. Undergraduates who meet the rigorous requirements for participation in a Bachelor's and Master Dual Degree Program may also be considered for both tracks.

Prospective students can learn about specific admission requirements by visiting the Graduate Admissions at Drexel University (<http://www.drexel.edu/grad/programs/edu/teaching-learning-and-curriculum/>) website.

Degree Requirements

Track I: Initial Pennsylvania Teacher Certification

A minimum of 45.0 credits is required for students with or without prior certification for the Master of Science degree. Students may also pursue the MS in Teaching, Learning and Curriculum; Track I without pursuing PA Instructional I Certification.

Core Courses

Completion of the following 30.0 (secondary certification) credits or 42.0 (PreK-4) credits of core pedagogy courses allows for recommendation for PA Instructional I certification. View the requirements on the Post-Baccalaureate Teaching Certificate: Elementary Pre-K-4 and Secondary Concentrations (p. 376) page for additional information on requirements for specialization in subject areas. Students on Track I who do not wish to pursue PA Instructional I Certification, or who do not qualify for PA Instructional I certification may complete the MS Degree without a concentration by completing 15.0 credits of Core Pedagogy and 30.0 credits of MS Electives.

Track II: Advanced Studies in Teaching, Learning and Curriculum

A minimum of 45.0 credits is required including 27.0 credits of professional core, research policy, and organization courses and 18.0 credits of concentration electives. Students may choose from the following concentration options with the approval of a graduate academic advisor and the program director:

- Adult Education and Organization Development
- Autism Spectrum Disorders
- Creativity and Innovation
- Education Policy
- Global and International Education
- Higher Education
- Learning Technologies
- Multisensory Reading Instruction Level I
- Reading Specialist (48.0 credits required to complete MS)
- Teaching English as a Second Language (TESL)
- Customized concentration (including professional electives from various academic departments:
 - Educational Administration (qualified candidate may begin course work toward the 24.0 credit School Principal K-8 Certification program)
 - Instructional Technology (qualified candidate may begin course work toward the Instructional Technology Specialist Certification program)

Track III: Initial Pennsylvania Teacher Certification with Special Education 7 - 12 Certification

A minimum of 48.0 credits is required for students with or without prior certification for the Master of Science degree. Students may also pursue the MS in Teaching, Learning and Curriculum; without pursuing Certification.

Core Courses

Completion of the following 15.0 (secondary certification) credits and 33.0 Special Education core pedagogy courses allows for recommendation for PA Instructional I and Special Education (7-12) certification. View the requirements on the Post-Baccalaureate Teaching Certificate: Elementary Pre-K-4 and Secondary Concentrations (p. 376) page for additional information on requirements for specialization in subject areas.

Program Requirements

Track I: Teaching, Learning and Curriculum

Students complete 45.0 credit hours of pedagogy and methods course work including classroom-based field components. Successful completion of the Teacher Education Core Pedagogy and all Elementary Education or Secondary Education course work components of the degree, with the grade of B or better in each course, permits Drexel to recommend the candidate for an initial PA Instructional teaching credential providing the candidate is a US citizen or has an appropriate visa status, and has successfully completed all appropriate state testing requirements. Annual background checks are required to participate in course work with classroom-based field components.

Elementary Level Teacher Education Core Pedagogy (15 Credits)

EDEX 542 Fundamentals of Special Education

3.0

EDEX 544	The Inclusive Classroom (Field experience required)	3.0
EDLT 525	Design for Learning with Digital Media	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field experience required)	3.0

Elementary Education: Concentration in Pre-kindergarten - Grade 4 (27 credits)

EDEX 546	Literacy and Content Skill Development PreK-8 ((Field Experience Required))	3.0
EDUC 506	Assessment of Young Learners	3.0
EDUC 513	Elementary Science Teaching Methods	3.0
EDUC 521	Typical and Atypical Development in Early Childhood Education ((Field Experience Required))	3.0
EDUC 529	Early Literacy ((Field Experience Required))	3.0
EDUC 539	Expressive Arts	3.0
EDUC 540	Field Experience (12 week full time student teaching)	3.0
EDUC 555	Social Studies Teaching Methods	3.0
MTED 517	Mathematics Methods and Content (PreK-4) ((Field Experience Required))	3.0
Professional Elective (3 credits)		3.0
Total Credits		45.0

Middle Level Teacher Education Core Pedagogy (15 credits)

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom ((Field Experience Required))	3.0
EDLT 525	Design for Learning with Digital Media	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 565	Foundations in Instructing English Language Learners ((Field Experience Required))	3.0

Middle Level Education Grades 4 - 8 Concentration in Math, English, Social Studies or Science (18 credits)

EDEX 546	Literacy and Content Skill Development PreK-8 ((Field Experience Required))	3.0
EDUC 507	Teaching the Middle School Child ((Field Experience Required))	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 540	Field Experience (12 week full time student teaching)	3.0
EDUC 562	Middle Years Social Studies Methods ((Field Experience Required))	1.5
EDUC 563	Middle Years Mathematical Methods (4-8) ((Field Experience Required))	1.5
EDUC 564	English/Language Arts Teaching Methods for the Middle Years ((Field Experience Required))	1.5
EDUC 567	Middle Years Science Methods	1.5
Professional Electives (12.0)		12.0
Total Credits		45.0

Secondary Level Teacher Education Core Pedagogy (15 credits)

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom	3.0
EDLT 525	Design for Learning with Digital Media	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 565	Foundations in Instructing English Language Learners	3.0

Secondary Education Grades 7-12: Concentration in Biology, Chemistry, Earth and Space Science, English, General Science, Mathematics, Physics, or Social Studies (15 credits)

EDEX 566	Literacy and Content Skill Development 7-12 (Field experience required)	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field experience required)	3.0
EDUC 522	Evaluation of Instruction	3.0
Candidate selects appropriate methods course (including a school-based field component) matching desired area of certification		
EDUC 538	English Teaching Methods (Field experience required)	3.0
or EDUC 514	Science Teaching Methods	

or EDUC 556	Secondary Social Studies Methods (7-12)	
or MTED 519	Teaching Secondary Mathematics	
EDUC 540	Field Experience (12 week full time student teaching)	3.0
Professional Electives (15 credits)		15.0
Total Credits		45.0

Track II: Advanced Studies in Teaching, Learning and Curriculum

Students complete a total of 45-47.5 credit hours dependent on selected concentration. Some concentrations require participation in classroom-based field components (e.g., Autism Spectrum Disorders, Multisensory Reading Instruction Level 1, Reading Specialist, Teaching English as a Second Language). Annual background checks are required to participate in course work with classroom-based field components.

Core Courses (15 credits)

EDAM 714	Instructional and Curriculum Leadership (Take EDLS 550 if pursuing Reading Specialist Concentration)	3.0
or EDLS 550	Theories of Reading and Writing	
EDLT 532	Designing Virtual Communities for Staff Development - Non-Field Experience	3.0
EDUC 530	Advanced Techniques in Instruction & Assessment	3.0
Reading Specialist Concentration students enroll in EDLS 555		
EDLS 555	Understanding Literacy through Sociocultural Perspectives	3.0
or EDUC 609	Language & Culture in Education	
Professional Elective (Reading Specialist Concentration students enroll in EDLS 575 in lieu of elective)		3.0

Policy, Law & Organization Courses (6 credits)

Select two courses from following list. Reading Specialist Concentration students enroll in EDLS 570 and EDLS 650; Educational Policy Concentration students enroll in EDAM 705 and EDUC 804		
EDAM 705	School Law and Politics	
EDLS 570	Literacy and Evaluation	
EDLS 650	Designing a Literacy Program	
EDPO 620	Education Policy: Concepts, Issues, and Applications	
EDUC 804	Program Evaluation in Organizations	

Capstone Courses (9-10.5 credits)

EDU 780	Capstone Research	3.0
Students selects and enrolls in appropriate course work following one of the following capstone tracks: Practioner, Lesson Study, or Thesis		
EDUP 780	Practitioner Capstone Course I	3.0
or EDUL 780	Lesson Study Capstone Course I	
or EDUT 780	Thesis Capstone Course I	
EDUP 781	Practitioner Capstone Course II	3.0-4.5
or EDUL 781	Lesson Study Capstone Course II	
or EDUT 781	Thesis Capstone Course II	

Concentration Option (15-16 credits) *

Candidate selects a formal concentration or creates a customizable, non-transcripted concentration in consultation with an academic advisor. Options include:

Human Resource Development (15 credits)		
EHRD 500	Foundations of Human Resources Development	
EHRD 601	Leading and Evaluating Change	
EHRD 602	Coaching and Mentoring for Sustainable Learning	
EHRD 660	Principles of Adult Learning	
EHRD 604	Development of Human Resources	

Autism Spectrum Disorders (15 credits)

EDEX 555	Teaching Students with Autism Spectrum Disorder	
EDEX 556	Characteristics & Methods: Autism	
EDEX 558	Characteristics & Methods: High Functioning Autism	
EDEX 560	Communication & Language Interventions: Autism Spectrum Disorders	
EDEX 562	Behavior & Sensory Support: Autism Spectrum Disorders	

Creativity and Innovation (15 credits)

CRTV 501	Foundations in Creativity
CRTV 502	Tools and Techniques in Creativity
CRTV 503	Creativity in the Workplace
CRTV 620	Research Methods and Assessment of Creative and Innovative Thinking
CRTV 630	Global Perspectives on Creativity

Educational Policy (15 credits)

EDPO 620	Education Policy: Concepts, Issues, and Applications
EDPO 624	The Shaping of American Education Policy: Global Forces, Interest Groups, and Politics
EDPO 628	American Educational Policy and U.S. Competitiveness
EDPO 632	Ethics in Educational Policy Making
EDPO 636	Access & Equity in Educational Policy Making

Global & International Education (15 credits)

EDGI 500	Introduction to Global, International & Comparative Education
EDGI 504	History and Theory of Comparative Education
EDGI 510	Culture, Society & Education in Comparative Perspective
EDGI 512	Globalization and Educational Change
EDGI 514	Education and National Development

Higher Education (15 credits)

EDHE 500	Foundations of Higher Education
EDHE 510	Governance, Management & Administration in Higher Education
EDHE 530	Higher Education Law
EDHE 669	Diversity in Higher Education
EHRD 660	Principles of Adult Learning
EDGI 506	Comparative Higher Education Systems

Learning Technologies (15 credits)

EDLT 532	Designing Virtual Communities for Staff Development - Non-Field Experience
EDLT 537	Technologies for Performance Support
EDLT 543	Play & Learning in a Participatory Culture
EDLT 550	Introduction to Instructional Design
ELL 501	The Purpose and Business of E-Learning

Multisensory Reading Instruction Level 1 (15 credit)

EDLS 620	Applied Methods in Multisensory Reading Instruction
EDLS 621	Multisensory Reading Instruction
EDLS 622	Basic Word Study I
EDLS 623	Basic Word Study II
EDLS 624	Multisensory Practicum I
EDLS 625	Multisensory Practicum II
EDLS 626	Multisensory Practicum III
Professional Elective (minimum 3 credits)	

Reading Specialist Certification Concentration (16 credits)

EDLS 560	Reading and Writing in the Content Areas (7-12)
EDLS 565	Constructing Meaning through Reading and Writing
EDLS 620	Applied Methods in Multisensory Reading Instruction
EDLS 622	Basic Word Study I
EDLS 623	Basic Word Study II
EDLS 624	Multisensory Practicum I
EDLS 625	Multisensory Practicum II
EDLS 626	Multisensory Practicum III

Teaching English as a Second Language Certification (15 credits)

EDUC 602	Language Learning & Teaching
EDUC 604	Structure and Sound System of English
EDUC 606	Design and Assessment
EDUC 608	The Intercultural Learner
Professional Elective (minimum 1.5 credits)	

Total Credits 45.0-47.5

* Candidates may opt for a formal concentration or a **Customized Concentration** which may include course work from other Drexel academic departments in consultation with an academic advisors. Sample customized concentrations might include:

- Educational Administration
- Evaluation & Assessment
- Instructional Design
- Instructional Technology
- Leadership in Educational Settings
- Learning in Game-Based Environments
- Special Education Law and Process
- Special Education Leadership
- Urban Education

Track III: Teaching, Learning and Curriculum Dual Certification - Secondary Subject Areas with Special Education (7-12)

Students complete 48.0 credit hours of pedagogy and methods course work including classroom-based field components. Successful completion of the Teacher Education and Special Education Core Pedagogy and all Secondary Education course work components of the degree, with the grade of B or better in each course, permits Drexel to recommend the candidate for an initial PA Instructional teaching credential and 7-12 Special Education certification providing the candidate is a US citizen or has an appropriate visa status, and has successfully completed all appropriate state testing requirements. Clearances must be submitted prior to participation in course work with classroom-based field components.

Dual Certification Core: Secondary Education (General Science, Mathematics, Biology, Chemistry, Physics, Earth and Space Science, English or Social Studies with 7-12 Special Education Certification (48.0 credits)

EDEX 538	Special Education Law and Processes 7-12	3.0
EDEX 542	Fundamentals of Special Education	3.0
EDEX 543	Emotional and Behavioral Support of Individuals with Disabilities (Field Experience Required)	3.0
EDEX 544	The Inclusive Classroom (Field Experience Required)	3.0
EDEX 549	Teaching Individuals with High Incident Disabilities (Field Experience Required)	3.0
EDEX 550	Teaching Individuals with Low Incident Disabilities (Field Experience Required)	3.0
EDEX 552	Integrating Technology for Learning & Achievement (Field Experience Required)	3.0
EDEX 555	Teaching Students with Autism Spectrum Disorder (Field Experience Required)	3.0
EDEX 565	Teaching Secondary Mathematics in an Inclusive Environment (Field Experience Required)	3.0
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience Required)	3.0
EDEX 577	Special Education Practicum 7-12 (Stage III Field Practicum required)	3.0
EDLT 525	Design for Learning with Digital Media	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience Required)	3.0
EDUC 522	Evaluation of Instruction	3.0
Candidate selects appropriate methods course (including a school-based field component) matching desired area of certification		
EDUC 514	Science Teaching Methods (Stage III Pre Student Teaching Required)	3.0
or MTED 519	Teaching Secondary Mathematics	
or EDUC 556	Secondary Social Studies Methods (7-12)	
or EDUC 538	English Teaching Methods	

EDUC 540	Field Experience (12 week Student Teaching experience required)	3.0
Total Credits		48.0

Sample Plan of Study

Track I: Initial Certification Track - Secondary Education (Grades 7 - 12) - Students must declare a concentration in Biology, Chemistry, General Science, Earth and Space Science, Physics, Mathematics, English or Social Studies and take appropriate course for concentration during Term 5

First Year		
Term 1		Credits
EDEX 542	Fundamentals of Special Education	3.0
EDUC 520	Professional Studies in Instruction	3.0
Term Credits		6.0
Term 2		
EDEX 544	The Inclusive Classroom	3.0
EDUC 515	Adolescent Learners in Secondary Schools	3.0
Term Credits		6.0
Term 3		
EDEX 566	Literacy and Content Skill Development 7-12	3.0
Professional Elective		3.0
Term Credits		6.0
Term 4		
EDLT 525	Design for Learning with Digital Media	3.0
EDUC 522	Evaluation of Instruction	3.0
Term Credits		6.0
Second Year		
Term 5		
EDUC 514, MTED 519, EDUC 538, or EDUC 556	Science Teaching Methods Teaching Secondary Mathematics English Teaching Methods Secondary Social Studies Methods (7-12)	3.0
Professional Elective		3.0
Term Credits		6.0
Term 6		
EDUC 540	Field Experience	3.0
Term Credits		3.0
Term 7		
EDUC 565	Foundations in Instructing English Language Learners	3.0
Professional Elective		3.0
Term Credits		6.0
Term 8		
Professional Elective		3.0
Professional Elective		3.0
Term Credits		6.0
Total Credit: 45.0		

Track I: Initial Certification Track - Elementary Education (Grades PreK-4)

First Year		
Term 1		Credits
EDEX 542	Fundamentals of Special Education	3.0
EDUC 520	Professional Studies in Instruction	3.0
Term Credits		6.0
Term 2		
EDEX 544	The Inclusive Classroom	3.0

EDLT 525	Design for Learning with Digital Media	3.0
Term Credits		6.0
Term 3		
EDUC 521	Typical and Atypical Development in Early Childhood Education	3.0
EDEX 546	Literacy and Content Skill Development PreK-8	3.0
Term Credits		6.0
Term 4		
EDUC 513	Elementary Science Teaching Methods	3.0
EDUC 506	Assessment of Young Learners	3.0
Term Credits		6.0
Second Year		
Term 5		
MTED 517	Mathematics Methods and Content (PreK-4)	3.0
EDUC 529	Early Literacy	3.0
Term Credits		6.0
Term 6		
EDUC 540	Field Experience (Mandatory Full time Student Teaching)	3.0
Term Credits		3.0
Term 7		
EDUC 555	Social Studies Teaching Methods	3.0
EDUC 565	Foundations in Instructing English Language Learners	3.0
Term Credits		6.0
Term 8		
EDUC 539	Expressive Arts	3.0
Professional Elective		3.0
Term Credits		6.0
Total Credit: 45.0		

Track II: Advanced Studies in Teaching, Learning and Curriculum

Term 1		Credits
EDUC 609	Language & Culture in Education	3.0
Concentration or PLO Course		3.0
Term Credits		6.0
Term 2		
EDUC 530	Advanced Techniques in Instruction & Assessment	3.0
EDLT 532	Designing Virtual Communities for Staff Development - Non-Field Experience	3.0
Term Credits		6.0
Term 3		
EDAM 714	Instructional and Curriculum Leadership	3.0
Concentration Course		3.0
Term Credits		6.0
Term 4		
Concentration Course		3.0
Professional Elective		3.0
Term Credits		6.0
Term 5		
EDU 780	Capstone Research	3.0
Concentration or PLO Course		3.0
Term Credits		6.0
Term 6		
Concentration Course		3.0
Select one of the following Capstone I courses for the track you are following (Practitioner, Thesis or Lesson Study)		3.0
EDUP 780	Practitioner Capstone Course I	
EDUT 780	Thesis Capstone Course I	

EDUL 780	Lesson Study Capstone Course I	
Term Credits		6.0
Term 7		
Select one of the following Capstone 2 courses of the track you are following (Practitioner, Thesis or Lesson Study)		3.0-4.5
EDUP 781	Practitioner Capstone Course II	
EDUT 781	Thesis Capstone Course II	
EDUL 781	Lesson Study Capstone Course II	
Term Credits		3.0-4.5
Term 8		
Concentration or PLO Course		3.0
Concentration Course		3.0
Term Credits		6.0
Total Credit: 45.0-46.5		

Track II: Advanced Studies in Teaching, Learning and Curriculum (Reading Specialist Concentration)

Term 1		Credits
EDLS 575	Responding to Children's and Young Adult Literature	3.0
EDLS 620	Applied Methods in Multisensory Reading Instruction	1.0
EDUC 530	Advanced Techniques in Instruction & Assessment	3.0
Term Credits		7.0
Term 2		
EDLS 550	Theories of Reading and Writing	3.0
EDLS 622	Basic Word Study I	3.0
EDLS 624	Multisensory Practicum I	1.0
Term Credits		7.0
Term 3		
EDLS 555	Understanding Literacy through Sociocultural Perspectives	3.0
EDLS 623	Basic Word Study II	3.0
EDLS 625	Multisensory Practicum II	1.0
Term Credits		7.0
Term 4		
EDLS 560	Reading and Writing in the Content Areas (7-12)	3.0
EDLS 570	Literacy and Evaluation	3.0
EDLS 626	Multisensory Practicum III	1.0
Term Credits		7.0
Term 5		
EDLS 565	Constructing Meaning through Reading and Writing	3.0
EDU 780	Capstone Research	3.0
Term Credits		6.0
Term 6		
EDLS 650	Designing a Literacy Program	3.0
Select one of the following Capstone 1 courses for the track you are following (Practitioner, Thesis or Lesson Study)		
EDUL 780, EDUP 780,	Lesson Study Capstone Course I	3.0
780,	Practitioner Capstone Course I	
or EDUT 780	Thesis Capstone Course I	
Term Credits		6.0
Term 7		
EDLT 532	Designing Virtual Communities for Staff Development - Non-Field Experience	3.0
Select one of the following Capstone 2 courses for the track you are following (Practitioner, Thesis or Lesson Study)		
EDUL 781, EDUP 781,	Lesson Study Capstone Course II	3.0-4.5
781,	Practitioner Capstone Course II	
or EDUT 781	Thesis Capstone Course II	
Term Credits		6.0-7.5
Total Credit: 46.0-47.5		

Track III: Dual Certification Secondary Subject Areas and Special Education (7-12)

First Year		
Fall		
EDUC 565	Foundations in Instructing English Language Learners	3.0
EDEX 542	Fundamentals of Special Education	3.0
Term Credits		6.0
Winter		
EDEX 544	The Inclusive Classroom	3.0
EDUC 515	Adolescent Learners in Secondary Schools	3.0
Term Credits		6.0
Spring		
EDEX 552	Integrating Technology for Learning & Achievement	3.0
EDEX 566	Literacy and Content Skill Development 7-12	3.0
Term Credits		6.0
Summer		
EDEX 555	Teaching Students with Autism Spectrum Disorder	3.0
EDUC 522	Evaluation of Instruction	3.0
Term Credits		6.0
Second Year		
Fall		
EDUC 514, MTED 519, EDUC 556, or EDUC 538	Science Teaching Methods Teaching Secondary Mathematics Secondary Social Studies Methods (7-12) English Teaching Methods	3.0
EDEX 565	Teaching Secondary Mathematics in an Inclusive Environment	3.0
Term Credits		6.0
Winter		
EDEX 543	Emotional and Behavioral Support of Individuals with Disabilities	3.0
EDUC 540	Field Experience	3.0
Term Credits		6.0
Spring		
EDEX 577	Special Education Practicum 7-12	3.0
Term Credits		3.0
Summer		
EDEX 550	Teaching Individuals with Low Incident Disabilities	3.0
Term Credits		3.0
Third Year		
Fall		
EDEX 538	Special Education Law and Processes 7-12	3.0
EDEX 549	Teaching Individuals with High Incident Disabilities	3.0
Term Credits		6.0
Total Credit: 48.0		

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.

Eric Brewe, PhD (*Arizona State University*). Associate Professor. Physics Education Research, introductory course reform, network analysis in learning, neuromechanisms of learning.

José Luis Chávez, EdD (*University of Southern California*). Clinical Professor. Higher education leadership and administration.

Rebecca Clothey, PhD (*University of Pittsburgh*). Associate Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

James Connell, PhD (*Louisiana State University*) *Founding Clinical Core 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.

Kareem Edouard, PhD (*Stanford University*). Assistant Professor. Educational technology; internet-based STEM learning; equity and inclusion in STEM education

Salvatore V. Falletta, EdD (*North Carolina State University*). 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.

Alonzo M. Flowers, III, PhD (*Texas A&M University*). Associate Professor. Education issues including academic identity development of men of color in STEM education, diversity in teaching & learning, research methods/design, and college student development in higher education

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*). Associate Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (*University of Louisville, Kentucky*) *Department Chair for Policy, Organization & Leadership*. Associate Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (*University of Pittsburgh*) *Harrisburg EdD Educational Leadership & Change Program*. Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Dominic F. Gullo, PhD (*Indiana University*). 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.

H. Bernard Hall, PhD (*Temple University*). Assistant Professor. Hip-hop Pedagogy, English Education, Urban Teacher Education.

Penny Hammrich, PhD (*University of Minnesota*) *Dean*. Distinguished University 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.

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.

Deanna Hill, JD, PhD (*University of Pittsburgh*). Associate Clinical Professor. Higher education, international education, education law, education policy

Erin Horvat, PhD (*University of California, Los Angeles*) *Senior Vice Provost for Faculty 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 Dean of Research*. Associate Professor. Educational administration, leadership development, survey & instrument design.

Larry Keiser, PhD (*Drexel University*). Associate Clinical Professor. Education and corporate/business leaders' creativity and entrepreneurial mindsets; creative school/work environments; neuroscience of creativity; everyday creativity for teachers and educators.

Kristine Kelly, PhD (*University of Wisconsin, Madison*). Associate Clinical Professor. Sociology of gender and development; anthropology of policy; comparative and international education; qualitative research methods; Vietnam and Southeast Asia.

Cameron Kiosoglous, PhD (*Virginia Tech University*) *Program Director*. Assistant Clinical Professor. Coached on the USRowing National Team staff since 2002, including the 2004, 2008, 2012, and 2016 Olympic Games; coaching development; measuring coaching quality; self-insight and reflective practices; coaching leadership; conference presenter; published author.

Valerie Klein, PhD (*Amherst College*). Associate 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.

Michael G. Kozak, Ed.D. (*Rowan University*). Assistant Clinical Professor. Leadership, STEAM, online and blended learning environments, systems thinking, experiential learning, K-12 education, and facilitating change

Amanda Lannie, PhD (*Syracuse University*). Assistant Clinical Professor. Applied behavior analysis and special education; School-based consultation; system-wide interventions as a mechanism for delivery supports to all students; Designing effective and efficient interventions for students with emotional/behavioral disorders.

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*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Kristine Lewis-Grant, PhD (*Temple University*). 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*). 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

Joy Phillips, PhD (*The University of Texas at Austin*). Associate Clinical Professor. Visionary leadership in theory and practice, school reform as innovative problem-setting, thinking qualitatively about school reform. thinking about school reform by drawing, Educational Leadership Program Assessment.

Joyce Pittman, PhD (*Iowa State University of Science and Technology*). 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*). Assistant Professor. Educational administration.

Lori Severino, EdD (*Neumann University*). Assistant Professor. Special education, differentiated instruction, reading, Wilson language, multi-sensory instruction, reading comprehension, assessment, adolescent literacy.

Jason Silverman, PhD (*Vanderbilt University*). 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.

Joanne Sloand, EdD (*Duquesne University*) *Department Chair for Teaching, Learning & Curriculum*. Associate Clinical Professor. Special Education Leadership, Trauma-informed care, Parent engagement in special education service delivery.

Brian Smith, PhD (*Northwestern University*) *Senior Associate Dean of Academic Affairs*. Professor. Design of computer-based learning environments, computer science education, human-computer interaction, creativity and innovation; design sciences; informal/everyday learning.

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*). Distinguished Professor. STEM education, urban education, educational assistance

Bridget Sweeney Blakely, PhD (*Temple University*). Assistant Clinical Professor. Consultation; Positive Behavior Interventions and Supports (PBIS); Response to Intervention (RtI); Systems-level change; performance feedback

Mary Jean Tecce DeCarlo, EdD (*University of Pennsylvania*). Associate Clinical Professor. Early literacy development, learning differences, knowledge construction, urban education.

Sarah P. Ulrich, EdD (*Saint Joseph's University*) *Associate Dean of Teacher Education and Undergraduate Affairs*. Clinical Professor. Cross-cultural, language and academic development, school reform, teacher preparation, teacher retention, teacher residencies in urban contexts.

Sheila Vaidya, PhD (*Temple University*). Professor. Educational psychology, school psychology, research design.

Christina Vorndran, PhD (*Louisiana State University*) *Program Director, Applied Behavior Analysis and Special Education*. Clinical Professor. Designing effective and efficient community-based interventions, Severe behavior disorders, Functional behavior assessment

Christopher G. Wright, PhD (*Tufts University*). Assistant Professor. Engineering and science education, Urban education, elementary teacher education.

Emeritus Faculty

Mary Jo Grdina, PhD (*Case Western Reserve University*). Clinical Professor. Undergraduate studies, science education, curriculum design.

Fredricka K. Reisman, PhD (*Syracuse University*) *Director of the Torrance Center for Creativity and Innovation*. Professor Emeritus. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Advanced Teaching and Curriculum Certificate

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Online, Campus

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 13.1399

Standard Occupational Classification (SOC) Code: 11-9039

About the Program

The Advanced Teaching and Curriculum Certificate program (ATCC) meets the needs of in-service teachers in a variety of educational settings who seek advanced knowledge beyond that required for initial teacher certification in the areas of effective instruction, curriculum and assessment.

Upon completion of the ATCC, candidates will possess knowledge of the many facets of education.

- In-depth understanding of varying educational organizations and sectors
- Expertise in developing, analyzing, implementing and evaluating instructional strategies
- Ability to exhibit leadership

- Organizational, cross cultural, interpersonal, advocacy, and communication skills

In addition, the ATCC program will provide candidates opportunities to explore a variety of other roles in an educational setting including:

- Instructional leaders both in and beyond the classroom
- Researchers in local, state, national, or international organizations
- Professionals in foundations, associations, corporations, and private education institutions.

Program Requirements

EDUC 530	Advanced Techniques in Instruction & Assessment	3.0
EDUC 533	Designing Virtual Communities	3.0
EDUC 537	Learning Disabilities II	3.0
EDUC 608	The Intercultural Learner	3.0
EDUC 714	Instructional and Curriculum Leadership	3.0
EDUC 813	Educational Issues Seminar	3.0
Total Credits		18.0

Additional Information

The program is administered through Drexel University Online. For the most current admission information, please visit the Drexel University Online (<https://online.drexel.edu/online-degrees/education-degrees/cert-tlc/>) website.

Post-Master's Certificate in Applied Behavior Analysis

Certificate Level: Graduate

Admission Requirements: Master's degree in Education or Psychology

Certificate Type: Post-Master's

Number of Credits to Completion: 31.5

Instructional Delivery: Campus; Online

Calendar Type: Quarter

Expected Time to Completion: 9 to 15 months

Financial Aid Eligibility: Aid eligible

Classification of Instructional Programs (CIP) Code: 42.2814

Standard Occupational Classification (SOC) Code: 19-3031

About the Program

Behavior analysis is a widely accepted and validated scientific approach to the investigation and manipulation of the environmental arrangements that occasion behavior. Extensive research with proven methods and impressive findings has helped develop the technology now called applied behavior analysis. Behavior analytic clinical and research advances have led to significant contributions in educational programming, and mental health and behavioral health assessment and treatment approaches.

The post master's certificate in Applied Behavior Analysis will prepare clinical and educational leaders in the field of evidence-based approaches using behavior analytic principles and techniques. Graduates from this program will be highly successful candidates for institutions searching for knowledgeable and skilled behavior analysts serving in a variety of roles in behavior analytic settings. Interested students will also be prepared to transition to PhD programs in Applied Behavior Analysis and related fields.

Admission Requirements

Students applying to this program should have the following:

- Master's degree in psychology or education from a regionally accredited institution.
- Graduate GPA of 3.0 or higher.
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.
- An interview, in person or by phone, may be conducted by the admissions committee with those applicants who meet Graduate Admission's standard admissions criteria.

Program Requirements

Core Applied Behavior Analysis Courses

EDEX 630	Fundamental Elements of Behavior Change	4.5
EDEX 631	Measurement and Experimental Design	4.5
EDEX 632	Behavioral Assessment and Functional Analysis	4.5
EDEX 633	Behavioral Interventions	4.5
EDEX 634	Consultation, Systems Change and Supervision	4.5
EDEX 635	Ethical Considerations and Professional Conduct	4.5
EDEX 636	Applications of Fundamental Elements of Behavior Analysis	4.5
Total Credits		31.5

The Behavior Analyst Certification Board, Inc.® (<http://www.bacb.com/>) has approved the Core Applied Behavior Analysis course sequence as meeting the coursework requirements for eligibility to take the Board Certified Behavior Analyst Examination®. Applicants will have to meet additional requirements to qualify including a Master's degree from a regionally accredited institution in Applied Behavior Analysis, Education or Psychology.

Sample Plan of Study

Term 1		Credits
EDEX 630	Fundamental Elements of Behavior Change	4.5
EDEX 632	Behavioral Assessment and Functional Analysis	4.5
Term Credits		9.0
Term 2		Credits
EDEX 631	Measurement and Experimental Design	4.5
EDEX 633	Behavioral Interventions	4.5
Term Credits		9.0
Term 3		Credits
EDEX 634	Consultation, Systems Change and Supervision	4.5
EDEX 635	Ethical Considerations and Professional Conduct	4.5
Term Credits		9.0
Term 4		Credits
EDEX 636	Applications of Fundamental Elements of Behavior Analysis	4.5
Term Credits		4.5
Total Credit: 31.5		

Additional Information

For more information about this program, contact:

Kyra Dukes, MS
Program Manager
Applied Behavior Analysis Program

kat353@drexel.edu

Certificate in Autism Spectrum Disorders

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online, Campus

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.1013

Standard Occupational Classification (SOC) Code: 25-2059

About the Program

Within the past decade, the number of children diagnosed with an Autism Spectrum Disorder (ASD) has increased drastically. Consequently, the need for professionals trained in this specialized area has significantly increased. This course sequence is designed for those who seek additional expertise in this critical-need area. Students who complete the graduate-level Certificate in Autism Spectrum Disorders are equipped with the fundamental skills, knowledge, teaching methods, interventions, and supports needed to work with students with ASD who have varying profiles.

The program is a part-time graduate program consisting of 5 courses (15.0 credits). Teacher certification is not a requirement for admission to this program, however applicants are expected to have completed a bachelor's degree. Upon completion of the program, students with an active PA Instructional I or Instructional II teaching certificate are eligible for the Pennsylvania Department of Education Autism Spectrum Disorders Endorsement.

Admission Requirements

Students applying to this program should have the following:

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.

Program Requirements

Introductory Course

EDEX 555	Teaching Students with Autism Spectrum Disorder	3.0
----------	---	-----

Core Courses

EDEX 556	Characteristics & Methods: Autism	3.0
EDEX 558	Characteristics & Methods: High Functioning Autism	3.0
EDEX 560	Communication & Language Interventions: Autism Spectrum Disorders	3.0
EDEX 562	Behavior & Sensory Support: Autism Spectrum Disorders	3.0

Total Credits		15.0
---------------	--	------

A field component is required in each course.

Sample Plan of Study

First Year

Term 1		Credits
EDEX 555	Teaching Students with Autism Spectrum Disorder	3.0
EDEX 556	Characteristics & Methods: Autism	3.0
EDEX 558	Characteristics & Methods: High Functioning Autism	3.0
Term Credits		9.0

Term 2

EDEX 560	Communication & Language Interventions: Autism Spectrum Disorders	3.0
EDEX 562	Behavior & Sensory Support: Autism Spectrum Disorders	3.0
Term Credits		6.0

Total Credit: 15.0

Additional Information:

For more information about this program, contact the program manager:

Kyra Dukes, MS
Program Manager

kat353@drexel.edu

Certificate in Collaborative Special Education Law and Process

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 13.0402

Standard Occupational Classification (SOC) Code: 11-9039

About the Program

The Collaborative Special Education Law and Process Certificate prepares individuals to meet the unique learning needs of students with disabilities, through legally mandated school, home and community collaboration. Meeting the needs of children with disabilities through school-parent-community collaboration is the goal of educational policy in the United States.

A program goal is to more fully develop highly qualified special education teachers and administrators in schools and the community while offering special education collaborative knowledge and practical skills training to parents and advocates, whose cooperative partnership is imperative to support the provisions for the successful learning of all students as incorporated and mandated in NCLB and the IDEA 2004.

Achieving the program goal and objectives requires collaborative educators, advocates and service providers committed to meeting the learning needs of all students with disabilities. The Collaborative Special Education Law and Process Certificate will benefit participants by providing them with the specialized training necessary to be collaborative

partners in the complex process of implementing federal and state mandates to appropriately educate students with disabilities.

Admission Requirements

Applicants for the program follow the University standards for admissions to graduate study, i.e., possess an earned bachelor's degree from an accredited institution; an earned undergraduate GPA of 3.0 or higher (graduate degree GPA, if applicable, will be considered along with undergraduate GPA). In addition, the candidate will submit for consideration a completed graduate school application with official transcripts from all colleges or universities attended, two letters of recommendation and personal essay.

Requirements

EDEX 600	Family, School and Community Engagement in Special Education	3.0
EDEX 601	Special Education Advocacy	3.0
EDEX 602	Special Education Dispute Resolution and Skills Training	3.0
EDEX 710	School Law & Policy in Special Education	3.0
Total Credits		12.0

Certificate in Community College Administration and Leadership

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: Less than 2 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 13.0407

Standard Occupational Classification (SOC) Code: 11-9033

About the Program

The certificate in community college administration and leadership is an option for students and professionals who have already completed a bachelor's degree and would like to enhance their professional credentials without pursuing a master's degree.

Program Requirements

Required Courses

EDHE 500	Foundations of Higher Education	3.0
EDHE 530	Higher Education Law	3.0
ORGB 631	Leading Effective Organizations	3.0
Select three of the following:		9.0
EDHE 634	Proposal Writing & Sponsored Project Management	
EDHE 664	Strategies for Educational Success	
EDHE 668	Transformational Leadership	
EDHE 669	Diversity in Higher Education	
Total Credits		18.0

Additional Information

For additional information, visit Drexel University's Community College Administration and Leadership (<http://www.drexel.edu/soe/academics/certificates/Community-College-Administration/>) page or contact he@drexel.edu.

Certificate in Creativity and Innovation

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 13.9999

Standard Occupational Classification (SOC) Code: 11-9199

About the Program

The graduate-level certificate in Creativity & Innovation (C&I) is for those who do not wish to pursue a master's degree but who would value a credential that demonstrates their learning. It provides corporate and business leaders, employees, school leaders, teachers, higher education managers and leaders, a mastery of the certificate's contemporary, creativity content knowledge and coursework. It is essential in today's world of increasing complexity, change, and competition that all employees within an organization engage in creative problem solving and new idea generation to solve evolving issues that arise within the work setting. The skill sets to present their innovations to key decision makers within their schools/organizations for implementation is also required. By internalizing the spirit of creativity and the principles of creative problem solving, program participants are transformed into change leaders capable of overcoming the status quo to implement their creative ideas and innovations to inspire new directions and visions.

Upon completion of the certificate in C&I program, students will have formed an in-depth understanding of creativity, enhanced communication, creative problem solving, and how these new solutions and innovations may be applied to practical situations that enhance their workplace culture. Participants will use their newly enhanced creative-thinking skills to reflect critically on existing workplace practices and express coherent and cogent ideas and suggestions for continuous improvement within their workplaces.

Credits from the certificate program may be applied toward the MS in Creativity and Innovation (<http://www.drexel.com/online-degrees/business-degrees/ms-creativity-innovation/>) should a candidate decide to build upon the certificate credential within the allotted time in accordance with University policies.

Program Requirements

Requirements

CRTV 501	Foundations in Creativity	3.0
CRTV 502	Tools and Techniques in Creativity	3.0
CRTV 503	Creativity in the Workplace	3.0
CRTV 610	Creativity and Change Leadership	3.0
CRTV 620	Research Methods and Assessment of Creative and Innovative Thinking	3.0
CRTV 630	Global Perspectives on Creativity	3.0
Total Credits		18.0

Sample Plan of Study

Term		Credits	
Term 1	CRTV 501	Foundations in Creativity	3.0
	Term Credits		3.0
Term 2	CRTV 502	Tools and Techniques in Creativity	3.0
	CRTV 630	Global Perspectives on Creativity	3.0
	Term Credits		6.0
Term 3	CRTV 503	Creativity in the Workplace	3.0
	CRTV 610	Creativity and Change Leadership	3.0
	Term Credits		6.0
Term 4	CRTV 620	Research Methods and Assessment of Creative and Innovative Thinking	3.0
	Term Credits		3.0

Total Credit: 18.0

Additional Information

For more information, visit Drexel Online's Graduate Certificate Creativity and Innovation (<http://www.drexel.com/online-degrees/business-degrees/grad-cert-creativity/>) web page.

Certificate in E-Learning Leadership

Certificate Level: Graduate

Admission Requirements: Bachelor's

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.0501

Standard Occupational Classification (SOC) Code: 25-9011

NOTE: New students will not be admitted to this certificate program for the 2019-20 academic year. Please check back next year.

About the Program

The graduate certificate in E-Learning Leadership is designed to meet the needs of today's working professionals across many fields. As the demand for academic programs and courses to be delivered via e-learning continues to grow, the corresponding need for leadership in this important area increases. Similarly, corporations continue to seek leaders to oversee training and development initiatives via e-learning. This certificate provides, in a concentrated format, the most contemporary knowledge and skills needed in this important area for students who do not wish to pursue a master's degree but who would value a credential that demonstrates their learning.

Admission requires a bachelor's degree from an accredited institution and an undergraduate GPA of a 3.0 on a 4.0 scale. Credits from the certificate in e-learning leadership can be applied toward an MS in Learning Technologies (p. 348).

Objectives

Upon completion of the program, students will have formed an in-depth understanding of online and distance learning theories and will be able to answer the following questions:

- Which emerging technologies hold greatest promise for enriching learning experiences throughout the educational enterprise?
- What pedagogical strategies should designers embody in instructional materials, including those based on multimedia and those reflected in gaming environments?
- How should educators deploy, manage, and evaluate information and communication technologies in classrooms for optimal educational effects?
- What principles of design and practice should educators incorporate into distributed educational courses and programs?

To learn more, visit the Drexel University Online Graduate Certificate in E-Learning (<http://online.drexel.edu/online-degrees/business-degrees/cert-elearning/>) website.

Admission Requirements

Applicants for the program will follow the University standards for admission to graduate study. Prospective students must minimally have earned a bachelor's degree from an accredited institution and have an undergraduate GPA of 3.0 or higher to be considered for admission (graduate degree GPAs will be considered along with the undergraduate GPA).

In addition, prospective students are required to submit the following:

- Completed application form including official transcripts from all universities or colleges attended
- Two letters of recommendation
- Personal essay
- Resume
- Application fee (if applicable)

The applicant's potential to contribute to the overall quality of the program of study will also be considered. Decisions will be made using dates corresponding to the regular University schedule for rolling admissions in Graduate Admissions.

Program Requirements

Requirements		
ELL 501	The Purpose and Business of E-Learning	3.0
ELL 502	E-Learning Technologies	3.0
ELL 503	Teaching and Learning Issues in E-Learning	3.0
ELL 504	Learning Technologies & Disabilities	3.0
ELL 604	Design & Delivery of E-Learning I	3.0
ELL 605	Design & Delivery of E-Learning II	3.0
Total Credits		18.0

Additional Information

To learn more, visit the Drexel University Online Graduate Certificate in E-Learning (<http://online.drexel.edu/online-degrees/business-degrees/cert-elearning/>) website.

Certificate in Education Policy

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

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: 13.0406

Standard Occupational Classification (SOC) Code: 11-9039

About the Program

The certificate in education policy examines the concept of policy as it relates to education and educational institutions and their governance and practices. Students will learn the factors involved in education policy-making, including the ethics in policy-making decisions, and the methods for analyzing phenomenon that impact education policy.

The program is designed to prepare educators of all types in the decision-making process of education policy development.

Program Requirements

Requirements

EDPO 620	Education Policy: Concepts, Issues, and Applications	3.0
EDPO 624	The Shaping of American Education Policy: Global Forces, Interest Groups, and Politics	3.0
EDPO 628	American Educational Policy and U.S. Competitiveness	3.0
EDPO 632	Ethics in Educational Policy Making	3.0
EDPO 636	Access & Equity in Educational Policy Making	3.0
EDPO 640	Educational Policy-Making Tactics & Influence	3.0
Total Credits		18.0

Additional Information

For additional information, visit Drexel University's Certificate in Education Policy (<https://drexel.edu/soe/academics/certificates/Educational-Policy/>) page.

Certificate in Instructional Design

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 27.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.0501

Standard Occupational Classification (SOC) Code: 25-9031

NOTE: New students will not be admitted to this certificate program for the 2019-20 academic year. Please check back next year.

About the Program

The Instructional Design Certificate prepares students to apply the principles, theories, models, tools, and techniques of systematic instructional design in diverse organizational settings. It is appropriate for students from varied professional backgrounds seeking careers that utilize the systematic design and development of effective instruction either in physical facilities, online, or blended environments. This includes individuals preparing to be professional instructional designers, teachers,

and other learning design professionals for PK-20 education, adult education, and workplace training. It specifically addresses the needs of the millennial learner and collaborative, networked communities. Students are encouraged to integrate their professional experiences and engage co-learners from other environments in their explorations.

The outcomes of candidates who successfully complete the Instructional Design Certificate will be able to:

- create effective learning artifacts using a variety of media and methods including social media via mobile devices;
- design an effective instructional development plan that meets the needs of various stakeholders;
- collaborate with and lead a team of talented contributors to create an instructional product resulting in an effective and efficient outcome;
- design and integrate virtual community processes into learning environments;
- design effective learning experiences for online and blended students using tools and methods specific to these environments;
- apply knowledge from the quickly evolving field of learning science to the design process;
- create effective technology-enhanced instruction that includes analysis, design, development, implementation and evaluation;
- recognize and adapt learning environments, tools, methods, and strategies to engage and optimize learning for disabled populations;
- negotiate an effective instructional design and development initiative that meets the needs of a real client; and
- plan, develop, evaluate, and manage the rapid design/development of effective instructional materials.

Admission Requirements

Applicants for the program will follow the University standards for admission to graduate study. Prospective students must minimally have earned a bachelor's degree from an accredited institution and have an undergraduate GPA of 3.0 or higher to be considered for admission (graduate degree GPAs will be considered along with the undergraduate GPA).

In addition, prospective students are required to submit the following:

- Completed application form including official transcripts from all universities or colleges attended
- Two letters of recommendation
- Personal essay
- Resume
- Application fee (if applicable)

The applicant's potential to contribute to the overall quality of the program of study will also be considered. Decisions will be made using dates corresponding to the regular University schedule for rolling admissions in Graduate Admissions.

Credits from the certificate in Instructional Design can be applied toward an MS in Learning Technologies.

Program Requirements

Degree Requirements

Required Core Courses:

EDLT 532	Designing Virtual Communities for Staff Development - Non-Field Experience	3.0
or EDLT 533	Designing Virtual Communities	

EDLT 536	Learning Sciences and Instructional Design	3.0
EDLT 550	Introduction to Instructional Design	3.0
EDLT 554	Learning with Social Media and Mobiles	3.0
EDLT 811	Designing and Developing Multimedia Applications For Learning	3.0
ELL 502	E-Learning Technologies	3.0
ELL 504	Learning Technologies & Disabilities	3.0
Required Capstone Courses:		
EDAM 728	Research Methodology for Action Research	3.0
EDAM 740	Action Research Project	3.0
Total Credits		27.0

Additional Information

For additional information about this program, please contact LearningTech@drexel.edu (learningtech@drexel.edu).

Instructional Technology Specialist Certificate

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 27.0-33.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.0501
Standard Occupational Classification (SOC) Code: 25-9031

About the Program

The Instructional Technology Specialist certificate program was designed to address the dramatically increasing need in public education for certified instructional technology specialists at every level of K-12 schooling.

Applicants for instructional technology specialist Certification should ideally possess valid Pennsylvania Instructional I or II Teaching Certification. Students working on their initial teaching certificate may be required to complete additional coursework. (Visit the School of Education (<http://www.drexel.edu/soe/>) for additional information.)

Minimum coursework requirements for the instructional technology specialist Certificate include 27.0 credits of specific pedagogy. The PA Certification requires a "B" or better in all certification coursework. If a student seeks the Instructional Technology Specialist PA Certification without a previous held teaching certificate, he or she will also be required to complete EDUC 522 and EDUC 525 .

Admission Requirements

Applicants for the program will follow the University standards for admission to graduate study. Prospective students must minimally have earned a bachelor's degree from an accredited institution and have an undergraduate GPA of 3.0 or higher to be considered for admission (graduate degree GPAs will be considered along with the undergraduate GPA).

In addition, prospective students are required to submit the following:

- Completed application form including official transcripts from all universities or colleges attended

- Two letters of recommendation
- Personal essay
- Resume
- Application fee (if applicable)

The applicant's potential to contribute to the overall quality of the program of study will also be considered. Decisions will be made using dates corresponding to the regular University schedule for rolling admissions in Graduate Admissions.

Program Requirements

Core Courses		
EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom	3.0
EDEX 552	Integrating Technology for Learning & Achievement	3.0
EDLT 533	Designing Virtual Communities	3.0
EDLT 534	Developing Educational Leaders Using Technology	3.0
EDLT 535	Researching & Evaluating Instructional Technology	3.0
EDLT 544	Integrating Games & Pedagogical Content Knowledge	3.0
EDUC 565	Foundations in Instructing English Language Learners	3.0
ELL 504	Learning Technologies & Disabilities	3.0
Additional required courses for candidates without prior teacher certification:		0.0-6.0
EDLT 525	Design for Learning with Digital Media	
EDUC 522	Evaluation of Instruction	
Total Credits		27.0-33.0

Additional Information

For additional information about this program, please contact LearningTech@drexel.edu (learningtech@drexel.edu).

Certificate in Math Leadership & Coaching

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 20.0
Instructional Delivery: Online, Campus
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13.1311
Standard Occupational Classification (SOC) Code: 25-1022

About the Program

Building on the existing offerings of the Mathematics Learning and Teaching Program, this graduate certificate will enable current mathematics teachers and leaders to apply for State-Approved Endorsements in Mathematics Coaching. The program is designed to address the needs of math coaches and leaders for all levels of pre-K-12 education. However, the program's flexible design will allow for students to specialize in preK-12, pre-K-8 or 6-12 mathematics coaching and leadership through appropriate selection of Mathematics Education Core courses.

Mathematics Education Core Courses		
Select Two Courses:		6.0
MTED 500	Learning and Teaching Number and Operation	
MTED 501	Proportional and Algebraic Reasoning	
MTED 502	Geometry & Spatial Reasoning	

MTED 503	Data Analysis and Probabilistic & Statistical Reasoning	
MTED 511	Functions through the Curriculum	
Mathematics Coaching and Leadership Core Courses		
MTED 621	Collaborative Instructional Design & Analysis I	3.0
MTED 642	Mathematics Coaching and Leadership	3.0
MTED 643	Practicum in Mathematics Coaching and Leadership	2.0
MTED 651	Problem Solving Strategies	3.0
EDAM 524	Mentoring and Collaborative Leadership	3.0
Total Credits		20.0

Certificate in Mathematics Learning & Teaching

Certificate Level: Graduate

Admissions Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.1311

Standard Occupational Classification (SOC) Code: 25-1022

About the Program

The certificate in mathematics learning and teaching requires the completion of 15.0 credit hours of coursework and is designed to provide mathematics teachers with development opportunities for enhancing the quality of their instruction. Recognizing that many teachers pursue graduate studies while working full-time, the program has been designed such that it can be completed over five quarters (requiring only one course per quarter.) All courses in this program are in an online format.

Students in the certificate program take courses alongside those in the MS in Mathematics Learning & Teaching (p. 351). All of the certificate courses can be counted towards MS in Mathematics Learning & Teaching program. Additionally, certificate students may concurrently pursue the MS in Teaching, Learning and Curriculum (p. 359).

Program Requirements

Required Course

MTED 601	Diagnosing Student Mathematical Thinking	3.0
Select two of the following:		6.0
MTED 501	Proportional and Algebraic Reasoning	
MTED 502	Geometry & Spatial Reasoning	
MTED 503	Data Analysis and Probabilistic & Statistical Reasoning	
MTED 511	Functions through the Curriculum	
Students select 6.0 additional credits from any 600- 700 level MTED courses.		6.0
Total Credits		15.0

Certificate in Multisensory Reading Instruction Level 1

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Campus, Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.1315

Standard Occupational Classification (SOC) Code: 25-2022

About the Program

Students completing this certificate would be become eligible to be certified Wilson Language Level 1 instructors by the Wilson Language Corporation. (<http://www.wilsonlanguage.com/>)

The EDLS 621 course, *Multisensory Reading Instruction K/1*, will enable teachers to implement a tier 1 and tier 2 Response to Intervention reading program for all students in grades K-1. The two other courses, EDLS 622 *Basic Word Study I* and EDLS 623 *Basic Word Study II*, will inform and instruct students on how to teach phonetics, including the six syllable types and the rules of the English language. Three additional practicum courses are offered for students to practice the techniques and theories taught in the courses. The practicums involve tutoring a student for 60 hours.

Admission Requirements

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.
- International Students must submit a TOEFL score indicating a minimum of 600 (paper exam) or 250 (CBT exam). For more information, view the International Students page.

Program Requirements

Required Courses

EDLS 620	Applied Methods in Multisensory Reading Instruction	1.0
EDLS 621	Multisensory Reading Instruction	2.0
EDLS 622	Basic Word Study I	3.0
EDLS 623	Basic Word Study II	3.0
EDLS 624	Multisensory Practicum I	1.0
EDLS 625	Multisensory Practicum II	1.0
EDLS 626	Multisensory Practicum III	1.0
Total Credits		12.0

Additional Information

For more information about this program, contact:

Dr. Lori Severino
Assistant Clinical Professor
Special Education Programs
las492@drexel.edu

School Principal Certificate

Certificate Level: Graduate

Admissions Requirements: Bachelor's

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 24.0

Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.0408 / 13.0409
Standard Occupational Classification (SOC) Code: 11-9032

About the Program

The School Principal Certificate program was designed to produce school leaders who are knowledgeable about current theories and strategies in leadership and change. Components of the program's conceptual bedrock are heuristic diagnostic learning, intelligent use of emotions in interpersonal skills of leadership, creative problem solving, and learning technologies.

Admission Requirements

Applicants come from a variety of undergraduate and graduate backgrounds and typically desire to provide leadership for change as a school principal. The School Principal Certification is available for teachers or counselors who already possess initial teaching or educational specialist certificates. Applicants must meet the general admissions requirements for graduate studies at Drexel University.

Program Requirements

Students will not be recommended for the School Principal Certificate until all course requirements are met, the initial teaching or educational specialist certificate has been received, submitted passing Praxis Exam scores, and three years of satisfactory professional school experience have been completed. Minimum coursework requirements for the School Principal Certificate include 24.0 credits of specific pedagogy as outlined below. Students must achieve the grade of B or better in each graduate-level course needed for certification.

Certification Courses		
EDAM 705	School Law and Politics	3.0
EDAM 708	Integration of Technology with School Instruction and Management	3.0
EDAM 710	School Finance and Facilities	3.0
EDAM 712	School and Community Partnerships and Relations	3.0
EDAM 714	Instructional and Curriculum Leadership	3.0
EDAM 715	School Principal Internship: Technology	1.5
EDAM 716	School Principal Internship: Finance	1.5
EDAM 717	School Principal Internship: Leadership	1.5
EDAM 718	School Principal Internship: Relations	1.5
EDCR 510	Leadership in Educational Contexts and Systems	3.0
Total Credits		24.0

Students working toward School Principal Certification engage in a corresponding 1.5-credit school-based internship when enrolled in EDAM 715, EDAM 716, EDAM 717, EDAM 718 related to each course's content.

Sample Plan of Study

Term	Credits
Term 1	
EDCR 510	Leadership in Educational Contexts and Systems 3.0
	Term Credits 3.0
Term 2	
EDAM 712	School and Community Partnerships and Relations 3.0
EDAM 718	School Principal Internship: Relations 1.5
	Term Credits 4.5

Term 3		
EDAM 714	Instructional and Curriculum Leadership	3.0
EDAM 717	School Principal Internship: Leadership	1.5
	Term Credits	4.5
Term 4		
EDAM 705	School Law and Politics	3.0
EDAM 708	Integration of Technology with School Instruction and Management	3.0
EDAM 715	School Principal Internship: Technology	1.5
	Term Credits	7.5
Term 5		
EDAM 710	School Finance and Facilities	3.0
EDAM 716	School Principal Internship: Finance	1.5
	Term Credits	4.5
Total Credit: 24.0		

Students who possess a valid state-issued teacher or educational specialist certification and have completed a minimum of three years of satisfactory professional school experience upon successful completion of these certification courses, and who also meet the current state minimum score on the appropriate Praxis Exam may apply for School Principal Certification.

Students can receive a Master of Science degree in Educational Administration while pursuing the School Principal Certification. For additional information, visit the Educational Administration (<http://catalog.drexel.edu/graduate/schoolofeducation/educationaladministration/>) catalog page.

Post-Bachelor's Teaching Certificate: Elementary Education

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 42.0
Instructional Delivery: Campus, online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.1202
Standard Occupational Classification (SOC) Code: 25-2021

About the Program

This certificate program is designed for individuals who hold a bachelor's degree and who seek to qualify for Pennsylvania teacher certification at the elementary level (PreK - 4th grade). The curriculum is designed for those changing careers as well as those who already serve as temporary, emergency, or substitute teachers and wish to earn a formal teaching credential. Students completing the certification program have the option to continue coursework to earn their MS in Teaching, Learning & Curriculum degree. All graduate credits earned in this certificate program may be applied toward the Master's degree in Teaching, Learning and Curriculum (p. 359). The coursework in this program will prepare students for a Pennsylvania Instructional I Certificate.

For students intending to teach outside of Pennsylvania, through operation of interstate reciprocity agreements, a Pennsylvania teaching certificate may be converted to the analogous teaching certificate in another state. The School of Education recommends prospective students

contact their state's Department of Education to find out these transfer procedures before proceeding.

Certification Area

Successful completion of Drexel University's Pennsylvania Department of Education-approved programs will allow candidates to pursue Pennsylvania Instructional I certification in the area of Elementary Education (PreK-4).

Additional content area coursework (or equivalent) may be required and is determined by departmental review at the time of application.

Program Requirements

Early Childhood/Elementary (PreK-4) Certification

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
EDEX 546	Literacy and Content Skill Development PreK-8 (Field Experience required)	3.0
EDUC 506	Assessment of Young Learners	3.0
EDUC 513	Elementary Science Teaching Methods	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 521	Typical and Atypical Development in Early Childhood Education (Field Experience required)	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 529	Early Literacy (Field Experience required)	3.0
EDUC 539	Expressive Arts	3.0
EDUC 540	Field Experience (12 week Full time Student Teaching)	3.0
EDUC 555	Social Studies Teaching Methods	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
MTED 517	Mathematics Methods and Content (PreK-4) (Field Experience required)	3.0
Total Credits		42.0

Sample Plan of Study

First Year

Term 1		Credits
EDEX 542	Fundamentals of Special Education	3.0
EDUC 520	Professional Studies in Instruction	3.0
Term Credits		6.0
Term 2		
EDUC 525	Multi-Media Instructional Design	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
Term Credits		6.0
Term 3		
EDEX 546	Literacy and Content Skill Development PreK-8 (Field Experience required)	3.0
EDUC 521	Typical and Atypical Development in Early Childhood Education (Field Experience required)	3.0
Term Credits		6.0
Term 4		
EDUC 513	Elementary Science Teaching Methods	3.0
EDUC 506	Assessment of Young Learners	3.0
Term Credits		6.0

Second Year

Term 5		
EDUC 529	Early Literacy (Field Experience required)	3.0

MTED 517	Mathematics Methods and Content (PreK-4) (Field Experience required)	3.0
Term Credits		6.0
Term 6		
EDUC 540	Field Experience (Mandatory Full time Student Teaching)	3.0
Term Credits		3.0
Term 7		
EDUC 555	Social Studies Teaching Methods	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Term Credits		6.0
Term 8		
EDUC 539	Expressive Arts	3.0
Term Credits		3.0
Total Credit: 42.0		

Post-Bachelor's Teaching Certificate: Secondary Education

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 30.0
Instructional Delivery: Online, Campus
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.1205
Standard Occupational Classification (SOC) Code: 25-2031

About the Program

These certificate programs are designed for individuals who hold a bachelor's degree and who seek to qualify for Pennsylvania teacher certification at the secondary level. The curriculum is designed for those changing careers as well as those who already serve as temporary, emergency, or substitute teachers and wish to earn a formal teaching credential. Students completing the certification program have the option to continue coursework to earn MS in Teaching, Learning & Curriculum degree. All graduate credits earned in this certificate program may be applied toward the Master's degree in Teaching, Learning and Curriculum.

The program will prepare students for a Pennsylvania Instructional I Certificate. Students also have the option of earning the Graduate Intern Teaching Certificate during the course of the program. The PA Graduate Intern Teaching Certificate feature is only available to students who want to teach in Pennsylvania.

For students intending to teach outside of Pennsylvania, through operation of interstate reciprocity agreements, a Pennsylvania teaching certificate may be converted to the analogous teaching certificate in another state. The School recommends prospective students contact the state's Department of Education to find out these transfer procedures before proceeding.

Certification Areas

Drexel University's Pennsylvania Department of Education-approved programs certify students who already hold Bachelor's degrees to be teachers in Secondary Education (7-12):

- biology
- chemistry

- earth and space science
- English
- general science
- mathematics
- physics
- social studies

Additional undergraduate content courses may be required. Learn more about undergraduate content course requirements for secondary certification in each subject.

Program Requirements and Sample Plan of Study

Secondary Biology Core Certification requirements

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
EDUC 514	Science Teaching Methods (Field Experience required)	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 540	Field Experience (12 week Full time student teaching)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Total Credits		30.0

Sample Plan of Study

First Year (Part-Time)

Term 1		Credits	
EDEX 542	Fundamentals of Special Education	3.0	
EDUC 520	Professional Studies in Instruction	3.0	
Term Credits		6.0	
Term 2	EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0	
Term Credits		6.0	
Term 3	EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
Term Credits		3.0	
Term 4	EDUC 525	Multi-Media Instructional Design	3.0
EDUC 522	Evaluation of Instruction	3.0	
Term Credits		6.0	

Second Year (Part-Time)

Term 5		Credits
EDUC 514	Science Teaching Methods (Field Experience required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Term Credits		6.0

Term 6

EDUC 540	Field Experience (12 week full time Student teaching experience)	3.0
Term Credits		3.0

Total Credit: 30.0

Program Requirements and Sample Plan of Study

Secondary Chemistry Core Certification Requirements

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
EDUC 514	Science Teaching Methods (Field Experience required)	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 540	Field Experience (12 week Full time Student Teaching required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Total Credits		30.0

Sample Plan of Study

First Year (Part-Time)

Term 1		Credits	
EDEX 542	Fundamentals of Special Education	3.0	
EDUC 520	Professional Studies in Instruction	3.0	
Term Credits		6.0	
Term 2	EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0	
Term Credits		6.0	
Term 3	EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
Term Credits		3.0	
Term 4	EDUC 525	Multi-Media Instructional Design	3.0
EDUC 522	Evaluation of Instruction	3.0	
Term Credits		6.0	

Second Year (Part-Time)

Term 5		Credits	
EDUC 514	Science Teaching Methods (Field Experience required)	3.0	
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0	
Term Credits		6.0	
Term 6	EDUC 540	Field Experience (12 week full time Student Teaching experience)	3.0
Term Credits		3.0	

Total Credit: 30.0

Program Requirements and Sample Plan of Study

Secondary Earth and Space Science Core Certification requirements

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0

EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
EDUC 514	Science Teaching Methods (Field Experience required)	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 540	Field Experience (12 week Full Time Student Teaching required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Total Credits		30.0

Sample Plan of Study

First Year (Part-Time)

Term 1		Credits
EDEX 542	Fundamentals of Special Education	3.0
EDUC 520	Professional Studies in Instruction	3.0
Term Credits		6.0
Term 2		
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
Term Credits		6.0
Term 3		
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
Term Credits		3.0
Term 4		
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 522	Evaluation of Instruction	3.0
Term Credits		6.0

Second Year (Part-Time)

Term 5		
EDUC 514	Science Teaching Methods (Field Experience required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Term Credits		6.0
Term 6		
EDUC 540	Field Experience (12 Week Full Time Student Teaching required)	3.0
Term Credits		3.0
Total Credit: 30.0		

Program Requirements and Sample Plan of Study

Secondary English Core Certification Requirements

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 538	English Teaching Methods (Field Experience required)	3.0
EDUC 540	Field Experience (12 week Full Time Student Teaching)	3.0

EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Total Credits		30.0

Sample Plan of Study

First Year (Part-Time)

Term 1		Credits
EDEX 542	Fundamentals of Special Education	3.0
EDUC 520	Professional Studies in Instruction	3.0
Term Credits		6.0
Term 2		
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
Term Credits		6.0
Term 3		
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
Term Credits		3.0
Term 4		
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 522	Evaluation of Instruction	3.0
Term Credits		6.0

Second Year (Part-Time)

Term 5		
EDUC 538	English Teaching Methods (Field Experience required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Term Credits		6.0
Term 6		
EDUC 540	Field Experience (12 week Full Time Student Teaching required)	3.0
Term Credits		3.0
Total Credit: 30.0		

Program Requirements and Sample Plan of Study

Secondary General Science Core Certification Requirements

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
EDUC 514	Science Teaching Methods (Field Experience required)	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 540	Field Experience (12 week Full Time Student Teaching required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Total Credits		30.0

Sample Plan of Study

First Year (Part-Time)

Term 1		Credits
EDEX 542	Fundamentals of Special Education	3.0
EDUC 520	Professional Studies in Instruction	3.0
Term Credits		6.0
Term 2		Credits
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
Term Credits		6.0
Term 3		Credits
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
Term Credits		3.0
Term 4		Credits
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 522	Evaluation of Instruction	3.0
Term Credits		6.0

Second Year (Part-Time)

Term 5		Credits
EDUC 514	Science Teaching Methods (Field Experience required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Term Credits		6.0
Term 6		Credits
EDUC 540	Field Experience (12 week Full Time Student Teaching required)	3.0
Term Credits		3.0

Total Credit: 30.0

Program Requirements and Sample Plan of Study

Secondary Mathematics Core Certification Requirements

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 540	Field Experience (12 week Full Time Student Teaching required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
MTED 519	Teaching Secondary Mathematics (Field Experience required)	3.0
Total Credits		30.0

Sample Plan of Study

First Year (Part-Time)

Term 1		Credits
EDEX 542	Fundamentals of Special Education	3.0
EDUC 520	Professional Studies in Instruction	3.0
Term Credits		6.0
Term 2		Credits
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0

EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
Term Credits		6.0

Term 3

EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
Term Credits		3.0

Term 4

EDUC 525	Multi-Media Instructional Design	3.0
EDUC 522	Evaluation of Instruction	3.0
Term Credits		6.0

Second Year (Part-Time)

Term 5

MTED 519	Teaching Secondary Mathematics (Field Experience required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Term Credits		6.0

Term 6

EDUC 540	Field Experience (12 Week Full Time Student Teaching required)	3.0
Term Credits		3.0

Total Credit: 30.0

Program Requirements and Sample Plan of Study

Secondary Physics Core Certification Requirements

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
EDUC 514	Science Teaching Methods (Field Experience required)	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 540	Field Experience (12 week Full Time Student teaching required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0

Total Credits 30.0

Sample Plan of Study

First Year (Part-Time)

Term 1		Credits
EDEX 542	Fundamentals of Special Education	3.0
EDUC 520	Professional Studies in Instruction	3.0
Term Credits		6.0

Term 2

EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
Term Credits		6.0

Term 3

EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
Term Credits		3.0

Term 4

EDUC 525	Multi-Media Instructional Design	3.0
EDUC 522	Evaluation of Instruction	3.0
Term Credits		6.0

Second Year (Part-Time)		
Term 5		
EDUC 514	Science Teaching Methods (Field Experience required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Term Credits		6.0
Term 6		
EDUC 540	Field Experience (12 week Full Time Student Teaching required)	3.0
Term Credits		3.0
Total Credit: 30.0		

Program Requirements and Sample Plan of Study

Secondary Social Studies Core Certification Requirements		
EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDUC 520	Professional Studies in Instruction	3.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 540	Field Experience (12 week Full Time Student Teaching required)	3.0
EDUC 556	Secondary Social Studies Methods (7-12) (Field Experience required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Total Credits		30.0

Sample Plan of Study

First Year (Part-Time)		
Term 1		
EDEX 542	Fundamentals of Special Education	3.0
EDUC 520	Professional Studies in Instruction	3.0
Term Credits		6.0
Term 2		
EDUC 515	Adolescent Learners in Secondary Schools (Field Experience required)	3.0
EDEX 544	The Inclusive Classroom (Field Experience required)	3.0
Term Credits		6.0
Term 3		
EDEX 566	Literacy and Content Skill Development 7-12 (Field Experience required)	3.0
Term Credits		3.0
Term 4		
EDUC 525	Multi-Media Instructional Design	3.0
EDUC 522	Evaluation of Instruction	3.0
Term Credits		6.0
Second Year (Part-Time)		
Term 5		
EDUC 556	Secondary Social Studies Methods (7-12) (Field Experience required)	3.0
EDUC 565	Foundations in Instructing English Language Learners (Field Experience required)	3.0
Term Credits		6.0

Term 6		
EDUC 540	Field Experience (12 Week Full Time Student Teaching required)	3.0
Term Credits		3.0
Total Credit: 30.0		

Special Education 7-12 Post-Bachelor's Certificate

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 24.0
Instructional Delivery: Online, Campus
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.1019
Standard Occupational Classification (SOC) Code: 25-2054

About the Program

The special education 7-12 certification program seeks to produce professionals who are equipped with the fundamental skills, knowledge, and competencies necessary to meet the needs of students at risk for school failure and students with disabilities in multiple settings.

This certificate program focuses on students at the secondary level. The special education 7-12 certification program is intended for those interested in gaining greater skills and expertise in the area of secondary special education and a teaching certificate in the area of secondary special education. Candidates seeking PA special education 7-12 certification must have an active PA Instructional I or Instructional II teaching certificate in a required area.

This program is a part-time graduate program consisting of 27.0 credits in core special education 7-12 certification courses. For students that have not completed the prerequisite courses, the program will require 36.0 credits; 27.0 credits in core special education 7-12 certification courses and 9.0 credits in prerequisite courses.

The program is designed for currently certified teachers who wish to obtain special education 7-12 certification in Pennsylvania. Out-of-state teachers may also earn their PA special education 7-12 certification if they transfer their current teacher certification to PA.

The courses cover all required state and federal regulations as well as the PA General Standards for Special Education and the standards outlined by the Council of Exceptional Children (CEC).

Admission Requirements

Students applying to this program should have the following:

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.

Program Requirements

Pre-requisites for Special Education 7-12 Certification *

EDEX 542	Fundamentals of Special Education	
EDEX 544	The Inclusive Classroom	
EDEX 566	Literacy and Content Skill Development 7-12	
Required Courses: 7-12 Special Education Certification Concentration		
EDEX 538	Special Education Law and Processes 7-12	3.0
EDEX 543	Emotional and Behavioral Support of Individuals with Disabilities	3.0
EDEX 549	Teaching Individuals with High Incident Disabilities	3.0
EDEX 550	Teaching Individuals with Low Incident Disabilities	3.0
EDEX 552	Integrating Technology for Learning & Achievement	3.0
EDEX 555	Teaching Students with Autism Spectrum Disorder	3.0
EDEX 565	Teaching Secondary Mathematics in an Inclusive Environment	3.0
EDEX 577	Special Education Practicum 7-12	3.0
Total Credits		24.0

* 9.0 quarter credits total. All students entering this program from an approved PA certification program after 2011 should have had these three courses in their initial certification requirements. If a student does not have these courses, he or she must complete them with a minimum grade of "B" in addition to the required core certification courses.

A field component is required in most courses.

Additional Information:

For more information about this program, contact the program manager:

Ms. Kyra Dukes, Program Manager
kat353@drexel.edu

Graduate Intern Teaching Certificate

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 30.0 (secondary); 42.0 (Pre-K)

Instructional Delivery: Campus, Online

Calendar Type: Quarter

Expected Time to Completion: 1 - 3 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 13.1202; 13.1205

Standard Occupational Classification (SOC) Code: 25-2021; 25-2022; 25-2031

About the Program

Admission Requirements

Applicants for the Graduate Intern Teaching Certificate program must complete an interview with a teacher education advisor before completing a graduate application. During this interview the applicant's transcripts are evaluated in relation to Pennsylvania state standards for the specific certification area. If coursework is dated, a content exam or additional coursework may be required. Life experience that demonstrates knowledge of the content area will be considered. Additional coursework in the content area may be required to meet certification standards. In

addition, applicants must meet the general admission requirements for graduate studies at Drexel University.

Program Requirements

Graduate Intern Teaching Certificate applicants for secondary certification must have a bachelor's degree in an area related to that in which they intend to become certified. Before a candidate can move from a PA Intern Teaching Certificate to full certification, the PA Instructional I Teaching Certification, all coursework for the full teaching certificate must be met. Minimum coursework requirements for full teacher certification include 30.0 credits (grades 7-12 teacher certification areas), 33.0 credits (grades 4 - 8 teacher certification areas) and 42.0 credits (PreK-4 teacher certification) of pedagogy coursework. This coursework may be incorporated into the graduate Teaching, Learning and Curriculum master's degree program in the subject area of certification.

Drexel's PA Intern Certificate teachers may obtain a full-time teaching position after they have been recommended by the School of Education for the Pennsylvania Department of Education Intern Teaching Certificate. As candidate is required to be continually enrolled at Drexel once the non-renewable PA Intern Certificate is issued until the candidate is fully certified, and as the PA Intern Teaching Certificate is only valid for a maximum of three years, Drexel prefers to recommend candidates for the PA Intern Teaching Certificate after a school or school district has indicated to the candidate that they wish to hire the candidate without full teacher certification (PA Instructional I). Successful completion of the appropriate sections of the PECT/Praxis Series assessment through Educational Testing Service (ETS) for Grades 4 - 8 and grades 7-12 Certification areas or PECT exams through Pearson Education for PreK-4 Certification are also required to be recommended for a PA Intern Teaching Certificate. Drexel has final decision as to whether or not to recommend a candidate for a PA Intern Certificate regardless of a candidate's credentials.

In situations where a candidate is offered a teaching position prior to completing EDUC 540 Field Experience (the graduate version of student teaching), the Intern must register for EDUC 540 in the next available term. The PA Intern's classroom setting needs to be appropriate to the area being pursued for certification. A Drexel University Supervisor will be appointed and the Intern's first 12 weeks classroom teaching will serve as the Intern's student teaching placement.

It is strongly recommended that students admitted into the Drexel graduate program minimally and successfully complete EDUC 520 Professional Studies in Instruction, EDEX 542 Fundamentals of Special Education, the appropriate methods course, and EDUC 540 Field Experience prior to requesting a PA Intern Teaching Certificate. A grade of B or better is required in order for all Drexel pedagogy courses (EDUC and EDEX courses) to be considered successfully completed.

Completion of all required pedagogy coursework with at least a B in each and a B average in required content courses and passing the appropriate Pennsylvania state licensing exams will satisfy requirements for Pennsylvania Instructional I Certification.

Reading Specialist Certificate

Certificate Level: Graduate

Admissions Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 31.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.1315

Standard Occupational Classification (SOC) Code: 25-2022; 25-2031

About the Program

The Reading Specialist Certificate Program is designed for teachers who already possess an Instructional I certificate in PA or another State who has a desire to become literacy coach, a literacy program/curriculum consultant (for a school, literacy center, etc.), a reading intervention specialist, or to supplement existing knowledge/skills in developing expertise as a reading instructor. The program is designed for teachers who want to obtain another certification as a Reading Specialist. Students completing Drexel's Reading Specialist program would also become eligible to obtain the Wilson Language Instruction Level 1 by the Wilson Language Corporation. Through reciprocity agreements among the states, graduates can transfer their certification in almost any state across the United States.

Program Requirements

Reading Specialist Certificate Requirements:

EDLS 550	Theories of Reading and Writing	3.0
EDLS 555	Understanding Literacy through Sociocultural Perspectives	3.0
EDLS 560	Reading and Writing in the Content Areas (7-12)	3.0
EDLS 565	Constructing Meaning through Reading and Writing	3.0
EDLS 570	Literacy and Evaluation	3.0
EDLS 575	Responding to Children's and Young Adult Literature	3.0
EDLS 620	Applied Methods in Multisensory Reading Instruction	1.0
EDLS 622	Basic Word Study I	3.0
EDLS 623	Basic Word Study II	3.0
EDLS 624	Multisensory Practicum I	1.0
EDLS 625	Multisensory Practicum II	1.0
EDLS 626	Multisensory Practicum III	1.0
EDLS 650	Designing a Literacy Program	3.0
Total Credits		31.0

Post-Bachelor's Certificate in Special Education Leadership

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 25.0

Instructional Delivery: Online, Campus

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.0402

Standard Occupational Classification (SOC) Code: 11-9039

About the Program

The Post-Bachelor's Certificate in Special Education Leadership program is designed to produce educators who are equipped with the advanced skills, knowledge, and competencies necessary to lead programs that meet the needs of students at risk for and with disabilities in multiple settings.

The program requires 16.0 credits of special education leadership courses and 9.0 credits of leadership core courses (for a total of 25.0 credits).

The courses in the leadership core focus on areas of change, finance, evaluation and assessment, and technology. Students must complete all courses and meet the prerequisite standards established by the PA Dept of Education for recommendation for the PA Supervisor of Special Education certification.

Admission Requirements

Students applying to this program should have the following:

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.

Program Requirements

Leadership Core Courses

EDAM 708	Integration of Technology with School Instruction and Management	3.0
EDAM 710	School Finance and Facilities	3.0
EDAM 722	Evaluation & Assessment Competencies	3.0
Special Education Leadership Concentration Courses		
EDEX 710	School Law & Policy in Special Education	3.0
EDEX 712	Instructional & Curriculum Leadership in Special Education	3.0
EDEX 714	Development, Supervision, & Support: Special Education Leadership	3.0
EDEX 716	Organization & Administration of Special Education	3.0
EDEX 721	Supervisor of Special Education Internship: Special Education Leadership	1.0
EDEX 722	Supervisor of Special Education Internship: Instructional Leadership	1.0
EDEX 723	Supervisor of Special Education Internship: Collaboration & Personnel	1.0
EDEX 724	Supervisor of Special Education Internship: Finance & Management	1.0
Total Credits		25.0

Additional Information:

For more information about this program, contact the program manager:

Ms. Kyra Dukes, Program Manager
kat353@drexel.edu

Special Education PreK-8 Post-Bachelor's Certificate

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 24.0

Instructional Delivery: Online; Campus

Calendar Type: Quarter

Expected Time to Completion: 2 years

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.1017

Standard Occupational Classification (SOC) Code: 25-2052

About the Program

The special education PreK-8 certification program seeks to produce professionals who are equipped with the fundamental skills, knowledge, and competencies necessary to meet the needs of students at risk for school failure and students with disabilities in multiple settings.

This certificate program focuses on students from the prekindergarten to middle school levels. The special education PreK-8 certification program is intended for those interested in gaining greater skills and expertise in the area of PreK-8 special education and a teaching certificate in the area of PreK-8 special education. Candidates seeking PA special education PreK-8 certification must have an active PA Instructional I or Instructional II teaching certificate in a required area.

This program is a part-time graduate program consisting of 24.0 credits in core special education PreK-8 certification courses. For students that have not completed the prerequisite courses, the program will require 33.0 credits: 24.0 credits in core special education PreK-8 certification courses and 9.0 credits in prerequisite courses.

The program is designed for currently certified teachers who wish to obtain special education PreK-8 certification in Pennsylvania. Out of state teachers may also earn their PA special education PreK-8 certification if they transfer their current teacher certification to PA.

The courses cover all required state and federal regulations as well as the PA General Standards for Special Education and the standards outlined by the Council of Exceptional Children (CEC).

Admission Requirements

Students applying to this program should have the following:

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.

Program Requirements

Pre-requisites for Certification in Special Education (PreK-8)

Students must have completed the following courses in order to apply for a Pennsylvania Special Education PreK-8 certification. All students entering the post-bachelor's certificate program after 2011 should have had these core courses in their initial certification program. If a student has not completed the following three courses, they should be taken to apply for special education certification:

EDEX 542	Fundamentals of Special Education	3.0
EDEX 544	The Inclusive Classroom	3.0
EDEX 546	Literacy and Content Skill Development PreK-8	3.0

Core Certification Courses

EDEX 537	Special Education Law and Processes PreK-8	3.0
EDEX 543	Emotional and Behavioral Support of Individuals with Disabilities	3.0
EDEX 545	Teaching STEAM in an Inclusive Pre-K to 8 Environment	3.0
EDEX 549	Teaching Individuals with High Incident Disabilities	3.0

EDEX 550	Teaching Individuals with Low Incident Disabilities	3.0
EDEX 552	Integrating Technology for Learning & Achievement	3.0
EDEX 555	Teaching Students with Autism Spectrum Disorder	3.0
EDEX 576	Special Education Practicum PreK-8	3.0
Total Credits		24.0

A field component is required in most courses.

Sample Plan of Study

First Year

Term 1		Credits
EDEX 537	Special Education Law and Processes PreK-8	3.0
EDEX 549	Teaching Individuals with High Incident Disabilities	3.0
Term Credits		6.0

Term 2

EDEX 550	Teaching Individuals with Low Incident Disabilities	3.0
EDEX 555	Teaching Students with Autism Spectrum Disorder	3.0
Term Credits		6.0

Term 3

EDEX 552	Integrating Technology for Learning & Achievement	3.0
EDEX 576	Special Education Practicum PreK-8	3.0
Term Credits		6.0

Second Year

Term 1

EDEX 543	Emotional and Behavioral Support of Individuals with Disabilities	3.0
EDEX 545	Teaching STEAM in an Inclusive Pre-K to 8 Environment	3.0
Term Credits		6.0

Total Credit: 24.0

Additional Information:

For more information about this program, contact the program manager:

Ms. Kyra Dukes, Program Manager
kat353@drexel.edu

STEM Education Certificate

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 12.0

Instructional Delivery: Online, Campus

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.1316

Standard Occupational Classification (SOC) Code: 25-2022; 25-2031

About the Program

The Certificate in STEM embraces the School of Education's and Universities focus on STEM education. The program creates an opportunity for those individuals who want to gain further understanding of STEM and provides the comprehensive education needed to effectively teach STEM concepts, as well as integrates strategies within the curriculum to effectively enhance student performance in STEM areas. The primary goal for the certificate in STEM Education is to broaden and deepen students' understanding of STEM education.

Admission Requirements

- Bachelor's degree from a regionally accredited institution
- Two letters of recommendation
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended
- Completed Application Form
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA)
- An essay describing why you are interested in pursuing graduate study in this field
- International Students must submit a TOEFL score indicating a minimum of 600 (paper exam) or 250 (CBT exam).

Program Requirements

Required Courses

EDUC 840	Theories of Individual Cognition in STEM Education	3.0
EDUC 842	Social Foundation and Group Cognition in STEM Education	3.0
EDUC 844	Creativity and Innovation in STEM Education	3.0
Capstone Course (select one)		3.0
EDUC 514	Science Teaching Methods	
MTED 519	Teaching Secondary Mathematics	
Total Credits		12.0

Certificate in Student Development and Affairs

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 18.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: Less than 2 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 13.0406

Standard Occupational Classification (SOC) Code: 11-9033

About the Program

The certificate in student development and affairs is an option for students and professionals who have already completed a bachelor's degree and would like to enhance their professional credentials without pursuing a master's degree.

Program Requirements

Required Courses

EDHE 500	Foundations of Higher Education	3.0
EDHE 520	Student Development & Customer Service Management	3.0
EDHE 530	Higher Education Law	3.0
Select three of the following:		9.0
EDHE 652	Enrollment Marketing, Recruitment & Retention	
EDHE 662	Critical Issues in Student Affairs	
EDHE 663	Safety and Crisis Management	
EDHE 669	Diversity in Higher Education	
Total Credits		18.0

Additional Information

For additional information, visit Drexel University's Certificate in Student Development and Affairs (<http://www.drexel.edu/soe/academics/certificates/Student-Development-and-Affairs/>) page or contact he@drexel.edu.

Teaching English as a Second Language

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 13.5

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 13.1401

Standard Occupational Classification (SOC) Code: 25-2031

About the Program

Teaching English as a second language certification is an add-on certificate available to candidates that currently possess a Pennsylvania Instructional I or Instructional II teaching certificate. The 13.5 credit ESL certificate program covers the theory and practice of second language education, the structure and sound of English, the design and assessment of ESL course materials, as well as broader issues in intercultural learning. Completion of the program also includes field-based experiences and a capstone action research project, under the guidance of an ESL Program Specialist. It does not require that the instructor speak another language. Credits earned through this program may be applied toward the MS in Teaching, Learning and Curriculum (p. 359) initial certification or advanced track programs. All candidates are also required to complete field experiences ranging from 10 hours to 30 hours per course.

This program satisfies PA State of Education requirements for Program Specialist: ESL endorsement. Interstate agreements generally allow applicability across the US. However, prospective candidates outside of Pennsylvania are advised to check with their state authorities to determine whether this program is appropriate for their case.

Program Requirements

Courses

EDUC 602	Language Learning & Teaching	3.0
EDUC 604	Structure and Sound System of English	3.0
EDUC 606	Design and Assessment	3.0
EDUC 608	The Intercultural Learner	4.5
Total Credits		13.5

Sample Plan of Study

First Year

Term 1		Credits
EDUC 602	Language Learning & Teaching	3.0
EDUC 604	Structure and Sound System of English	3.0
Term Credits		6.0

Term 2

EDUC 606	Design and Assessment	3.0
----------	-----------------------	-----

EDUC 608	The Intercultural Learner	4.5
	Term Credits	7.5
Total Credit:		13.5

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.

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.

Majors

- Biostatistics (MS) (p. 390)
- Biostatistics (PhD) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/biostatisticsphd/>)
- Community Health and Prevention (MPH) (p. 391)
- Community Health and Prevention (PhD) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/communityhealthandpreventionphd/>)
- Environmental and Occupational Health (MPH) (p. 393)
- **NEW:** Environmental and Occupational Health (PhD)
- Environmental and Occupational Health Sciences (MS) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/environmentalandoccupationalhealthsciences/>)
- Epidemiology (MPH) (p. 396)
- Epidemiology (MS) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/epidemiologym/>)
- Epidemiology (PhD) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/epidemiologyphd/>)
- **NEW:** Global Health (MPH)
- Health Management and Policy (MPH) (p. 398)
- Health Management and Policy (DrPH) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/healthmanagementandpolicydrph/>)
- Health Services Research and Policy (MS) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/healthservicesresearchandpolicym/>)
- Health Services Research and Policy (PhD) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/healthservicesresearchandpolicy/>)
- Population Health Science (MS) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/populationhealthscience/>)
- Public Health (MPH) (p. 401)
- Public Health - Executive Program (MPH) (p. 404)
- Public Health Ethics (MS) (<http://catalog.drexel.edu/graduate/schoolofpublichealth/publichealthethics/>)

Joint Degrees

- **NEW:** Health Services Research and Policy MS/MD (<http://catalog.drexel.edu/graduate/schoolofpublichealth/healthservicesresearchandpolicy-msmd/>)
- Law/Public Health JD/MPH (<http://catalog.drexel.edu/graduate/schoolofpublichealth/jdmph/>)
- Public Health MD/MPH (<http://catalog.drexel.edu/graduate/schoolofpublichealth/mdmph/>)
- Public Health/Business Administration MPH/MBA (<http://catalog.drexel.edu/graduate/schoolofpublichealth/mphmba/>)

Minors

- **NEW:** Arts and Community Health
- Biostatistics (<http://catalog.drexel.edu/graduate/schoolofpublichealth/biostatisticsgminor/>)
- Environmental and Occupational Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/environmentalandoccupationalhealthgminor/>)
- Global Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/globalhealthgminor/>)
- Health Economics (<http://catalog.drexel.edu/graduate/schoolofpublichealth/healtheconomicsgminor/>)
- Human Health Risk Assessment (<http://catalog.drexel.edu/graduate/schoolofpublichealth/humanhealthriskassessmentgminor/>)
- Infectious Disease and Population Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/infectiousdiseasegminor/>)
- Latino and Immigrant Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/latinoimmigranthealthgminor/>)
- Lesbian, Gay, Bisexual and Transgender (LGBT) Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/lgbtgminor/>)
- Maternal and Child Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/maternalandchildhealthgminor/>)
- Program Monitoring and Evaluation (<http://catalog.drexel.edu/graduate/schoolofpublichealth/programmonitoringandevaluationgminor/>)
- Public Health Emergency Preparedness (<http://catalog.drexel.edu/graduate/schoolofpublichealth/publichealthemergencypreparednessgminor/>)
- Public Health Ethics and History (<http://catalog.drexel.edu/graduate/schoolofpublichealth/publichealthethicsandhistorygminor/>)
- **NEW:** Social Justice Policy
- Substance Use and Misuse (<http://catalog.drexel.edu/graduate/schoolofpublichealth/substanceuseandmisusegminor/>)
- Urban Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/urbanhealthgminor/>)

Certificates

- Epidemiology and Biostatistics (p. 405)
- Global Health (p. 406)
- Lesbian, Gay, Bisexual and Transgender (LGBT) Health (p. 407)
- Maternal and Child Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/maternalandchildhealthpbc/>)
- **NEW:** Public Health

Dornsife School of Public Health Faculty

Joseph Amon, PhD, MSPH (*Uniformed Services University of the Health Sciences*) *Director of the Office of Global Health*. Clinical Professor. Department of Community Health and Prevention. Global health; health and human rights; political epidemiology; ethics; mixed methods; health policy and advocacy; HIV/TB; monitoring and evaluation.

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

Sharrelle Barber, ScD, MPH (*Harvard University*). Assistant Research Professor. Department of Epidemiology and Biostatistics. Racism and health inequities, social epidemiology cardiovascular disease epidemiology, urban health, global health.

Scarlett Bellamy, ScD (*Harvard University*). Professor. Department of Epidemiology and Biostatistics. Clinical Trials Data Analysis Methods Health Disparities Infectious Disease Mental health and Behavioral health Reproductive or Sexual Health.

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.

Usama Bilal, PhD, MPH, MD (*Johns Hopkins University*). Assistant Professor. Department of Epidemiology and Biostatistics. Urban health; macrosocial determinants of chronic diseases; health inequalities; food environments and nutrition; epidemiologic methods.

Sandra Bloom, MD (*Temple University School of Medicine*). Associate Professor. Department of Health Management and Policy. Psychological trauma and organizational stress.

Sherry Brandt-Rauf, MPhil, JD (*Columbia University*). Associate Teaching Professor. Department of Environmental and Occupational Health. Health policy, occupational health, environmental exposures, health disparities, public health law.

Jennifer Breaux, DrPh, MPH, CHES (*Drexel University*) *Director of Undergraduate Education*. Assistant Professor. Department of Community Health and Prevention. Maternal and child health, community health, human rights.

Darryl Brown, PhD (*Johns Hopkins University*) *Director of HMP Doctoral Programs*. Assistant Teaching Professor. Department of Health Management and Policy. Health services research and planning; health inequality, patient reported outcomes, applied health economics.

James W. Buehler, MD (*University of California, San Francisco*) *Director, MPH Program*. Clinical Professor. Department of Health Management and Policy. Public health capacity and practice, public health and healthcare interface, urban health.

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. Drexel University College of Medicine; Infectious diseases, public health emergency preparedness, medicine and public health, public health practice, crisis and emergency risk communication.

Mariana Chilton, PhD, MPH (*University of Pennsylvania*) *Director, Center for Hunger-Free Communities*. Professor. Department of Health Management and Policy. Nutrition, housing and health; chronic diseases; human rights, chronic diseases, community health, human rights and hunger.

Jane Clougherty, MSc, ScD (*Harvard University*). Associate Professor. Department of Environmental and Occupational Health. Social susceptibility to environmental pollutants; air pollution exposure science; community violence; urban health.

AnneClaire De Roos, PhD, MPH (*University of North Carolina at Chapel Hill*). Associate Professor. Department of Environmental and Occupational Health. Environmental and occupational epidemiology, pesticides, persistent pollutants, drinking water quality, greenspace in cities, extreme weather 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.

Nancy Epstein, MPH, MAHL (*University of North Carolina at Chapel Hill*). Professor. Department of Community Health and Prevention. Community organizing and community engagement strategies; arts and community health; religion, spirituality and health; health policy and advocacy; organizational and group dynamics; 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.

Alex Ezeh, PhD (*University of Pennsylvania*). Dornsife Professor. Department of Community Health and Prevention. Global/International Health; Reproductive and Sexual Health; Urban Health.

Jerry Fagliano, MPH, PhD (*Johns Hopkins University*) *Chair*. Associate Clinical Professor. Department of Environmental and Occupational Health. Children's health and environmental exposures; health impacts of climate change; inequities in environmental exposure and disease; spatial distribution and clustering of disease.

Robert I. Field, PhD, JD, MPH (*Columbia University*) *Director of the JD-Master of Public Health Program*. Professor. Department of Health Management and Policy. Health law; public health law; health system structure; ethics of vaccines; public policy and legal aspects of health reform; genetic privacy.

Janet Fleetwood, PhD (*University of Southern California*). Professor. Department of Community Health and Prevention. Bioethics, Strategic Planning, Social Justice & Equity.

Arthur L. Frank, MD, PhD (*Mount Sinai School of Medicine*) *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*). Associate Teaching Professor. Department of Health Management and Policy. Health department structure and financing; health policy and law; Medicare/Medicaid and public health infrastructure.

Marla Gold, MD (*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.

Neil Goldstein, PhD, MBI (*Drexel University*). Assistant Research Professor. Department of Epidemiology and Biostatistics. Data Analysis Methods, eHealth or mHealth, Infectious Disease, Maternal and Child Health, Reproductive or Sexual health, Spatial Analysis or GIS, Statistical Modeling, Vaccines and vaccinations, Electronic medical records/informatics, Translational epidemiology.

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.

Ali Groves, PhD, MHS (*University of North Carolina*). Assistant Professor. Department of Community Health and Prevention. Reproductive or sexual health; maternal and child health; global health; data analysis methods.

Irene Headen, PhD (*University of California, Berkeley*). Assistant Professor. Community Engaged Research, Health Disparities Health and Place, Maternal and Child Health Mixed Methods Research, Social Determinants of Racial/Ethnic Inequities in Maternal Health, Spatial Analysis or GIS, Urban Health

Tom Hipper, MSPH, MA (*Johns Hopkins Bloomberg School of Public Health*). Assistant Professor. Department of Environmental and Occupational Health. Crisis and risk communication in public health; mental health of first responders

Jana Hirsch, MES, PhD (*University of Michigan*). Assistant Research Professor. Department of Epidemiology and Biostatistics. Health and place, built environment, health disparities, behavioral health, spatial analysis, GIS, urban health, physical activity, active aging and age-friendly neighborhoods, gentrification, neighborhood change.

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.

Tran Huynh, PhD, MPH, CIH (*University of Minnesota*). Assistant Professor. Department of Environmental and Occupational Health. Industrial hygiene, immigrant health, occupational health, occupational exposure assessment and epidemiology, occupational health disparities, nail salons.

Jessie Kemmick Pintor, PhD, MPH (*University of Minnesota*). Assistant Professor. Department of Health Management and Policy. Community based participatory research; immigrant health; health disparities; health services research; health policy; maternal & child health; mixed methods; immigration policy.

Ann Klassen, PhD (*Johns Hopkins University*). Professor. Department of Community Health and Prevention. Cancer and chronic disease disparities, urban health, minority, immigrant and global health, tobacco control, nutrition, health communication, qualitative and mixed methods, place-based and spatial analysis.

Jennifer Kolker, MPH (*University of Michigan*) *Associate Dean for Public Health Practice; Director of Executive MPH Program*. Associate Clinical Professor. Department of Health Management and Policy. Public health policy and practice, workforce training, safety net programs, urban health issues; health department infrastructure and financing.

Shiriki Kumanyika, PhD, MS, MPH (*Cornell University*). Research Professor. Department of Community Health and Prevention. Solutions to obesity and diet-related diseases in black children and adults, Ethnic disparities in obesity in the US and other high-income countries, "Culture of health" approaches in black communities, Assessment of food environments, Environmental influences on lifestyle changes, Targeted marketing of unhealthy foods and beverages, Food and nutrition policy, Evidence-based public health, Social determinants of health and health equity, Systems science applications in public 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*) *Associate Dean for Research*. 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.

Michael LeVasseur, PhD (*Drexel University*). Visiting Assistant Professor. Data Analysis Methods, Health Disparities, Infectious Disease, Reproductive or Sexual Health

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. Cardiovascular disease and diabetes epidemiology; Pharmacoepidemiology; Burden of disease and health disparity; Hospital EHRs data for disease risk surveillance and prediction; Air pollution and urban health.

Gina Lovasi, PhD, MPH (*University of Washington*) *Co-Director of the Urban Health Collaborative*. Dornsife Associate Professor. Department of Epidemiology and Biostatistics. Cardiovascular disease; data analysis methods; health and place or built environment; health disparities; spatial analysis or GIS; urban health; urban trees and greenspace; local retail; transportation, infrastructure and policies.

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*. Professor. Department of Epidemiology and Biostatistics. 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 University*). 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 Emerita. 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.

Alex Ortega, PhD (*University of Michigan*) *Chair; Director, Center for Population Health and Community Impact*. Professor. Department of Health Management and Policy. Epidemiological methods in health services research; health needs of Latino children and families; health disparities intervention research; youth engagement in community interventions.

Sungchul Park, PhD, MPH (*University of Washington*). Assistant Professor. Department of Health Management and Policy. Health economics; health policy; health services research; health disparities; Medicare; managed care; statistical modelling; and data analysis methods.

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.

Harrison Quick, PhD (*University of Minnesota*). Assistant Professor. Department of Epidemiology and Biostatistics. Bayesian inference; spatial and spatiotemporal data analysis; statistical disclosure limitation.

Alex Quistberg, PhD, MPH (*University of Washington*). Assistant Research Professor. Department of Environmental and Occupational Health. Data analysis methods, global health or international health, health and place or built environment, health disparities, spatial analysis or GIS, urban health, intentional/violent injury and trauma, unintentional injury and trauma.

John A. Rich, MD, MPH (*Duke University*) *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.

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.

Brisa Sanchez, PhD (*Harvard University*). Dornsife Endowed Professor. Department of Epidemiology and Biostatistics. Statistical methods development, big data, data integration for environment studies, health disparities, environment exposure, built environment.

Ayden Scheim, PhD (*Western University, Canada*). Assistant Professor. Department of Epidemiology and Biostatistics. Social epidemiology, health disparities, global health, HIV/AIDS, LGBT health, injection drug use, research methods for small and hidden populations, community-based participatory research.

Ayden Scheim, PhD (*Western University*). Assistant Professor. Global Health or International health, Infectious Disease, Substance Use, Community Based Participatory Research, Social Epidemiology, Survey Research Methods, HIV/AIDS, LGBT Health.

Leah Schinasi, PhD (*University of North Carolina*). Assistant Research Professor. Department of Environmental and Occupational Health. Health and place or built environment, occupational health, urban health, environmental health, environmental justice, environmental epidemiology, climate change.

Randall L. Sell, ScD (*Harvard University*). Professor. Department of Community Health and Prevention. Demography; Defining and measuring sexual orientations, gender and sex; Sampling sexual and gender minorities for public health research.

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.

Jim Stimpson, PhD (*University of Nebraska*) Associate Dean for Academic Affairs. Professor. Department of Health Management and Policy. Health policy; Health services research; Health disparities; Immigrant health; Health and place or built environment; Urban health; Medical sociology.

Theresa Sweet, PhD, MPH (*University of Michigan*). Associate Teaching 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*). Associate Professor. Department of Epidemiology and Biostatistics. Methods for categorical, missing and hierarchical data; spatial epidemiology/statistics, Bayesian inference, and disease mapping.

Jennifer A. Taylor, PhD, MPH, CPPH (*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.

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. Psychosocial risk for HIV infection and STIs among sexual and gender minority adults and adolescents; correction of misclassification of sexuality and its impact on measurement of HIV/STI risk; agent-based model simulation of HIV and STI incidence among persons with substantial risk for acquiring infection; impact of life course sexual trauma and violence on mental health conditions, substance abuse, and HIV risk; HIV natural history, pathogenesis and clinical trials.

Michael Yudell, MPH, PhD (*Columbia University*) Chair, Department of Community Health. Associate Professor. Department of Community Health and Prevention. Public health ethics; history of public health; race and racism; autism.

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.

Biostatistics

Major: Public Health

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 47.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 26.1102

Standard Occupational Classification (SOC) code: 11-9121; 15-2041

About the Program

Biostatistics applies statistical, mathematical and computational techniques to scientific research in health-related fields, including medicine, epidemiology, and public health. Biostatistics has been an integral and indispensable tool in improving health and reducing illness. Biostatisticians play essential roles in designing studies and analyzing research data. Graduates with degrees in biostatistics are employed in public health research and service organizations, university research groups, hospitals, pharmaceutical companies, health-related industries and government. The demand for biostatisticians in the job market has been consistently strong. New technologies are generating an unprecedented amount of data which present exciting opportunities for biostatisticians with strong computational skills.

The goal of Drexel University's MS Program in Biostatistics is to provide students with a thorough understanding of biostatistical methods, strong computational skills, and the ability to apply this knowledge to research focusing on health related problems. The program prepares students for handling the quantitative and computational aspects of a research project, ranging from study design, data collection and management, developing analysis plans, conducting analyses and reporting findings both orally and in writing. The MS in Biostatistics program includes course work in statistical theory and methods, computing and data management, epidemiology, and general public health topics. Incorporated into the second year is a two quarter-long practicum experience working on a real academic, government, or industry project in a sponsoring organization setting. The practicum-based research project will involve the application of biostatistical analysis to a problem of significance to the sponsoring academic, government or industry organization with joint oversight provided by a Department faculty member and an on-site PhD level biostatistician.

Upon graduation MS students will attain competencies in the following three areas: general public health knowledge, biostatistics knowledge, data management and computing skills.

Additional Information

For additional information about the program, visit the Dornsife School of Public Health (<http://publichealth.drexel.edu>) web site.

Admission Requirements

Applicants to the MS in Biostatistics must meet the following requirements, having:

- a baccalaureate degree, ideally in a quantitative field such as mathematics, economics and computer science or a scientific area such as natural, biological, medical and environmental sciences.
- at least two semesters of calculus in college.
- at least one semester of linear algebra in college.
- knowledge and experience in computing such as operating system, office software and Internet. Familiarity with a programming language or a statistical package is desirable.

The application package will include:

- undergraduate and graduate transcripts
- three letters of recommendation from faculty or professionals who can evaluate the applicant's promise as a graduate student

- Graduate Record Examination (GRE) scores are NOT required, however, you may choose to submit scores to strengthen your application
- International applicants must submit an English Language Proficiency exam. Applicants may submit the TOEFL or IELTS. TOEFL and IELTS exams are considered valid for two (2) years from the date the exam was administered.
- a written statement of career and educational goals

Degree Requirements

Completion of the MS in Biostatistics requires: (1) a minimum of 47 credit hours of course work; (2) a cumulative grade point average of 3.0 or higher; (3) a substantial data analysis project (6 credit hours) with a written report (30-50 pages) and oral presentation.

Required Biostatistics Courses

BST 551	Statistical Inference I	3.0
BST 553	Longitudinal Data Analysis	3.0
BST 555	Introduction to Statistical Computing	3.0
BST 557	Survival Data Analysis	3.0
BST 569	Linear Statistical Models	4.0
BST 570	Generalized Linear Models	3.0
BST 651	Statistical Inference II	4.0
BST 701	Advanced Statistical Computing	3.0

Required Epidemiology Course

EPI 570	Introduction to Epidemiology	3.0
---------	------------------------------	-----

Required Public Health Course

PBHL 501	Introduction to Public Health	0.0
----------	-------------------------------	-----

Master's Project Course

BST 699	Data Analysis Project	6.0
---------	-----------------------	-----

Electives

Students must select 12.0 credits total. Some potential electives include the following:

BST 557	Survival Data Analysis	
BST 558	Applied Multivariate Analysis	
BST 561	Design & Analysis of Clinical Trials	
BST 567	Statistical Consulting	
BST 568	Nonparametric and Semiparametric Models	
BST 604	Applied Bayesian Analysis	
EPI 550	Applied Survey Research in Epidemiology	
EPI 552	Epidemiology for Public Health Practice	
EPI 553	Infectious Disease Epidemiology	
EPI 556	Perinatal Epidemiology	
EPI 557	Cardiovascular Disease Epidemiology & Prevention	
EPI 558	Making Sense of Data	
EPI 559	Pharmacoepidemiology	
EPI 561	Pathophysiologic Basis of Epidemiologic Research	
EPI 573	Autism as a Public Health Challenge	

Total Credits 47.0

Sample Plan of Study

Term 1		Credits
BST 551	Statistical Inference I	3.0
BST 555	Introduction to Statistical Computing	3.0
BST 569	Linear Statistical Models	4.0
Term Credits		10.0
Term 2		
BST 651	Statistical Inference II	4.0
BST 570	Generalized Linear Models	3.0

EPI 570	Introduction to Epidemiology	3.0
Term Credits		10.0
Term 3		
BST 557	Survival Data Analysis	3.0
BST 701	Advanced Statistical Computing	3.0
Biostatistics elective		3.0
Term Credits		9.0
Term 4		
BST 553	Longitudinal Data Analysis	3.0
BST 699	Data Analysis Project	3.0
Biostatistics elective		3.0
Term Credits		9.0
Term 5		
BST 699	Data Analysis Project	3.0
PBHL 501	Introduction to Public Health	0.0
Biostatistics electives		6.0
Term Credits		9.0
Total Credit: 47.0		

Community Health and Prevention

Major: Community Health and Prevention

Degrees Awarded: Master of Public Health (MPH)

Calendar Type: Quarter

Total Credit Hours: 56.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.2201

Standard Occupational Classification (SOC) code: 11-9111; 21-1091; 21-1094

About the Program

As a student in Community Health and Prevention, you will learn about the major drivers of community health, obtain the skills you need to design, implement, and evaluate public health interventions, and learn how to improve health through meaningful partnerships with community stakeholders. Community Health and Prevention faculty focus on a range of topics including public health ethics, the individual, social and structural determinants of health, the use of theory to understand health behavior, and the implementation and evaluation of public health interventions and policies. Our students are trained in the application of mixed methods – the use of both quantitative and qualitative approaches in data collection and analysis to understand, promote and sustain community health. The student's classroom and practical experiences will foster the development of practical skills relevant to obtaining a career in public health upon graduation. Our graduates design, implement, manage, and evaluate health promotion programs and policies. They are leaders in health education, community organization, and advocacy efforts that promote the health of communities in domestic and global settings.

Competencies

- Design, implement, and evaluate theoretically-informed and culturally-responsive public health interventions that incorporate multi-level frameworks or innovatively combine individual and social change theories derived from public health research and practice
- Apply appropriate qualitative and quantitative mixed-methods for community-oriented research design
- Apply intersectional perspectives derived from theory in response to multi-dimensional processes when conducting community-engaged public health research and practice

- Apply ethical, socially just, and culturally-responsive principles and strategies to community organizing, community health assessment, program planning, implementation and evaluation
- Partner with communities to contextually assess health problems and propose solutions to public health issues and inequities that recognize the role of power
- Advocate for human rights-based values in public health research, practice, and policy

Additional Information

For additional information about this program, go the Dornsife School of Public Health's Admissions web page (<https://drexel.edu/dornsife/admissions/overview/>).

Admission Requirements (MPH)

The School of Public Health seeks students with intellectual and interpersonal competencies as well as those with potential for leadership. The school has set a high priority on establishing a student body that is representative of the nation's population. We strive to recruit and to admit applicants from underrepresented minority groups who can contribute to the richness of our student population and to that of the nation's public health professionals.

Admissions Process

- The Admissions Committee carefully reviews applications and gives personal essays and letters of recommendation particular attention.
- The selection process weighs prior academic and personal accomplishments, emphasizing demonstrated leadership.
- Diversity of background and outside interests, depth of self-appraisal, commitment to public health, and working with individuals are highly valued.
- Prior work experience in a field related to public health is highly recommended.

Applicants should have:

- Satisfactorily completed an undergraduate bachelor degree program in an accredited US college or university, or its equivalent in another country
- A course in Statistics is highly recommended
- Six undergraduate or graduate credits in the social or behavioral sciences and three in the biological sciences are preferred, but not required
- Graduate Record Examination (GRE) scores are NOT required, however, you may choose to submit scores to strengthen your application
- International applicants must submit an English Language Proficiency exam. Applicants may submit the TOEFL or IELTS. TOEFL and IELTS exams are considered valid for two (2) years from the date the exam was administered.

Please note: The Dornsife School of Public Health's code for submitting GRE scores is 2194. The SOPHAS GRE school code is 7890.

The Application Process also requires:

- Completion of the Schools of Public Health Common Application (<http://www.sophas.org>).

- A personal essay describing what you perceive to be pressing public health issues, why a career in the field appeals to you, and how it will use your strengths and commitment
- Three letters of recommendation
- Resume or CV

Applicants to the joint MD/MPH program must be accepted to both the Drexel College of Medicine (<http://www.drexelmed.edu/>) and the Dornsife School of Public Health (<https://drexel.edu/dornsife/>).

Degree Requirements

Requirements		
PBHL 500	Practical Experience for the Master of Public Health	0.0
MPH Foundation Courses		
PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 512	Methods for Public Health Research I	4.0
PBHL 513	Methods for Public Health Research II	4.0
CHP Foundation Courses		
Required courses		
CHP 500	Behavior and Social Change Theories	3.0
CHP 501	Community Engagement in Public Health Practice & Research	3.0
CHP 503	Multi-Method Data Analysis in Community Health & Prevention	4.0
CHP Depth (Choose TWO classes from the list below)		6.0
CHP 550	Community Based Prevention Practices	
CHP 605	Outcomes and Impact Evaluation	
CHP 672	Theory and Practice in Health Communication	
CHP 673	Outcomes Assessment of Community Health and Prevention	
CHP Integrated Learning Experience		
CHP 750	Integrative Learning Experience in Community Health & Prevention I	3.0
CHP 751	Integrative Learning Experience in Community Health & Prevention II	3.0
CHP Electives/Graduate Minors		
Methods Elective *		3.0
Electives/Graduate Minor **		15.0
Community Health and Prevention Electives		
CHP 516	History of Public Health	
CHP 517	Overview of Maternal and Child Health	
CHP 518	Global Issues in Maternal and Child Health	
CHP 540	Prevention Principles and Practices	
CHP 607	Public Health Ethics	
CHP 608	Animals and Public Health	
CHP 650	Drug Use and Public Health	
CHP 670	Multicultural Competence in Community Health and Prevention	
CHP 671	Community Organizing and Community Assessment for Health and Wellness	
CHP 681	Research with Rare, Stigmatized and Hidden Populations	
CHP 682	LGBT Health Disparities	
CHP 683	Intersectional Perspectives	
CHP 691	Public Health Practice in and with Latino Communities	
CHP 692	Migration and Health	
CHP 705	Religion, Spirituality, and Health	
CHP 802	Theory & Practice of Community Health and Prevention II	
CHP 803	Research Methods for Community Health and Prevention	
CHP 804	Qualitative Research in Community Health	
CHP 806	Community Based Participatory Research	
CHP 808	Measuring Health	
CHP 815	Advanced Topics in Qualitative Analysis & Manuscript Development	
CHP T580	Special Topics in Community Health & Prevention	
CHP T680	Special Topics in Community Health & Prevention	

Biostatistics Electives

BST 557	Survival Data Analysis
BST 558	Applied Multivariate Analysis
BST 560	Intermediate Biostatistics I

Environmental and Occupational Health Electives

EOH 560	Overview of Issues in Global Health
EOH 642	Healthy Housing & Built Environment
EOH 645	Exposure Assessment
EOH 646	Environmental Health in Vulnerable Populations
EOH 648	Public Health and Disaster Preparedness
EOH 649	Occupational and Environmental Cancers
EOH 654	Microbes and Public Health Practice
EOH 655	Infection Prevention and Control in the Healthcare Environment
EOH 657	Public Health Impacts of Global Climate Change
EOH 658	Crisis and Risk Communication in Public Health
EOH 665	Quantitative Risk Analysis for Environmental Health

Epidemiology Electives

EPI 551	Epidemiology of Cancer
EPI 553	Infectious Disease Epidemiology
EPI 557	Cardiovascular Disease Epidemiology & Prevention
EPI 558	Making Sense of Data
EPI 559	Pharmacoepidemiology
EPI 561	Pathophysiologic Basis of Epidemiologic Research

Health Management and Policy Electives

HMP 500	Health Management and Policy I
HMP 501	Health Management and Policy II
HMP 510	Evolution of United States Health Policy
HMP 511	Legal Aspects of Public Health
HMP 512	The Business of Healthcare: Advanced Healthcare Financial Management
HMP 513	Healthcare Planning Principles and Practice
HMP 514	Policy Analysis for Population Health
HMP 515	Health Organizational Leadership
HMP 516	Health Care Organizations and Management
HMP 550	Health Disparities: Systemic, Structural, Environmental & Economic
HMP 551	Historical and Contemporary Developments in Social Justice
HMP 552	Perspectives on Gender, Race, Ethnicity, and Social Class
HMP 554	Issues in United States Health Policy
HMP 555	Violence, Trauma and Adversity in Public Health
HMP 556	Public Health Leadership
HMP 600	Public Health Advocacy and Activism
HMP 601	Seminar in Fire Arms and Public Health
HMP 602	The Politics of Food & Gender
HMP 603	Health Systems Policy Analysis
HMP 650	Management of Healthcare Outcomes
HMP 651	Managing a Public Health Agency
HMP 652	Change Management in Public Health
HMP 653	Fundamentals of Disaster Management
HMP 654	Public Health Funding & Program Development
HMP 655	Coordinating a Population's Care
HMP 701	Health Care Data Analytics
HMP 703	Introduction to GIS for Public Health
HMP 802	Health and Human Rights
HMP 815	Cost Benefit Analysis for Health Services
HMP 820	Methods in Implementation Science
HMP 852	Health Economics I
HMP 853	Health Economics II

Total Credits 56.0

- * Students can take a methods class at the masters or doctoral level from across the university with approval of graduate and faculty advisor. 800-level courses may require professor's permission.
- ** Students have an additional 15.0 credits worth of electives and can use these to further focus their academic work by completing a graduate minor

Sample Plan of Study (MPH)

First Year		Credits
Fall		
CHP 500	Behavior and Social Change Theories	3.0
PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 512	Methods for Public Health Research I	4.0
Term Credits		11.0
Winter		
CHP 501	Community Engagement in Public Health Practice & Research	3.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 513	Methods for Public Health Research II	4.0
Term Credits		11.0
Spring		
CHP 503	Multi-Method Data Analysis in Community Health & Prevention	4.0
CHP Depth/Elective/Minors		6.0
Term Credits		10.0
Second Year		
Fall		
CHP 750	Integrative Learning Experience in Community Health & Prevention I	3.0
PBHL 500	Practical Experience for the Master of Public Health	0.0
CHP Depth/Elective/Minors		9.0
Term Credits		12.0
Winter		
CHP 751	Integrative Learning Experience in Community Health & Prevention II	3.0
CHP Depth/Elective/Minors		9.0
Term Credits		12.0

Total Credit: 56.0

Environmental & Occupational Health

*Major: Environmental and Occupational Health
 Degree Awarded: Master of Public Health (MPH)
 Calendar Type: Quarter
 Total Credit Hours: 56.0
 Co-op Option: None
 Classification of Instructional Programs (CIP) code: 51.2202
 Standard Occupational Classification (SOC) code: 19-2041*

About the Program

As a student in Environmental and Occupational Health, you will learn how to assess and monitor environmental and occupational exposures and to understand their health consequences. You will work alongside our faculty to investigate and act on the environmental determinants of health including climate change and exposure to air pollution, pesticides or other substances. You will learn how to make housing healthier, to promote health and prevent injuries in the workplace, to enhance access to clean water, and to prepare for public health emergencies around the globe. Opportunities in this field include application of environmental

and occupational health principles to protect and promote the health of populations in homes, communities and workplace settings.

Major Competencies:

- Assess pathways of human exposure to hazardous agents and stressors in the environment and workplace.
- Investigate and synthesize research on hazardous agents and their impacts on human health effects, including how individual and population factors affect vulnerability.
- Evaluate epidemiologic methods used in occupational and environmental research and interpret findings.
- Select and apply appropriate quantitative risk assessment methods.
- Recommend strategies for preventing, controlling, and managing risks from environmental and occupational hazards.
- Analyze environmental and occupational health policies in relation to environmental justice, equity, and efficacy.

Additional Information

For additional information about this program, contact:

Kristi LeBlanc, MSEd
Department of Environmental and Occupational Health
Senior Program Manager
kk842@drexel.edu
267-359-6181

Admission Requirements

The Dornsife School of Public Health seeks students with intellectual and interpersonal competencies as well as those with potential for leadership. The school has set a high priority on establishing a student body that is representative of the nation's population. We strive to recruit and to admit applicants from underrepresented minority groups who can contribute to the richness of our student population and to that of the nation's public health professionals.

Admission Process

Admission to the program is based on the following criteria:

- Personal essays and letters of recommendation
- Academic and personal accomplishments with emphasis on demonstrated leadership
- Diversity of background and outside interests, depth of self-appraisal, commitment to public health, capacity to work with individuals

Applicants should have:

- Satisfactorily completed an undergraduate bachelor degree program in an accredited US college or university, or its equivalent in another country
- Previous coursework in statistics and the natural sciences (biology, chemistry, physics, etc.) is highly recommended
- Graduate Record Examination (GRE) scores are NOT required, however, you may choose to submit scores to strengthen your application
- International applicants must submit an English Language Proficiency exam. Applicants may submit the TOEFL or IELTS. TOEFL and IELTS exams are considered valid for two (2) years from the date the exam was administered.

Please note: The Dornsife School of Public Health's code for submitting GRE scores is 2194. The SOPHAS GRE school code is 7890.

The Application Process also requires:

- Completion of the Schools of Public Health Common Application (<http://www.sophas.org>).
- Essay describing what you perceive to be pressing public health issues, why a career in the field appeals to you, and how it will use your strengths and commitment
- Three letters of recommendation
- Resume or CV

Applicants to the joint MD/MPH program must be accepted to both the Drexel College of Medicine (<http://www.drexelmed.edu/>) and the Dornsife School of Public Health (<https://drexel.edu/dornsife/>).

Degree Requirements

MPH Foundation Courses		16.0
PBHL 510	Public Health Foundations and Systems I	
PBHL 511	Public Health Foundations and Systems II	
PBHL 512	Methods for Public Health Research I	
PBHL 513	Methods for Public Health Research II	
EOH Foundation Courses		18.0
EOH 510	Principles and Practice of Environmental and Occupational Health	
EOH 605	Evidence Evaluation for Identification of Environmental Hazards	
	or EOH 665 Quantitative Risk Analysis for Environmental Health	
EOH 610	Environmental and Occupational Toxicology	
EOH 615	Environmental and Occupational Health Policy	
EOH 620	Environmental Hazard Assessment	
EOH 625	Occupational and Environmental Epidemiology	
Integrative Learning Experience		4.0
EOH 750	Integrative Learning Experience: Environmental and Occupational Health I	
EOH 751	Integrative Learning Experience: Environmental and Occupational Health II	
Practical Experience		0.0
PBHL 500	Practical Experience for the Master of Public Health	
Electives*		18.0
These courses may be within the Dornsife School of Public Health, or from other academic units within the University. Students may choose to use their elective credits to complete a graduate minor. Students must meet with their Graduate Advisor to select electives and/or a graduate minor. It is the responsibility of the student to determine course restrictions for electives. The following is a sample of some of the Dornsife School of Public Health electives offered by department:		
Biostatistics Electives		
BST 555	Introduction to Statistical Computing	
BST 559	Intermediate SAS	
BST 560	Intermediate Biostatistics I	
BST 567	Statistical Consulting	
Community Health and Prevention Electives		
CHP 500	Behavior and Social Change Theories	
CHP 501	Community Engagement in Public Health Practice & Research	
CHP 503	Multi-Method Data Analysis in Community Health & Prevention	
CHP 516	History of Public Health	
CHP 517	Overview of Maternal and Child Health	
CHP 518	Global Issues in Maternal and Child Health	
CHP 540	Prevention Principles and Practices	
CHP 550	Community Based Prevention Practices	
CHP 605	Outcomes and Impact Evaluation	
CHP 607	Public Health Ethics	

CHP 608	Animals and Public Health
CHP 650	Drug Use and Public Health
CHP 670	Multicultural Competence in Community Health and Prevention
CHP 671	Community Organizing and Community Assessment for Health and Wellness
CHP 672	Theory and Practice in Health Communication
CHP 673	Outcomes Assessment of Community Health and Prevention
CHP 681	Research with Rare, Stigmatized and Hidden Populations
CHP 682	LGBT Health Disparities
CHP 683	Intersectional Perspectives
CHP 691	Public Health Practice in and with Latino Communities
CHP 692	Migration and Health
CHP 705	Religion, Spirituality, and Health
CHP 802	Theory & Practice of Community Health and Prevention II
CHP 803	Research Methods for Community Health and Prevention
CHP 804	Qualitative Research in Community Health
CHP 806	Community Based Participatory Research
CHP 808	Measuring Health
CHP 815	Advanced Topics in Qualitative Analysis & Manuscript Development

Environmental and Occupational Health Electives

EOH 550	Introduction to Urban Health
EOH 560	Overview of Issues in Global Health
EOH 563	Injury Prevention and Control
EOH 564	Safety in Healthcare
EOH 580	Fundamentals of Industrial Hygiene
EOH 642	Healthy Housing & Built Environment
EOH 645	Exposure Assessment
EOH 646	Environmental Health in Vulnerable Populations
EOH 648	Public Health and Disaster Preparedness
EOH 649	Occupational and Environmental Cancers
EOH 654	Microbes and Public Health Practice
EOH 655	Infection Prevention and Control in the Healthcare Environment
EOH 657	Public Health Impacts of Global Climate Change
EOH 658	Crisis and Risk Communication in Public Health
EOH 665	Quantitative Risk Analysis for Environmental Health
EOH 710	Advanced Methods in GIS for Public Health
EOH 725	Seminar in Environmental Epidemiology

Epidemiology Electives

EPI 500	Introduction to Epidemiology and Biostatistics
EPI 550	Applied Survey Research in Epidemiology
EPI 551	Epidemiology of Cancer
EPI 552	Epidemiology for Public Health Practice
EPI 553	Infectious Disease Epidemiology
EPI 556	Perinatal Epidemiology
EPI 557	Cardiovascular Disease Epidemiology & Prevention
EPI 558	Making Sense of Data
EPI 559	Pharmacoepidemiology
EPI 560	Intermediate Epidemiology
EPI 561	Pathophysiologic Basis of Epidemiologic Research
EPI 562	The Changing US HIV Epidemic and the Responses of Affected Communities
EPI 563	Interprofessional Collaboration for Urban Health
EPI 564	Data Science Using R
EPI 569	Disease Outbreak Investigations
EPI 573	Autism as a Public Health Challenge
EPI 610	Public Health Surveillance
EPI 677	Health and Design Research

Health Management and Policy Electives

HMP 500	Health Management and Policy I
HMP 501	Health Management and Policy II
HMP 510	Evolution of United States Health Policy

HMP 511	Legal Aspects of Public Health
HMP 512	The Business of Healthcare: Advanced Healthcare Financial Management
HMP 513	Healthcare Planning Principles and Practice
HMP 514	Policy Analysis for Population Health
HMP 515	Health Organizational Leadership
HMP 516	Health Care Organizations and Management
HMP 550	Health Disparities: Systemic, Structural, Environmental & Economic
HMP 551	Historical and Contemporary Developments in Social Justice
HMP 552	Perspectives on Gender, Race, Ethnicity, and Social Class
HMP 554	Issues in United States Health Policy
HMP 555	Violence, Trauma and Adversity in Public Health
HMP 556	Public Health Leadership
HMP 600	Public Health Advocacy and Activism
HMP 601	Seminar in Fire Arms and Public Health
HMP 602	The Politics of Food & Gender
HMP 603	Health Systems Policy Analysis
HMP 650	Management of Healthcare Outcomes
HMP 651	Managing a Public Health Agency
HMP 652	Change Management in Public Health
HMP 653	Fundamentals of Disaster Management
HMP 654	Public Health Funding & Program Development
HMP 655	Coordinating a Population's Care
HMP 656	Organizational Finance Seminar: Case Studies in Health Care
HMP 657	Health Care Strategy and Operations: Creating Change
HMP 701	Health Care Data Analytics
HMP 703	Introduction to GIS for Public Health
HMP 704	Using Data to Drive Policy and Practice
HMP 802	Health and Human Rights
HMP 810	Health Services Research
HMP 812	Qualitative Methods for Health Policy Research and Practice
HMP 815	Cost Benefit Analysis for Health Services
HMP 820	Methods in Implementation Science
HMP 852	Health Economics I
HMP 853	Health Economics II

Total Credits 56.0

* 800 level courses may require professor's permission

Sample Plan of Study

Term 1		Credits
EOH 510	Principles and Practice of Environmental and Occupational Health	3.0
PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 512	Methods for Public Health Research I	4.0
Term Credits		11.0
Term 2		
EOH 610	Environmental and Occupational Toxicology	3.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 513	Methods for Public Health Research II	4.0
Term Credits		11.0
Term 3		
EOH 605	Evidence Evaluation for Identification of Environmental Hazards	3.0
EOH 615	Environmental and Occupational Health Policy	3.0
EOH 620	Environmental Hazard Assessment	3.0
Elective		3.0
Term Credits		12.0
Term 4		
EOH 625	Occupational and Environmental Epidemiology	3.0
EOH 750	Integrative Learning Experience: Environmental and Occupational Health I	2.0

PBHL 500	Practical Experience for the Master of Public Health	0.0
Electives		6.0
Term Credits		11.0
Term 5		
EOH 751	Integrative Learning Experience: Environmental and Occupational Health II	2.0
Electives		9.0
Term Credits		11.0
Total Credit: 56.0		

Epidemiology MPH

Major: Epidemiology

Degree Awarded: Master of Public Health

Calendar Type: Quarter

Total Credit Hours: 56.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 26.1309

Standard Occupational Classification (SOC) code: 19-1041

About the Program

MPH Epidemiology students learn and apply quantitative approaches to characterize, monitor, and understand the health of populations. Students gain experience in the design of epidemiologic studies and in the analysis of data. Epidemiology and Biostatistics faculty focus on a range of analytic approaches and their application to a spectrum of topics including social inequalities in health, neighborhood differences in health, chronic and infectious disease epidemiology, the epidemiology of health across life stages, nutrition, physical activity and obesity, and clinical research. Career paths in epidemiology often involve data collection, analyses, and interpretation to inform policy and practice in governmental, private, nonprofit, academic and healthcare settings. Epidemiology graduates may also manage research studies that lead to the changes in decision making in public health.

For additional information about this program, visit the Dornsife School of Public Health (<http://drexel.edu/dornsife/>) web site.

Admission Requirements

The School of Public Health seeks students with intellectual and interpersonal competencies as well as those with potential for leadership. The school has set a high priority on establishing a student body that is representative of the nation's population. We strive to recruit and to admit applicants from underrepresented minority groups who can contribute to the richness of our student population and to that of the nation's public health professionals.

Admissions Process

- The Admissions Committee carefully reviews applications and gives personal essays and letters of recommendation particular attention.
- The selection process weighs prior academic and personal accomplishments, emphasizing demonstrated leadership.
- Diversity of background and outside interests, depth of self-appraisal, commitment to public health, and working with individuals are highly valued.
- Prior work experience in a field related to public health is highly recommended.

Applicants should have:

- Satisfactorily completed an undergraduate bachelor degree program in an accredited US college or university, or its equivalent in another country
- A course in Statistics is highly recommended
- Six undergraduate or graduate credits in the social or behavioral sciences and three in the biological sciences are preferred, but not required
- Graduate Record Examination (GRE) scores are NOT required, however, you may choose to submit scores to strengthen your application
- International applicants must submit an English Language Proficiency exam. Applicants may submit the TOEFL or IELTS. TOEFL and IELTS exams are considered valid for two (2) years from the date the exam was administered.

Applicants to the MS in Epidemiology program should apply using the Schools of Public Health Application Services (SOPHAS).

For more information and to apply online, visit www.sophas.org (<http://www.sophas.org>).

The Application Process also requires:

- Completion of the Schools of Public Health Common Application (<http://www.sophas.org>).
- A personal essay describing what you perceive to be pressing public health issues, why a career in the field appeals to you, and how it will use your strengths and commitment
- Three letters of recommendation
- Resume or CV

Please note: The Dornsife School of Public Health's code for submitting GRE scores is 2194. The SOPHAS GRE school code is 7890.

Applicants to the joint MD/MPH program must be accepted to both the Drexel College of Medicine (<http://www.drexelmed.edu/>) and the Dornsife School of Public Health (<http://publichealth.drexel.edu/>).

Degree Requirements

Curriculum

Core Courses

All students will begin their studies in Public Health Foundations and Systems and Public Health Research Methods; two new multidisciplinary core courses which will be team-taught by faculty from each department. The courses are designed to run across the first two quarters and total 16.0 credits. This format ensures that course development is shaped by content/disciplinary experts and includes the breadth and depth of relevant skills that all MPH graduates will need regardless of their chosen discipline.

Discipline-Specific Courses

Students will take four discipline-specific courses in Epidemiology over the five-quarter MPH program.

MPH Practical Experience

All MPH degree students must develop skills in basic public health concepts and demonstrate capacity to apply these concepts through a practical experience relevant to their area of specialization. "Practice"

refers to implementing (doing) public health, rather than understanding (studying, researching) public health.

The practical experience is an applied, field-based requirement that gives students experience in the practice of public health (no credits) – requiring *depth* (120-240 hours in a field placement) and *breadth* (1 experience per month) – including participation in short-term volunteer opportunities and participation in on- or off-campus learning opportunities. The practical experience requirement can begin during the third quarter of year one and be completed during the summer or the second year of study.

Integrative Learning Experience

The integrative learning experience (ILE) is the culminating requirement for MPH students.

Epidemiology students will take 3 credits in the final 2 quarters of the program. For the ILE, students spend approximately 12 hours each week working on a community-oriented, health-related project, often working as an integral part of a community-based organization. This can be in the areas of government, healthcare and social services, among others. Students may also work with faculty in specific research areas.

In preparation for developing a culminating high quality written product that demonstrates mastery of core public health and discipline-specific competencies, students are required to identify an issue or problem of significance to the target community or agency, synthesize the literature, develop an approach or methodology to address the issue and either implement and test the validity of a proposed approach or set out a detailed prescription for addressing the problem.

MPH Foundation Courses

PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 512	Methods for Public Health Research I	4.0
PBHL 513	Methods for Public Health Research II	4.0

EPI Foundation Courses

BST 555	Introduction to Statistical Computing	3.0
BST 560	Intermediate Biostatistics I	3.0
EPI 500	Introduction to Epidemiology and Biostatistics	3.0
EPI 560	Intermediate Epidemiology	3.0
EPI 611	Research Project Development	1.0

Integrative Learning Experience

EPI 750	Integrative Learning Experience in Epidemiology I	3.0
EPI 751	Integrative Learning Experience in Epidemiology II	3.0

Practical Experience

PBHL 500	Practical Experience for the Master of Public Health	0.0
----------	--	-----

Electives **21.0**

Biostatistics Electives

BST 551	Statistical Inference I	
BST 553	Longitudinal Data Analysis	
BST 557	Survival Data Analysis	
BST 558	Applied Multivariate Analysis	
BST 559	Intermediate SAS	
BST 561	Design & Analysis of Clinical Trials	
BST 567	Statistical Consulting	
BST 568	Nonparametric and Semiparametric Models	
BST 569	Linear Statistical Models	
BST 570	Generalized Linear Models	
BST 604	Applied Bayesian Analysis	
BST 651	Statistical Inference II	
BST 701	Advanced Statistical Computing	

Community Health and Prevention Electives

CHP 500	Behavior and Social Change Theories
CHP 501	Community Engagement in Public Health Practice & Research
CHP 503	Multi-Method Data Analysis in Community Health & Prevention
CHP 516	History of Public Health
CHP 517	Overview of Maternal and Child Health
CHP 518	Global Issues in Maternal and Child Health
CHP 540	Prevention Principles and Practices
CHP 550	Community Based Prevention Practices
CHP 605	Outcomes and Impact Evaluation
CHP 607	Public Health Ethics
CHP 608	Animals and Public Health
CHP 650	Drug Use and Public Health
CHP 670	Multicultural Competence in Community Health and Prevention
CHP 671	Community Organizing and Community Assessment for Health and Wellness
CHP 672	Theory and Practice in Health Communication
CHP 673	Outcomes Assessment of Community Health and Prevention
CHP 681	Research with Rare, Stigmatized and Hidden Populations
CHP 682	LGBT Health Disparities
CHP 683	Intersectional Perspectives
CHP 691	Public Health Practice in and with Latino Communities
CHP 692	Migration and Health
CHP 802	Theory & Practice of Community Health and Prevention II
CHP 803	Research Methods for Community Health and Prevention
CHP 804	Qualitative Research in Community Health
CHP 806	Community Based Participatory Research
CHP 808	Measuring Health
CHP 815	Advanced Topics in Qualitative Analysis & Manuscript Development

Environmental and Occupational Health Electives

EOH 560	Overview of Issues in Global Health
EOH 563	Injury Prevention and Control
EOH 564	Safety in Healthcare
EOH 642	Healthy Housing & Built Environment
EOH 645	Exposure Assessment
EOH 646	Environmental Health in Vulnerable Populations
EOH 648	Public Health and Disaster Preparedness
EOH 649	Occupational and Environmental Cancers
EOH 654	Microbes and Public Health Practice
EOH 655	Infection Prevention and Control in the Healthcare Environment
EOH 657	Public Health Impacts of Global Climate Change
EOH 658	Crisis and Risk Communication in Public Health
EOH 665	Quantitative Risk Analysis for Environmental Health

Epidemiology Electives

EPI 550	Applied Survey Research in Epidemiology
EPI 551	Epidemiology of Cancer
EPI 552	Epidemiology for Public Health Practice
EPI 553	Infectious Disease Epidemiology
EPI 556	Perinatal Epidemiology
EPI 557	Cardiovascular Disease Epidemiology & Prevention
EPI 558	Making Sense of Data
EPI 559	Pharmacoepidemiology
EPI 561	Pathophysiologic Basis of Epidemiologic Research
EPI 562	The Changing US HIV Epidemic and the Responses of Affected Communities
EPI 563	Interprofessional Collaboration for Urban Health
EPI 564	Data Science Using R
EPI 569	Disease Outbreak Investigations
EPI 572	Design and Analysis of Epidemiological Studies
EPI 573	Autism as a Public Health Challenge
EPI 610	Public Health Surveillance

EPI 677	Health and Design Research
EPI 700	Advanced Epidemiology
EPI 801	Causal Inference in Epidemiology
EPI 802	Methodological Challenges
EPI T580	Special Topics in Epidemiology
EPI T680	Special Topics in Epidemiology
EPI T780	Special Topics in Epidemiology
EPI T880	Special Topics in Epidemiology
EPI T980	Special Topics in Epidemiology
Health Management and Policy Electives	
HMP 500	Health Management and Policy I
HMP 501	Health Management and Policy II
HMP 510	Evolution of United States Health Policy
HMP 511	Legal Aspects of Public Health
HMP 512	The Business of Healthcare: Advanced Healthcare Financial Management
HMP 513	Healthcare Planning Principles and Practice
HMP 514	Policy Analysis for Population Health
HMP 515	Health Organizational Leadership
HMP 516	Health Care Organizations and Management
HMP 550	Health Disparities: Systemic, Structural, Environmental & Economic
HMP 551	Historical and Contemporary Developments in Social Justice
HMP 552	Perspectives on Gender, Race, Ethnicity, and Social Class
HMP 554	Issues in United States Health Policy
HMP 555	Violence, Trauma and Adversity in Public Health
HMP 556	Public Health Leadership
HMP 600	Public Health Advocacy and Activism
HMP 601	Seminar in Fire Arms and Public Health
HMP 602	The Politics of Food & Gender
HMP 603	Health Systems Policy Analysis
HMP 650	Management of Healthcare Outcomes
HMP 651	Managing a Public Health Agency
HMP 652	Change Management in Public Health
HMP 653	Fundamentals of Disaster Management
HMP 654	Public Health Funding & Program Development
HMP 656	Organizational Finance Seminar: Case Studies in Health Care
HMP 657	Health Care Strategy and Operations: Creating Change
HMP 701	Health Care Data Analytics
HMP 703	Introduction to GIS for Public Health
HMP 704	Using Data to Drive Policy and Practice
HMP 802	Health and Human Rights
HMP 810	Health Services Research
HMP 812	Qualitative Methods for Health Policy Research and Practice
HMP 815	Cost Benefit Analysis for Health Services
HMP 820	Methods in Implementation Science
HMP 852	Health Economics I
HMP 853	Health Economics II

Total Credits 56.0

Sample Plan of Study

First Year

Term 1		Credits
BST 555	Introduction to Statistical Computing	3.0
PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 512	Methods for Public Health Research I	4.0
Term Credits		11.0

Term 2

EPI 500	Introduction to Epidemiology and Biostatistics	3.0
PBHL 511	Public Health Foundations and Systems II	4.0

PBHL 513	Methods for Public Health Research II	4.0
Term Credits		11.0
Term 3		
BST 560	Intermediate Biostatistics I	3.0
EPI 560	Intermediate Epidemiology	3.0
Elective		3.0
Term Credits		9.0
Term 4		
EPI 611	Research Project Development	1.0
EPI 750	Integrative Learning Experience in Epidemiology I	3.0
Electives		9.0
Term Credits		13.0
Term 5		
EPI 751	Integrative Learning Experience in Epidemiology II	3.0
Electives		9.0
Term Credits		12.0

Total Credit: 56.0

Health Management and Policy

Major: Health Management and Policy

Degree Awarded: Master of Public Health (MPH)

Calendar Type: Quarter

Total Credit Hours: 56.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.0701

Standard Occupational Classification (SOC) code: 11-9111

About the Program

The MPH program provides students with the knowledge and skills they need to make a difference in today's public health world. The full-time program is structured on a quarter basis with 56.0 total credit hours required for completion of the degree over five quarters. Full-time MPH students select a major at the time of application.

Training the next generation of public health practitioners and leaders to take on management and policy roles that will improve population health and health care delivery at the local and national levels is the work of the Department of Health Management and Policy (HMP). Students concentrate in either management or health policy, and are prepared to plan, implement, evaluate and operate effective, community-responsive programs and organizations that can bring about positive change. Recognizing that almost all policy impacts health, faculty train students to develop skills in management, organization, finance, advocacy, political action, research, and public policy.

Competencies:

- Analyze the government powers and restraints that underlie the development and implementation of a public health program or policy
- Apply financial tools and measures to assure effective resource use in achieving population health improvement objectives
- Analyze the evolution of healthcare policy over the past century and its bearing on the future of population health in the United States
- Apply population health principles in assessing value-based healthcare delivery and financing strategies
- Contribute to the development of an evidence-informed program or policy proposal that addresses an important urban public health problem

Management Track

- Develop evidence-based recommendations to address complex management and organizational issues in health care
- Understand the principles of business and strategic planning and their relationship to needs and values of the community
- As a health leader, develop self-knowledge, interpersonal effectiveness, and well-being

Policy Track

- Propose evidence-based policy options to improve the health of populations
- Apply economic theory to understand policy changes and the implications of these changes for as they relate to the possible tradeoff between efficiency and equity

Additional Information

For more information about the program, contact:

Allison Keene, MS
Program Manager

Dornsife School of Public Health
Drexel University
Nesbitt Hall 332
3215 Market Street
Philadelphia, PA 19104
ah849@drexel.edu
267.359.6032

Additional information can be found on the Dornsife School of Public Health (<http://www.drexel.edu/dornsife/>) website.

Admission Requirements

The School of Public Health seeks students with intellectual and interpersonal competencies as well as those with potential for leadership. The school has set a high priority on establishing a student body that is representative of the nation's population. We strive to recruit and to admit applicants from underrepresented minority groups who can contribute to the richness of our student population and to that of the nation's public health professionals.

Admissions Process

- The Admissions Committee carefully reviews applications and gives personal essays and letters of recommendation particular attention.
- The selection process weighs prior academic and personal accomplishments, emphasizing demonstrated leadership.
- Diversity of background and outside interests, depth of self-appraisal, commitment to public health, and working with individuals are highly valued.
- Prior work experience in a field related to public health is highly recommended.

Applicants should have:

- Satisfactorily completed an undergraduate bachelor degree program in an accredited US college or university, or its equivalent in another country
- A course in Statistics is highly recommended

- Six undergraduate or graduate credits in the social or behavioral sciences and three in the biological sciences are preferred, but not required
- Graduate Record Examination (GRE) scores are NOT required, however, you may choose to submit scores to strengthen your application
- International applicants must submit an English Language Proficiency exam. Applicants may submit the TOEFL or IELTS. TOEFL and IELTS exams are considered valid for two (2) years from the date the exam was administered.

Please note: The Dornsife School of Public Health's code for submitting GRE scores is 2194. The SOPHAS GRE school code is 7890.

The Application Process also requires:

- Completion of the Schools of Public Health Common Application (<http://www.sophas.org>).
- A personal essay describing what you perceive to be pressing public health issues, why a career in the field appeals to you, and how it will use your strengths and commitment
- Three letters of recommendation
- Resume or CV

Applicants to the joint MD/MPH program must be accepted to both the Drexel College of Medicine (<http://www.drexelmed.edu/>) and the Dornsife School of Public Health (<http://publichealth.drexel.edu/>).

Degree Requirements

MPH Foundations Courses

PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 512	Methods for Public Health Research I	4.0
PBHL 513	Methods for Public Health Research II	4.0

Foundation Courses

HMP 500	Health Management and Policy I	3.0
HMP 501	Health Management and Policy II	3.0
HMP 510	Evolution of United States Health Policy	3.0
HMP 511	Legal Aspects of Public Health	3.0
HMP 512	The Business of Healthcare: Advanced Healthcare Financial Management	3.0

Social Determinants (select one)

HMP 550	Health Disparities: Systemic, Structural, Environmental & Economic	3.0
HMP 551	Historical and Contemporary Developments in Social Justice	
HMP 552	Perspectives on Gender, Race, Ethnicity, and Social Class	
HMP 554	Issues in United States Health Policy	
HMP 555	Violence, Trauma and Adversity in Public Health	
HMP 556	Public Health Leadership	

Management Concentration or Policy Concentration (select one)

Management Concentration		
HMP 513	Healthcare Planning Principles and Practice	
HMP 515	Health Organizational Leadership	
HMP 516	Health Care Organizations and Management	
Policy Concentration		
CHP 605	Outcomes and Impact Evaluation	
HMP 514	Policy Analysis for Population Health	
HMP 852	Health Economics I	

Electives *

Health Management and Policy		
HMP 600	Public Health Advocacy and Activism	

HMP 601	Seminar in Fire Arms and Public Health
HMP 602	The Politics of Food & Gender
HMP 603	Health Systems Policy Analysis
HMP 650	Management of Healthcare Outcomes
HMP 651	Managing a Public Health Agency
HMP 652	Change Management in Public Health
HMP 653	Fundamentals of Disaster Management
HMP 654	Public Health Funding & Program Development
HMP 655	Coordinating a Population's Care
HMP 656	Organizational Finance Seminar: Case Studies in Health Care
HMP 657	Health Care Strategy and Operations: Creating Change
HMP 701	Health Care Data Analytics
HMP 703	Introduction to GIS for Public Health
HMP 704	Using Data to Drive Policy and Practice
HMP 802	Health and Human Rights
HMP 810	Health Services Research
HMP 812	Qualitative Methods for Health Policy Research and Practice
HMP 815	Cost Benefit Analysis for Health Services
HMP 820	Methods in Implementation Science
HMP 852	Health Economics I
HMP 853	Health Economics II
Epidemiology/Biostatistics Electives	
BST 555	Introduction to Statistical Computing
BST 559	Intermediate SAS
EPI 551	Epidemiology of Cancer
EPI 553	Infectious Disease Epidemiology
EPI 556	Perinatal Epidemiology
EPI 557	Cardiovascular Disease Epidemiology & Prevention
EPI 558	Making Sense of Data
EPI 559	Pharmacoepidemiology
EPI 561	Pathophysiologic Basis of Epidemiologic Research
EPI 564	Data Science Using R
EPI 573	Autism as a Public Health Challenge
Community Health and Prevention Electives	
CHP 503	Multi-Method Data Analysis in Community Health & Prevention
CHP 517	Overview of Maternal and Child Health
CHP 518	Global Issues in Maternal and Child Health
CHP 540	Prevention Principles and Practices
CHP 550	Community Based Prevention Practices
CHP 605	Outcomes and Impact Evaluation
CHP 607	Public Health Ethics
CHP 608	Animals and Public Health
CHP 650	Drug Use and Public Health
CHP 670	Multicultural Competence in Community Health and Prevention
CHP 671	Community Organizing and Community Assessment for Health and Wellness
CHP 672	Theory and Practice in Health Communication
CHP 673	Outcomes Assessment of Community Health and Prevention
CHP 681	Research with Rare, Stigmatized and Hidden Populations
CHP 682	LGBT Health Disparities
CHP 683	Intersectional Perspectives
CHP 691	Public Health Practice in and with Latino Communities
CHP 692	Migration and Health
CHP 801	Theory & Practice of Community Health & Prevention I
CHP 802	Theory & Practice of Community Health and Prevention II
CHP 803	Research Methods for Community Health and Prevention
CHP 804	Qualitative Research in Community Health
CHP 806	Community Based Participatory Research
CHP 807	Public Health Ethics
CHP 808	Measuring Health
Environmental and Occupational Health Electives	
EOH 560	Overview of Issues in Global Health

EOH 563	Injury Prevention and Control
EOH 564	Safety in Healthcare
EOH 610	Environmental and Occupational Toxicology
EOH 615	Environmental and Occupational Health Policy
EOH 620	Environmental Hazard Assessment
EOH 625	Occupational and Environmental Epidemiology
EOH 630	Environmental Health Risk and Impact Assessment
EOH 640	Environmental and Occupational Health
EOH 642	Healthy Housing & Built Environment
EOH 645	Exposure Assessment
EOH 646	Environmental Health in Vulnerable Populations
EOH 648	Public Health and Disaster Preparedness
EOH 649	Occupational and Environmental Cancers
EOH 654	Microbes and Public Health Practice
EOH 655	Infection Prevention and Control in the Healthcare Environment
EOH 657	Public Health Impacts of Global Climate Change
EOH 658	Crisis and Risk Communication in Public Health
EOH 665	Quantitative Risk Analysis for Environmental Health
Integrative Learning Experience 4.0	
An additional 3-credits (7-credits in total) could be earned by means of a more intensive/extensive culminating learning experience, if approved by the faculty advisor and Department Chairperson. The number of credits to be earned will depend on the scope and breadth of effort undertaken by the student to complete this academic requirement. Increasing the number of credits taken to satisfy the master's project requirement will require students to reduce the number of elective credits taken.	
Total Credits	56.0

Sample Plan of Study

Fall Start Sample Management Concentration

First Year		Credits
Fall		
HMP 500	Health Management and Policy I	3.0
PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 512	Methods for Public Health Research I	4.0
Term Credits		11.0
Winter		
HMP 501	Health Management and Policy II	3.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 513	Methods for Public Health Research II	4.0
Term Credits		11.0
Spring		
HMP 512	The Business of Healthcare: Advanced Healthcare Financial Management	3.0
HMP 513	Healthcare Planning Principles and Practice	3.0
HMP 516	Health Care Organizations and Management	3.0
Elective Course		3.0
Term Credits		12.0
Second Year		
Fall		
HMP 510	Evolution of United States Health Policy	3.0
HMP 515	Health Organizational Leadership	3.0
HMP 750	Integrative Learning Experience	2.0
Elective Course		3.0
Term Credits		11.0
Winter		
HMP 511	Legal Aspects of Public Health	3.0
HMP 751	Integrative Learning Experience II	2.0
Elective Course		3.0

Social Determinants Elective	3.0
Term Credits	11.0
<hr/>	
Total Credit: 56.0	

Fall Start Sample Policy Concentration

First Year

Fall		Credits
HMP 500	Health Management and Policy I	3.0
PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 512	Methods for Public Health Research I	4.0
Term Credits		11.0

Winter

HMP 501	Health Management and Policy II	3.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 513	Methods for Public Health Research II	4.0
Term Credits		11.0

Spring

HMP 510	Evolution of United States Health Policy	3.0
HMP 512	The Business of Healthcare: Advanced Healthcare Financial Management	3.0
Elective		3.0
Social Determinants Elective		3.0
Term Credits		12.0

Second Year

Fall		Credits
HMP 514	Policy Analysis for Population Health	3.0
HMP 750	Integrative Learning Experience	2.0
HMP 852	Health Economics I	3.0
Elective		3.0
Term Credits		11.0

Winter

CHP 605	Outcomes and Impact Evaluation	3.0
HMP 511	Legal Aspects of Public Health	3.0
HMP 751	Integrative Learning Experience II	2.0
Elective		3.0
Term Credits		11.0

Total Credit: 56.0

Spring Start Sample Management Concentration

First Year

Spring

Elective		3.0
Elective		3.0
Elective		3.0
Term Credits		9.0

Summer

PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 512	Methods for Public Health Research I	4.0
PBHL 513	Methods for Public Health Research II	4.0
Term Credits		16.0

Second Year

Fall

HMP 510	Evolution of United States Health Policy	3.0
HMP 512	The Business of Healthcare: Advanced Healthcare Financial Management	3.0
HMP 515	Health Organizational Leadership	3.0
Term Credits		9.0

Winter

HMP 500	Health Management and Policy I	3.0
HMP 511	Legal Aspects of Public Health	3.0
HMP 750	Integrative Learning Experience	2.0
Social Determinants Elective		3.0
Term Credits		11.0

Spring

HMP 501	Health Management and Policy II	3.0
HMP 513	Healthcare Planning Principles and Practice	3.0
HMP 516	Health Care Organizations and Management	3.0
HMP 751	Integrative Learning Experience II	2.0
Term Credits		11.0

Total Credit: 56.0

Spring Start Sample Policy Concentration

First Year

Spring

Elective		3.0
Elective		3.0
Elective		3.0
Term Credits		9.0

Summer

PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 512	Methods for Public Health Research I	4.0
PBHL 513	Methods for Public Health Research II	4.0
Term Credits		16.0

Second Year

Fall

HMP 510	Evolution of United States Health Policy	3.0
HMP 512	The Business of Healthcare: Advanced Healthcare Financial Management	3.0
HMP 852	Health Economics I	3.0
Term Credits		9.0

Winter

CHP 605	Outcomes and Impact Evaluation	3.0
HMP 500	Health Management and Policy I	3.0
HMP 511	Legal Aspects of Public Health	3.0
HMP 750	Integrative Learning Experience	2.0
Term Credits		11.0

Spring

HMP 501	Health Management and Policy II	3.0
HMP 514	Policy Analysis for Population Health	3.0
HMP 751	Integrative Learning Experience II	2.0
Social Determinants Elective		3.0
Term Credits		11.0

Total Credit: 56.0

Public Health MPH

Major: Public Health

Degree Awarded: Master of Public Health (MPH)

Calendar Type: Quarter

Total Credit Hours: 56.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.2201

Standard Occupational Classification (SOC) code: 11-9111

About the Program

The Master of Public Health program provides students with the knowledge and skills they need to make a difference in today's public health world.

Our MPH curriculum incorporates several key elements:

- Solid training in state-of-the-art core competencies that students need to be effective
- Integration and interdisciplinary from the very beginning
- Flexibility to incorporate specialization in several public health areas
- Extensive opportunities for community, practice, and research engagement
- Graduate in only 5 quarters, allowing for a head start in the job market

"We redesigned the MPH degree to ensure that our students graduate with the knowledge and skills to make a difference in the field of public health. We also wanted to increase the ability of students to specialize in areas they are particularly interested in, and to expand the flexibility of the curriculum to allow students to graduate earlier."

We built the new curriculum working from actual public health challenges -- asking ourselves what it will take to address tough problems. The result is a curriculum design that is integrated across disciplines, because interdisciplinary, cross-sector teamwork is exactly what is required for 21st century public health practice and research."

- Ana V. Diez Roux, MD, PhD, MPH
Dean, Dornsife School of Public Health

Competencies:

- Apply epidemiological methods to the breadth of settings and situations in public health practice
- Select quantitative and qualitative data collection methods appropriate for a given public health context
- Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
- Interpret results of data analysis for public health research, policy or practice
- Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings
- Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels
- Assess population needs, assets and capacities that affect communities' health
- Apply awareness of cultural values and practices to the design or implementation of public health policies or programs
- Design a population-based policy, program, project or intervention
- Explain basic principles and tools of budget and resource management
- Select methods to evaluate public health programs
- Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence
- Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes

- Advocate for political, social or economic policies and programs that will improve health in diverse populations
- Evaluate policies for their impact on public health and health equity
- Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making
- Select communication strategies for different audiences and sectors
- Communicate audience-appropriate public health content, both in writing and through oral presentation
- Describe the importance of cultural competence in communicating public health content
- Perform effectively on inter-professional teams
- Apply systems thinking tools to a public health issue

Program Highlights (MPH)

Majors

Full-time MPH students select a major at the time of application:

- Community Health and Prevention (p. 391)
- Environmental and Occupational Health (p. 393)
- Epidemiology (p. 396)
- Health Management and Policy (p. 398)

Minors

Minors are open to all Drexel graduate students in all schools and colleges. The minors are designed to complement students' training by providing basic knowledge in topics outside their primary discipline. In addition to the list below, additional minors are being developed.

- Biostatistics (<http://catalog.drexel.edu/graduate/schoolofpublichealth/biostatisticsgminor/>)
- Environment and Occupational Health (p.)
- Global Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/globalhealthgminor/>)
- Human Health Risk Assessment (<http://catalog.drexel.edu/graduate/schoolofpublichealth/humanhealthriskassessmentgminor/>)
- Infectious Disease and Population Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/infectiousdiseasegminor/>)
- Latino/Immigrant Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/latinoimmigranthealthgminor/>)
- Lesbian, Gay, Bisexual and Transgender (LGBT) Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/lgbtgminor/>)
- Maternal and Child Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/maternalandchildhealthgminor/>)
- Program Monitoring and Evaluation (<http://catalog.drexel.edu/graduate/schoolofpublichealth/programmonitoringandevaluationgminor/>)
- Public Health Ethics and History (<http://catalog.drexel.edu/graduate/schoolofpublichealth/publichealthethicsandhistorygminor/>)
- Substance Use and Misuse (<http://catalog.drexel.edu/graduate/schoolofpublichealth/substanceuseandmisusegminor/>)
- Urban Health (<http://catalog.drexel.edu/graduate/schoolofpublichealth/urbanhealthgminor/>)

Curriculum (MPH)

Core Courses

All students will begin their studies in PBHL 510 and PBHL 511 *Public Health Foundations and Systems I & II* and PBHL 512 and PBHL 513 *Methods for Public Health Research I & II*, two new multidisciplinary core courses which will be team-taught by faculty from each department. The courses are designed to run across the first two quarters and total 16.0 credits. This format ensures that course development is shaped by content/disciplinary experts and includes the breadth and depth of relevant skills that all MPH graduates will need regardless of their chosen discipline.

Discipline-Specific Courses

Students will take a minimum of five discipline-specific courses in their major field of study over the five-quarter MPH program.

MPH Practical Experience

All MPH degree students must develop skills in basic public health concepts and demonstrate the capacity to apply these concepts through a practical experience relevant to their area of specialization. "Practice" refers to implementing (doing) public health, rather than understanding (studying, researching) public health.

The practical experience is an applied, field-based requirement that gives students experience in the practice of public health (no credits) -- requiring *depth* (120-240 hours in a field placement) and *breadth* (1 experience per month) - including participation in short-term volunteer opportunities and participation in on- or off-campus learning opportunities. The practical experience requirement can begin during the third quarter of year one and be completed during the summer of the second year of study.

Integrative Learning Experience

The integrative learning experience (ILE) is the culminating requirement for MPH students. Each department/major has their own specific requirements for the ILE, which requires students to take 4-6 credits in the final 2 quarters of the program and to produce a high-quality written product that demonstrates mastery of core public health and discipline-specific competencies. The ILE can be coordinated with the field-based practical experience.

Admission Requirements

The School of Public Health seeks students with intellectual and interpersonal competencies as well as those with potential for leadership. The school has set a high priority on establishing a student body that is representative of the nation's population. We strive to recruit and to admit applicants from underrepresented minority groups who can contribute to the richness of our student population and to that of the nation's public health professionals.

Admissions Process

- The Admissions Committee carefully reviews applications and gives personal essays and letters of recommendation particular attention.
- The selection process weighs prior academic and personal accomplishments, emphasizing demonstrated leadership.
- Diversity of background and outside interests, depth of self-appraisal, commitment to public health, and working with individuals are highly valued.
- Prior work experience in a field related to public health is highly recommended.

Applicants should have:

- Satisfactorily completed an undergraduate bachelor degree program in an accredited US college or university, or its equivalent in another country
- A course in Statistics is highly recommended
- Six undergraduate or graduate credits in the social or behavioral sciences and three in the biological sciences are preferred, but not required
- Graduate Record Examination (GRE) scores are NOT required, however, you may choose to submit scores to strengthen your application
- International applicants must submit an English Language Proficiency exam. Applicants may submit the TOEFL or IELTS. TOEFL and IELTS exams are considered valid for two (2) years from the date the exam was administered.

Please note: The Dornsife School of Public Health's code for submitting GRE scores is 2194. The SOPHAS GRE school code is 7890.

The Application Process also requires:

- Completion of the Schools of Public Health Common Application (<http://www.sophas.org>).
- A personal essay describing what you perceive to be pressing public health issues, why a career in the field appeals to you, and how it will use your strengths and commitment
- Three letters of recommendation
- Resume or CV

Applicants to the joint MD/MPH program must be accepted to both the Drexel College of Medicine (<http://www.drexelmed.edu/>) and the Dornsife School of Public Health (<http://publichealth.drexel.edu/>).

Degree Requirements

The full-time educational program is structured on a quarter term basis, with a total credit hour requirement of 56.0 quarter credit hours. This is generally taken as a two-year program; all course work must be completed within four years of the date of matriculation for the full-time program.

MPH Foundation Courses		
PBHL 500	Practical Experience for the Master of Public Health	0.0
PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 512	Methods for Public Health Research I	4.0
PBHL 513	Methods for Public Health Research II	4.0
MPH Discipline Specific Foundation Courses		16.0
MPH Integrative Learning Experience *		6.0
MPH Electives/Graduate Minor Courses **		18.0
Total Credits		56.0

* Integrated Learning Experience courses depend on the MPH major. Community Health & Prevention: CHP 750 and CHP 751; Environmental & Occupational Health: EOH 750 and EOH 751; Epidemiology: EOH 750 and EOH 751; Health Management & Policy: HMP 750 and HMP 751.

** 800 level courses may require professor's permission.

Sample Plan of Study

Term 1		Credits
PBHL 510	Public Health Foundations and Systems I	4.0
PBHL 512	Methods for Public Health Research I	4.0
Discipline Specific Foundation course		3.0
Term Credits		11.0
Term 2		
PBHL 511	Public Health Foundations and Systems II	4.0
PBHL 513	Methods for Public Health Research II	4.0
Discipline Specific Foundation course		3.0
Term Credits		11.0
Term 3		
PBHL 500	Practical Experience for the Master of Public Health	0.0
Discipline Specific Foundation course		4.0
Electives		6.0
Term Credits		10.0
Term 4		
Integrated Learning Experience		3.0
Electives		6.0
Discipline Specific Foundation course		3.0
Term Credits		12.0
Term 5		
Integrated Learning Experience		3.0
Electives		6.0
Discipline Specific Foundation course		3.0
Term Credits		12.0

Total Credit: 56.0

Executive Master of Public Health

Major: Public Health

Degree Awarded: Master of Public Health (MPH)

Calendar Type: Quarter

Total Credit Hours: 56.0

Co-op Option: None

Classification of Instructional Programs (CIP) code: 51.2201

Standard Occupational Classification (SOC) code: 11-9111

About the Program

Designed for working professionals, the Executive Masters of Public Health (EMPH) program offers a convenient class schedule in which students can earn their degree in 21 months. Whether working in public health, a related health care setting or seeking a career change, the Executive MPH program is tailored for individuals who are committed to advancing their careers and acquiring the knowledge and tools to advance to leadership roles in public health. The program is fast-paced, intensive and demanding, but builds on each individual's former education, work experience and skills. The Executive MPH program is fully accredited by the Council on Education for Public Health (CEPH).

The Executive MPH curriculum combines both on-campus coursework and online modalities. Classes meet on-campus Friday and Saturday, three times within a ten-week quarter and utilize web-based technologies to interact with faculty and students during the weeks when not in class. Classes are taught by full-time School of Public Health faculty with active and diverse research interests as well as adjunct faculty with leadership roles as practicing public health professionals.

Like the full-time MPH program, the Executive MPH program covers the major disciplines of public health including community health and

prevention, environmental and occupational health, epidemiology and biostatistics, and health management and policy. The EMPH program is designed as a generalist degree, however students have the opportunity to complete both self-directed elective courses and an integrated learning experience where they can gain practical public health experience during the second year.

EMPH students are provided with mentoring and advising opportunities both by full-time School of Public Health faculty and public health practitioners.

Competencies

- Promote health equity in accordance with the principles of social, distributive & deliberative justice.
- Develop knowledge and skills needed for public health and health sector leadership focused on planning, organization, and diversity.
- Analyze an urban health problem and design an intervention that promotes public health in a variety of settings.
- Build professional public health practice abilities by enhancing organizational and management skills targeting population health improvement.
- Translate public health science into public policy and action.

Additional Information

For more information about this program, contact:

Jamel Long MS.Ed

Director of Academic Affairs & Program Manager for Executive MPH
jl884@drexel.edu

Jen Kolker, MPH

Executive MPH Program Director
Associate Dean for Public Health Practice
jak682@drexel.edu

Or visit the School of Public Health's Executive Master of Public Health Degree (<http://drexel.edu/dornsife/academics/degrees/executive-mpH-degree/>) page.

Admission Requirements

The School of Public Health seeks students with intellectual and interpersonal competencies as well as those with potential for leadership. The school has set a high priority on establishing a student body that is representative of the nation's population. We strive to recruit and to admit applicants from underrepresented minority groups who can contribute to the richness of our student population and to that of the nation's public health professionals.

While most of the students in the Executive MPH program are from the Philadelphia area, the format of the program does not limit students from outside of the Philadelphia region from attending.

Admissions process:

- The Admissions Committee carefully reviews applications and gives personal essays and letters of recommendation particular attention.
- The selection process weighs prior academic and personal accomplishments, emphasizing demonstrated leadership.

- Diversity of background and outside interests, depth of self-appraisal, commitment to public health, and working with individuals are highly valued.
- A minimum of 2 years of professional work experience is required.

Applicants should have:

- Satisfactorily completed an undergraduate bachelor degree program in an accredited US college or university, or its equivalent in another country
- A course in Statistics is highly recommended
- Six undergraduate or graduate credits in the social or behavioral sciences and three in the biological sciences are preferred, but not required.
- Graduate Record Examination (GRE) scores are NOT required, however, you may choose to submit scores to strengthen your application
- International applicants must submit an English Language Proficiency exam. Applicants may submit the TOEFL or IELTS. TOEFL and IELTS exams are considered valid for two (2) years from the date the exam was administered.

The Application Process also requires:

- Completion of the School's application
- A personal essay describing what you perceive to be pressing public health issues, why a career in the field appeals to you, and how it will use your strengths and commitment
- Two letters of recommendation, preferably from individuals who can assess the applicant's ability to handle a rigorous graduate curriculum (i.e., faculty, supervisor, etc.)
- Resume or CV.

Forms, details about requirements, and information about application deadlines are all available on the Executive MPH (<http://www.drexel.edu/grad/programs/pubhealth/public-health-executive/>) page of Drexel's Graduate Admissions website.

Degree Requirements

The Executive Program is designed for working professionals, whether in public health or considering a career change to public health. The program is tailored for individuals who are committed to advancing their careers and acquiring the knowledge and tools to advance to leadership roles in public health.

The Executive MPH program requires a minimum of 56.0 credits. All degree requirements must be completed within seven years of the date of matriculation. A minimum of five consecutive academic semesters is required for the degree. Enrollment must be continuous unless academic leaves are granted. A minimum overall GPA of 3.0 is required for graduation.

Required Courses

BST 520	Principles of Biostatistics	4.0
CHP 520	Community Health and Prevention I: Community Engagement & Assessment	4.0
CHP 521	Community Health and Prevention II: Program Planning and Evaluation	4.0
CHP 590	Public Health History and Ethics	2.0
EOH 550	Introduction to Urban Health	3.0
EOH 640	Environmental and Occupational Health	4.0
EPI 530	Principles of Epidemiology	4.0

HMP 505	Qualitative Data and Mixed Methods Analysis	2.0
HMP 556	Public Health Leadership	3.0
HMP 640	Healthcare and Public Health Administration	4.0
HMP 660	Public Policy and Advocacy	4.0
PBHL 570	Integrated Public Health Case Analysis	4.0
PBHL 580	Public Health Practice (EMPH)	1.0
PBHL 667	Professional Seminar for the Executive MPH Program I	2.0
PBHL 668	Professional Seminar for the Executive MPH Program II	2.0
Public Health Electives		9.0
Total Credits		56.0

Sample Plan of Study

Term 1		Credits
CHP 520	Community Health and Prevention I: Community Engagement & Assessment	4.0
EPI 530	Principles of Epidemiology	4.0
Term Credits		8.0
Term 2		Credits
BST 520	Principles of Biostatistics	4.0
CHP 521	Community Health and Prevention II: Program Planning and Evaluation	4.0
Term Credits		8.0
Term 3		Credits
EOH 640	Environmental and Occupational Health	4.0
HMP 640	Healthcare and Public Health Administration	4.0
Term Credits		8.0
Term 4		Credits
CHP 590	Public Health History and Ethics	2.0
HMP 505	Qualitative Data and Mixed Methods Analysis	2.0
HMP 660	Public Policy and Advocacy	4.0
Term Credits		8.0
Term 5		Credits
EOH 550	Introduction to Urban Health	3.0
PBHL 667	Professional Seminar for the Executive MPH Program I	2.0
Public Health Elective		3.0
Term Credits		8.0
Term 6		Credits
HMP 556	Public Health Leadership	3.0
PBHL 668	Professional Seminar for the Executive MPH Program II	2.0
Public Health Elective		3.0
Term Credits		8.0
Term 7		Credits
PBHL 570	Integrated Public Health Case Analysis	4.0
PBHL 580	Public Health Practice (EMPH)	1.0
Public Health Elective		3.0
Term Credits		8.0
Total Credit: 56.0		

Certificate in Epidemiology and Biostatistics

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 9.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time To Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 26.1309

Standard Occupational Classification (SOC) Code: 19-1041

About the Program

Drexel's online Certificate in Epidemiology and Biostatistics is a graduate level, interdisciplinary program designed for working professionals coming from a variety of backgrounds, including physicians, nurses, public health administrators, health educators, clinical research professionals, policy experts and more. Students will learn about concepts and methods in epidemiology and biostatistics, and how to apply them to real-world problems. Students will also learn techniques for describing, summarizing and analyzing data, assessing associations among variables, and determining the extent to which chance may or may not be influencing the observed results.

Never before has disease prevention and health promotion been more important. As public health issues arise in the US and globally, those who can apply knowledge gained through research to real-world problems are in great demand across all sectors: health care, pharmaceuticals, governmental and non-governmental agencies, business, and academia.

For the most current admission information, please visit Drexel University Online (<https://online.drexel.edu/>).

About the Curriculum

The certificate program provides research-oriented training in the theory and tools of Epidemiology and Biostatistics, two of the core public health disciplines.

Students learn the principles of epidemiology and biostatistics and gain skills in using epidemiologic and biostatistical tools to describe, monitor, and investigate the drivers of population health. Statistical background needed to conduct research, develop hypotheses, analyze data, and interpret and communicate results.

The curriculum reflects core epidemiological and biostatistical concepts and practices in a similar manner to the full-time and Executive MPH programs. The online format allows asynchronous learning while providing flexibility for adult learners constrained by physical and time limitations.

Program Requirements

Requirements		
BST 571	Introduction to Biostatistics	3.0
EPI 570	Introduction to Epidemiology	3.0
EPI 572	Design and Analysis of Epidemiological Studies	3.0
Total Credits		9.0

Sample Plan of Study

First Year		
Term 1		Credits
EPI 570	Introduction to Epidemiology	3.0
Term Credits		3.0
Term 2		
BST 571	Introduction to Biostatistics	3.0
Term Credits		3.0
Term 3		
EPI 572	Design and Analysis of Epidemiological Studies	3.0
Term Credits		3.0
Total Credit: 9.0		

Additional information

For more information about the program, visit the Certificate in Epidemiology and Biostatistics (<http://www.drexel.com/online-degrees/public-health-degrees/cert-epi-bio/>) on the Drexel University Online web site.

Certificate in Global Health

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Aid eligible

Classification of Instructional Program (CIP) Code: 51.2210

Standard Occupational Classification (SOC) Code: 21-1091

About the Program

This online certificate in global health is designed to train post-baccalaureate students and public health professionals for a career in global health and development, including in international settings. The program stresses the development of analytic and technical skills required for pursuing further work in the growing areas of global health and international development. The curriculum focuses on designing, implementing, and evaluating programs in under-served communities in the US and international/developing countries. Students will learn to translate theory into practical applications to current global health and developmental challenges. Course materials are designed for the adult-learner in an online, distributed format.

Admission Requirements

Admission requirements to the program include:

- a bachelor's degree
- completion of Certificate Program Application Form
- working knowledge of and access to a PC or Mac with DVD/CD-ROM drive, high speed connection to the Internet as well as MS Office.
- the ability to download free versions of Adobe Acrobat Reader, Skype, and/or VSee video conferencing applications.

Program Requirements

Required Courses		
CHP 607	Public Health Ethics	3.0
CHP 660	Global Health Ethics	1.5
CHP 661	Monitoring and Evaluation in Global Health Programs and Advocacy	1.5
CHP 673	Outcomes Assessment of Community Health and Prevention	3.0
EOH 560	Overview of Issues in Global Health	3.0
HMP 603	Health Systems Policy Analysis	3.0
Total Credits		15.0

Note: Introductory Public Health Learning Objectives: PBHL 501 is a required prerequisite course for students who do not have a degree from a CEPH accredited school.

Certificate in Lesbian, Gay, Bisexual and Transgender (LGBT) Health

Certificate Level: Graduate

Admissions Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 9.0

Instructional Delivery: Online

Calendar Type: Quarter

Expected Time to Completion: 1 year

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.2207

Standard Occupational Classification (SOC) Code: 21-1091

About the Program

The Certificate in Lesbian, Gay, Bisexual and Transgender (LGBT) Health program is designed to address the complex issues confronting the health disparities and health-seeking behaviors of LGBT people. The sequence of courses examines health disparities, research, sampling and measurement methodologies involved in the study of LGBT populations, and the intersections of social identities/inequalities (such as those based on ethnicity, sexual orientation and sex/gender among others).

The program is offered entirely online, and in a flexible format to provide qualified students and health professionals with an opportunity to acquire these credentials regardless of restrictions in time and physical location. Those who successfully complete the certificate program and wish to broaden their scope of public health education could pursue an MPH degree program.

Program Requirements

Required Courses

CHP 681	Research with Rare, Stigmatized and Hidden Populations	3.0
CHP 682	LGBT Health Disparities	3.0
CHP 683	Intersectional Perspectives	3.0
Total Credits		9.0

Sample Plan of Study

First Year

Fall		Credits
CHP 681	Research with Rare, Stigmatized and Hidden Populations	3.0
CHP 682	LGBT Health Disparities	3.0
CHP 683	Intersectional Perspectives	3.0
Term Credits		9.0

Total Credit: 9.0

Additional Information

For additional information about this program, go the Dornsife School of Public Health's Admissions web page (<https://drexel.edu/dornsife/admissions/overview/>).

Thomas R. Kline School of Law

The Thomas R. Kline School of Law (<http://www.drexel.edu/law/>) was established in 2006, and was built on the strengths of Drexel University, including experiential education and the fields of engineering, science, business, and health care.

The School offers the Juris Doctor (JD) degree, which has been designed to prepare law students for the challenges of 21st-century practice. Students can elect to fulfill concentrations in business and entrepreneurship law, health law, intellectual property law, and criminal law. The School also offers a Master of Legal Studies (MLS) program for individuals in other disciplines and professions who would benefit from focused legal knowledge in their field, a Master of Laws (LLM) in American Legal Practice for internationally trained attorneys that offers an optional focus on New York Bar Exam preparation, and specialized LLMs for attorneys who want to dive deeply into one area of practice.

Educational Objectives

The educational objectives of the Thomas R. Kline School of Law include knowledge of the law, training in practical skills, and commitment to professionalism. The Juris Doctor (JD) degree program offers a standard law school curriculum, to ensure that its graduates are well-equipped to pass the bar examination upon graduation and to be competent legal professionals, regardless of their particular practice areas. Students may complete the JD on a full-time basis in either two or three years.

The Master of Legal Studies (MLS) program and associated certificates, designed for individuals who are not seeking to become attorneys, are intended to develop and improve career-related skills through the study of the legal system, legal writing, law, regulation, and policy.

The Master of Laws (LLM) in American Legal Practice allows for a flexible curriculum or specialized tracks to target the student's goals for US practice or legal knowledge. LLM students can take advantage of experiential learning opportunities as well as courses designed to develop proficiency in English legal vocabulary.

The specialized LLMs are designed for practicing attorneys to develop expertise beyond the curriculum offered in their JD programs. The programs are ideal for new and experienced attorneys who are looking for advancement in their organizations or who wish to explore trending areas of law and regulation more deeply.

Accreditation

The Juris Doctor program at the Drexel University Thomas R. Kline School of Law is fully accredited by the American Bar Association (ABA). The ABA does not offer accreditation to non-JD programs, but has acquiesced to the Master of Laws, Master of Legal Studies, and certificate programs offered by the Thomas R. Kline School of Law.

Majors

- American Legal Practice (LLM) (p. 409)
- **NEW:** Cyber Law and Data Privacy (LLM)
- **NEW:** Global Financial Regulation (LLM)
- **NEW:** Health Care and Pharmaceutical Compliance (LLM)
- **NEW:** International Commercial Law (LLM)

- Juris Doctor (JD) (p. 409)
- Legal Studies (MLS) (p. 412)
- Trial Advocacy and Dispute Resolution (LLM) (p. 414)

Certificates

- Criminal Law (p. 417)
- Cybersecurity and Information Privacy Compliance (<http://catalog.drexel.edu/graduate/schooloflaw/cybersecurityandinformationprivacycompliancepbc/>)
- Financial Regulatory Compliance (<http://catalog.drexel.edu/graduate/schooloflaw/financialregulatorycompliancepbc/>)
- Health Care Compliance (p. 417)
- Higher Education Compliance (p. 417)
- Human Resources Compliance (p. 418)
- NCAA Compliance (p. 419)
- **NEW:** Pharmaceutical and Medical Device Regulatory Compliance

Admissions Requirements

Admission to the Thomas R. Kline School of Law is determined using a variety of factors evaluated by the law admissions committee. For Juris Doctor (JD) candidates, the committee evaluates the student's LSAT score, academic record (including graduate degrees), work and volunteer experience, and personal background.

To apply, prospective JD students submit the following:

- a resume - describing employment history, including part-time and summer employment.
- a personal statement - essay discussing motivation for attending law school and how the Thomas R. Kline School of Law will help the applicant achieve his or her goals.
- LSDAS registration - all applicants, including those educated abroad, are required to register with the Law School Data Assembly Service (LSDAS). The LSDAS will provide Drexel University with a report containing information important in the admission process.

Visit the Law School Admission Council Website at www.lsac.org (<http://www.lsac.org/>) for more information and to register.

The report includes an undergraduate academic summary; undergraduate, graduate and law/professional school transcripts; LSAT scores; and letters of recommendation (at least two) processed by the Law School Admission Council (LSAC).

To access the online application (<http://drexel.edu/law/admissions/apply/>) or for additional guidelines on how to apply, visit the Thomas R. Kline School of Law (<http://www.drexel.edu/law/>) website.

Students who are interested in the Master of Legal Studies or Certificate programs should visit and apply through Drexel University Online (<http://online.drexel.edu/>).

Facilities

Located in the heart of the University's main campus in University City, the Thomas R. Kline School of Law (<http://www.drexel.edu/law/>) is in a 57,254 square foot facility that includes:

- a 2-story atrium and balcony area for meetings, receptions and casual conversation

- two large classrooms, seating 72
- one moot courtroom, seating 65
- one medium classroom, seating 55
- two classrooms, seating 32
- two seminar rooms
- one classroom, seating 18
- thirty-seven offices for full-time faculty, plus 2 offices for adjunct professors
- office space for student organizations, Trial Team, Moot Court, Law Review and in-house clinics
- the Legal Research Center (<http://drexel.edu/law/lrc/Overview/>), one-floor library with 14,500 linear feet of shelving
- quiet study areas and group study rooms within the library

Additionally, the Thomas R. Kline School of Law utilizes space in the Dornsife Center for Neighborhood Partnerships and the Papadakis Integrated Sciences Building. The entire area shares Drexel's campus-wide wireless access to the internet, and all classrooms include data ports for each student and high-tech audio/visual resources. The law building is located on Market Street, between 33rd and 34th Streets. It is also a half-block from both the Market-Frankford elevated subway line (serving Center City and the Northeast), as well as the subway-surface lines (serving the City's western suburbs), making the law school convenient to where students will live and to the courts and co-op placements in the downtown legal district.

American Legal Practice

Major: American Legal Practice

Degree Awarded: Master of Laws (LLM)

Calendar Type: Semester

Total Credit Hours: 24.0

Classification of Instructional Programs (CIP) code: 22.0101

Standard Occupational Classification (SOC) code: 23-1011

About the Program

The Master of Laws (LL.M.) in American Legal Practice is designed for students who have completed, at a minimum, an LL.B. or its equivalent outside of the United States. The LL.M. provides these students with a sophisticated knowledge of US legal practice and grounds them in a basic understanding of US law.

Admission Requirements

Students must have an earned Bachelor of Laws (LL.B.) or its equivalent. Admissions will be based on applicant grades from their prior institutions. No entry exam is required, except that students who have completed their first law degree program in a language other than English will be required to have a minimum score on the TOEFL or a comparable exam.

Degree Requirements

To earn the general LL.M., students must successfully complete 24.0 semester credits. There are no distribution requirements. Every student will receive individualized academic counseling and the student's individual program of study will be set up in consultation with an advisor.

New York Bar Concentration Requirements

Students opting to follow the New York Bar concentration within the LL.M. must complete 33.0 semester credits and follow the course plan as

described. In addition to the required courses, students are also required to complete 50 hours of certified pro bono work to fulfill the New York Bar Concentration, per state eligibility requirements.

New York Bar Concentration Requirements

LAW 565S	Legal Methods I	3.0
LAW 566S	Legal Methods II	2.0-3.0
or LAW 884S	Contract Drafting	
LAW 830S	Professional Responsibility	3.0
LAW 886S	Writing Strategies for the Bar	2.0
LAW 970S	Introduction to United States Legal Systems	3.0
One course designated as "Statutory"		2.0-4.0
At least 6 credits from the following menu of courses:		6.0
LAW 550S	Torts	
LAW 552S	Contracts	
LAW 554S	Civil Procedure	
LAW 556S	Property	
LAW 558S	Criminal Law	
LAW 560S	Constitutional Law	
LAW 670S	Criminal Procedure: Investigations	
One Experiential course & Seminar from the following menu:		5.0-14.0
LAW 931S & LAW 654S	Law Co-op and Lawyering Practice Seminar	
LAW 933S & LAW 654S	Co-op Intensive and Lawyering Practice Seminar	
LAW 924S & LAW 653S	Entrepreneurial Law Clinic and Entrepreneurial Law Clinic Seminar	
LAW 941S & LAW 942S & LAW 656S	Criminal Litigation Clinic I and Criminal Litigation Clinic II and Justice Lawyering Sem	
LAW 943S & LAW 944S & LAW 656S	Civil Litigation Clinic I and Civil Litigation Clinic II and Justice Lawyering Sem	
LAW 947S & LAW 948S & LAW 656S	Federal Litigation and Appeals Clinic and Federal Litigation and Appeals Clinic II and Justice Lawyering Sem	
LAW 950S & LAW 951S & LAW 656S	Community Lawyering Clinic I and Community Lawyering Clinic II and Justice Lawyering Sem	
LAW 925S & LAW 654S	Field Practicum and Lawyering Practice Seminar	
Additional electives as needed *		0.0-7.0
Total Credits		26.0-45.0

* *Students are required to complete a minimum of 33.0 credits to earn the concentration. Students will need to take as many elective credits as necessary to get to 33.0 total credits, based on the courses they choose to fulfill the other requirements.

The JD Program

Major: Law

Degree Awarded: Juris Doctor (JD)

Calendar Type: Semester

Total Credit Hours: 85.0

Classification of Instructional Programs (CIP) code: 22.0101

Standard Occupational Classification (SOC) code: 23-1011

About the Program

The Kline School of Law offers a rigorous law curriculum that aims to prepare students for the realities of practice, combining the classic foundation of legal education with the experiential components that are so vital to both Drexel University's mission and to legal employers today.

Students have the option of completing the JD in the traditional three years, or through an accelerated two-year program designed to get students into the legal workforce faster, with the same essential skills and knowledge.

Students spend their first year on campus being introduced to the foundations of legal analysis, skills, and professionalism in a diverse learning community. The program includes traditional first-year courses, such as contracts, property, and criminal law, as well as a critical introduction to lawmaking and statutory interpretation through a Legislation & Regulation course. The first year also includes a comprehensive legal methods course, taught by full-time faculty, which instructs students on the fundamentals of legal writing and analysis.

The remaining curriculum exposes students to a broad array of topics relevant to the study of law. Students are required to complete courses in professional responsibility, legal writing and other practice skills, and statutory law. Students must also complete at least 50 hours of pro bono work.

The Experiential Education Program

Students are required to complete either a co-op placement or a clinical experience in order to graduate. This requirement provides students with an integrated learning experience that prepares them for the complexities of modern-day practice.

The cooperative education program (co-op) allows upper-level students to spend a semester - or in some cases, a full year - at a single legal placement. The Kline School of Law has relationships with a wide-ranging selection of co-op partners including judicial chambers, private law firms, in-house counsel offices, and non-profit organizations, but has also assisted many students in creating opportunities in other practice jurisdictions. Students are not paid for their work but will instead receive academic credits for their co-op experiences and for a lawyering practice seminar that must be taken in conjunction with the co-op.

Clinical experiences offer students the chance to represent real clients in a clinical setting. Clinical offerings include a Civil Litigation Field Clinic, Criminal Litigation Field Clinic, Federal Appeals and Litigation Clinic, Community Lawyering Clinic, and an Entrepreneurial Law Clinic. These experiences are paired with a seminar that guides students through reflection on their work and its impact on the community.

In addition to the co-op and clinical requirement, students may also take advantage of a broad selection of simulation courses that involve in-depth trial practice, advocacy, litigation, transactional practice, and alternative dispute resolution.

About the Concentrations

The Thomas R. Kline School of Law builds on some of the strengths for which Drexel University is nationally known by offering four optional concentrations. These are areas in which there are expanding employment opportunities and a need for specialized knowledge and skills: intellectual property, health, business & entrepreneurship, and criminal law. These concentrations consist not only of specialized courses taught in the classroom, but also experiential learning opportunities such as co-ops and simulations.

Joint Degrees

For those law students interested in pursuing expertise in another area of study, the School also offers several joint degrees combining law with other subjects, including Law and Business Administration (JD/MBA),

Law and Library and Information Science (JD/MSLIS), (p. 226) Law and Psychology (JD /PhD (p. 226)), Law and Public Health (JD/MPH), and Law and Public Policy (JD/MSPP). For more details about joint degree opportunities, visit the Thomas R. Kline School of Law Joint Degree (<http://www.drexel.edu/law/academics/jointDegrees/>) website.

Additional Information

For additional information about the JD program, visit the the Thomas R. Kline School of Law (<http://www.drexel.edu/law/>) website.

Degree Requirements

Required Courses

LAW 550S	Torts	4.0
LAW 552S	Contracts	4.0
LAW 554S	Civil Procedure	4.0
LAW 555S	Legislation and Regulation	3.0
LAW 556S	Property	4.0
LAW 558S	Criminal Law	4.0
LAW 560S	Constitutional Law	4.0
LAW 565S	Legal Methods I	3.0
LAW 566S	Legal Methods II	3.0
LAW 830S	Professional Responsibility	3.0
Total Credits		36.0

A total of 85 semester credits are required to graduate, with a minimum of 61 credits of "in-class" coursework (see Law School Student Handbook for courses that do not count.)

Additional Requirements:

Students must also complete:

1. At least one legal writing course designated as meeting the standard of the Upper-Level Writing requirement [WUL], as indicated by the course materials; and
2. At least one Statutory course, as indicated by the course materials.

Professional Practice Requirement

To better prepare our students for the legal profession, students are required to complete either a law co-op or a law clinic.

Pro Bono Requirement

Students must fulfill a minimum of 50 hours of qualifying pro bono service.

Sample Plan of Study

First Year

Fall		Credits
LAW 550S	Torts	4.0
LAW 552S	Contracts	4.0
LAW 554S	Civil Procedure	4.0
LAW 565S	Legal Methods I	3.0
Term Credits		15.0
Total Credit:		15.0

First Year

Spring		Credits
LAW 556S	Property	4.0
LAW 558S	Criminal Law	4.0
LAW 566S	Legal Methods II	3.0

LAW 555S	Legislation and Regulation	3.0
Term Credits		14.0

Total Credit: 14.0

Second Year

Fall		Credits
LAW 560S	Constitutional Law	4.0
Term Credits		4.0

Total Credit: 4.0

In addition to this plan, 52 additional credits - including LAW 830S, an Upper-Level Writing course, an upper-level Statutory course, and a Professional Practice experience - must also be completed in order for students to complete the degree.

School of Law Faculty

Tabatha Abu El-Haj, PhD, LL.M., JD (*New York University; Georgetown University Law Center; New York University School of Law*). Professor. Constitutional law (specifically, First Amendment and election law), popular constitutionalism, administrative law, and the sociology of law.

Bret D. Asbury, JD (*Yale Law School*) *Associate Dean for Academic Affairs*. Professor. Civil procedure; law and literature.

Adam Benforado, JD (*Harvard Law School*). Professor Emerita. Law and mind sciences, corporate law and contract law.

Amelia Boss, JD (*Rutgers-Camden School of Law*). Trustee Professor. Commercial law, including electronic payment systems, bankruptcy and contracts.

Susan Brooks, JD (*New York University*) *Associate Dean for Experiential Learning*. Professor. Clinical and co-op education; family law; children's rights; legal ethics.

Chapin Cimino, JD (*University of Chicago Law School*). Professor. Contract law; constitutional law; law and humanities; higher education law.

David S. Cohen, JD (*Columbia University School of Law*). Professor. Constitutional law; civil rights; sex discrimination.

Clare Keefe Coleman, JD (*Villanova University School of Law*) *Director of International Student Programs*. Associate Professor. Writing specialist.

Rose Corrigan, PhD (*Rutgers University*) *Director of the Center for Law, Policy, and Social Action*. Associate Professor. Women, public law, American politics and policy.

David DeMatteo, PhD, JD (*MCP Hahnemann University; Villanova University School of Law*) *Director of the JD-PhD Program in Law and Psychology*. Professor. Psychopathy, forensic mental health assessment, drug policy; offender diversion.

Roger J. Dennis, JD (*Northwestern University School of Law*) *Founding Dean Emeritus*. Professor Emeritus. Corporate law; business organizations; civil procedure; law and economics.

Tracye Edwards, JD (*Duke University*). Assistant Professor. Human Resources Compliance.

Nicole El, JD (*New England School of Law*). Supervising Attorney, Criminal Litigation Field Clinic. Criminal litigation.

Robert I. Field, PhD, JD, MPH (*Columbia University*) *Director of the JD-Master of Public Health Program*. . Professor. Department of Health

Management and Policy. Health law; public health law; health system structure; ethics of vaccines; public policy and legal aspects of health reform; genetic privacy.

Daniel M. Filler, JD (*New York University School of Law*) *Dean*. Professor. Criminal law and procedure; sentencing and death penalty; law and society; law and humanities.

Richard H. Frankel, LL.M., JD (*Georgetown University Law Center; Yale Law School*) *Director of the Federal Litigation and Appeals Clinic*. Associate Professor. Appellate litigation, access to justice in areas including consumer, administrative, and immigration law.

Barry Furrow, JD (*Harvard Law School*) *Director of the Health Law Program*. Professor. Health law; torts.

Eamon Gallagher, JD (*Drexel University Kline School of Law*) *Director of the Entrepreneurial Law Clinic*. Corporate transactional law; entrepreneurship and law

Alex Geisinger, LL.M., JD (*Harvard Law School; University of Connecticut School of Law*) *Associate Dean for Faculty Development and Research*. Professor. Environmental law; torts; commercial law; behavioral law and economics.

Deborah Gordon, JD (*New York University School of Law*). Associate Professor. Trusts and estates, gift tax, legal methods.

Wendy Greene, LL.M., JD (*George Washington University School of Law; Tulane University School of Law*). Professor. Natural hair discrimination; race and the law; employment law

Beth L. Haas, JD (*Villanova University School of Law*) *Associate Dean of Graduate Studies and Online Learning*. Associate Professor. Aviation litigation, product liability defense and toxic torts.

Abbie Heller, JD (*Drexel University Kline School of Law*) *Assistant Director of Trial Advocacy*.

Katelyn Hufe, JD (*Drexel University Kline School of Law*) *Co-Director of the Federal Litigation and Appeals Clinic*. Professor. Immigration law; refugee and asylum; domestic violence.

Nicole Iannarone, JD (*Yale Law School*). Assistant Research Professor. Financial industry regulation; consumer and securities issues; law and technology.

Yolanda Ingram, JD (*Washburn University School of Law*) *Director of Bar Support*. Assistant Teaching Professor. Higher education compliance; diversity and inclusion

Aimée Kahan, JD (*University of Pennsylvania School of Law*) *Director of Master of Legal Studies Program*. Associate Professor. Health care quality, patient safety, and risk management

Anil Kalhan, MPPM, JD (*Yale School of Management; Yale Law School*). Professor. Immigration and citizenship law, constitutional law, comparative law and criminal law.

Lauren Katz-Smith, JD (*Drexel University Kline School of Law*). Assistant Clinical Professor.

Nancy C. Kraybill, JD (*University of California-Los Angeles School of Law*) *Director of Academic Skills*. Professor. Arbitration, mediation, civil litigation and academic skill development.

Elizabeth Kukura, LL.M., JD (*London School of Economics and Political Science; Temple University School of Law; New York University School of Law*). Visiting Assistant Professor. Reproductive rights; women's health care.

Amy Landers, JD (*University of California*) Director of the *Intellectual Property Law Program*. Professor. Patents and intellectual property law.

Rachel Lopez, LL.M., JD (*Universite Paris 1, Pantheon-Sorbonne; University of Texas School of Law*) Director of the *Stern Community Lawyering Clinic*. Associate Professor. Appellate law and the functioning of court and judicial systems; bioethics; reproductive rights; intersection of law and religion.

Amy Montemarano, JD (*Rutgers University School of Law – Camden*). Associate Professor. Legal research and writing.

Kevin P. Oates, LL.M., JD (*Temple University School of Law; Pace University School of Law*) Senior Associate Dean of Students and Administration. Professor. Legal methods; evidence; conflicts of law; legal ethics.

Karl Okamoto, JD (*Columbia University School of Law*) Director of the *Business and Entrepreneurship Law Program*. Professor. Entrepreneurship; business organizations; corporate law; venture finance; securities law.

Reena E. Parambath, JD (*Temple University School of Law*) Director of the *Co-op Program*. Associate Professor.

Pammela Quinn, JD (*Duke University School of Law*). Associate Professor. International law and enforcement of legal norms at the international and domestic levels.

Rebecca Rich, JD (*University of Illinois at Urbana-Champaign; Boston College Law School*) Director of the *Legal Research Center*. Assistant Teaching Professor. Disability law; law and technology; administrative law; bioethics.

Jared Rosenblatt, JD (*Hofstra University School of Law*) Associate Director of *Trial Advocacy Program*. Associate Professor. Criminal law, trial advocacy, evidence, professional responsibility, sports law

Terry Jean Seligmann, JD (*New York University School of Law*) Arlin M. Adams Professor of *Legal Writing Emerita*. Professor Emerita. Legal methods; education and special education law.

Arly Smith-Pearson, JD (*Tulane University School of Law*) *Supervising Attorney*. Civil Litigation Field Clinic. Civil litigation.

Norman P. Stein, JD (*Duke University School of Law*). Professor. Pension law; employee benefits; tax law.

Gwen Roseman Stern, JD (*Temple University School of Law*) Director of *Trial Advocacy Program*. Professor. Medical malpractice and product-liability law, trial advocacy and community awareness of legal procedures.

Donald F. Tibbs, PhD, LL.M., JD (*Arizona State University; University of Wisconsin Law School; University of Pittsburgh School of Law*). Associate Professor. The overlapping issues of law, civil rights, criminal procedure, race and punishment and professional responsibility.

Lisa Tucker, JD (*Harvard Law School*). Associate Professor. Legal methods; United States Supreme Court practice, family law.

Emily B. Zimmerman, JD (*Yale Law School*) Director of the *Criminal Law Program*. Professor. Legal methods; criminal law and procedure.

Emeritus Faculty

Donald Bersoff, JD, PhD (*Yale University, New York University*). Professor Emeritus. Law and psychology; mental health law.

Master of Legal Studies

Major: Legal Studies

Degree Awarded: Master of Legal Studies (MLS)

Calendar Type: Semester

Total Credit Hours: 30.0

Classification of Instructional Programs (CIP) code: 22.0203

Standard Occupational Classification (SOC) code: 23-1011

About the Program

As society becomes increasingly regulated, job candidates with advanced skills in legal and regulatory analysis, as well as regulatory compliance, have become highly appealing to many employers. Although many employers do not want to hire additional attorneys, they require employees with sophisticated and narrowly focused exposure to law and legal regulation.

The Master of Legal Studies (MLS) program is a post-baccalaureate degree designed for individuals to develop and improve career-related skills through the study of the legal system, legal writing, law, regulation, and policy. Ideal candidates include individuals in other disciplines, professionals who would benefit from focused legal knowledge (such as those in the fields of health, college sports, education, human resources, finance, etc.), individuals seeking career changes, and those generally interested in the field of law. Upon completion of each degree program, graduates will understand how the law relates to and impacts their particular areas of interest, although they will not be attorneys.

Currently, the following concentrations are offered (optional):

- Criminal Law
- Cybersecurity and Information Privacy Compliance
- Entrepreneurship and Law
- Financial Regulatory Compliance
- Health Care Compliance
- Higher Education Compliance
- Human Resources Compliance
- NCAA Compliance and Sports Law
- Pharmaceutical and Medical Device Regulatory Compliance

The program is designed to be completed on either a part-time or full-time basis.

Degree Requirements

All students must complete the required core curriculum courses, and additional electives or concentration courses, totaling 30.0 semester credits.

Within the program, eight optional concentrations are currently offered:

- Criminal Law
- Cybersecurity and Information Privacy Compliance
- Health Care Compliance

- Human Resources Compliance
- Financial Regulatory Compliance
- NCAA Compliance and Sports Law
- Higher Education Compliance
- Entrepreneurship and Law

Required Core Curriculum Courses

LSTU 500S	Introduction to the Legal System	3.0
LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
LSTU 502S	Ethics and Professional Standards	3.0
LSTU 503S	Legal Research and Analysis	3.0
LSTU 507S	Risk Assessment and Management	3.0
LSTU 540S	MLS Masters Capstone	3.0-4.0

Electives or Concentration

Complete LSTU, LAW electives or any combination of electives & concentrations	11.0-12.0
Total Credits	30.0

Health Care Compliance Concentration *

Required Courses		
LSTU 504S	Health Care Rules and Regulations	3.0
LSTU 505S	Health Care Quality, Patient Safety and Risk Management	3.0
LSTU 506S	Patients and Privacy: HIPAA and Related Regulations	3.0
LSTU or LAW Elective		3.0
Total Credits		12.0

* Students completing this concentration will be manually enrolled in the LSTU 540S MLS Capstone course section that is focused on compliance.

NCAA Compliance and Sports Law Concentration *

Required Courses		
LSTU 510S	NCAA Governance Process	3.0
LSTU 511S	NCAA Rules I and Infractions Cases	3.0
LSTU 512S	NCAA Rules II and Enforcement Process	3.0
LSTU or LAW Elective		3.0
Total Credits		12.0

* Students completing this concentration will be manually enrolled in the LSTU 540S MLS Capstone course section that is focused on compliance.

Human Resources Compliance Concentration *

Required Courses		
LSTU 520S	Legal Issues in Employee Hiring and Termination	3.0
LSTU 521S	Human Resources Compliance: Managing the Employer/Employee Relationship	3.0
LSTU 522S	Human Resources in Practice: Negotiation, Mediation, and Alternative Dispute Resolution	3.0
LSTU or LAW Elective		3.0
Total Credits		12.0

* Students completing this concentration will be manually enrolled in the LSTU 540S MLS Capstone course section that is focused on compliance.

Criminal Law Concentration *

Required Courses		
LAW 558S	Criminal Law	3.0
LAW 670S	Criminal Procedure: Investigations	3.0
LSTU 530S	Corrections Law	3.0
LSTU or LAW Elective		3.0
Total Credits		12.0

* Students completing this concentration will be manually enrolled in the LSTU 540S MLS Capstone Thesis section.

Higher Education Compliance Concentration *

Required Courses		
LSED 532S	Legal Landscape of Student Rights and Campus Safety	3.0
LSED 533S	Institutional Compliance: Aid and Accreditation	3.0
LSED 534S	Higher Education Institutions: Financial Rules and Regulations	3.0
LSTU or LAW Elective		3.0
Total Credits		12.0

* Students completing this concentration will be manually enrolled in the LSTU 540S MLS Capstone course section that is focused on compliance.

Entrepreneurship and Law Concentration *

Required Courses		
ENTP 501	Entrepreneurship Essentials **	3.0
ENTP 535	Social Entrepreneurship **	3.0
ENTP 540	Methods of Entrepreneurship **	3.0
ENTP 641	Innovation in Established Companies **	3.0
Total Credits		12.0

* Students completing this concentration will be manually enrolled in the LSTU 540S MLS Capstone Thesis section.

** ENTP courses are on the Quarter Schedule. Note that 3 quarter credits = 2 semester credits. Therefore 12 quarter credits = 8 semester credits.

Financial Regulatory Compliance *

Required Courses		
LAW 700S	Business Organizations	3.0
Choose three from this list: 9.0		
LAW 734S	Legal Regulation of Investment Advisers	
LAW 735S	Legal Regulation of Investment Companies	
LAW 736S	Broker/Dealer Regulation	
LAW 737S	Banking Law	
Total Credits		12.0

* Students completing this concentration will be manually enrolled in the LSTU 540S MLS Compliance Capstone section.

Cybersecurity and Information Privacy Compliance*

LAW 770S	European Union Data Privacy and Protection	3.0
LSTU 515S	Information Privacy Law	3.0
LSTU 517S	The Law and Strategies Surrounding Cybersecurity	3.0
LSTU or LAW Elective		3.0
Total Credits		12.0

* Students concentrating in Cybersecurity and Information Privacy will be manually enrolled in the LSTU 540S Compliance Capstone.

Pharmaceutical and Medical Device Regulatory Compliance Concentration*

Choose four from the list below: 12.0		
LAW 770S	European Union Data Privacy and Protection	
LAW 785S	Legal Regulation of Pharmaceutical and Medical Device Research and Development	
LAW 787S	Legal Regulation of Pharmaceutical and Medical Device Sales and Marketing Practices	
LAW 792S	Food and Drug Law	
LSTU 506S	Patients and Privacy: HIPAA and Related Regulations	
LSTU 515S	Information Privacy Law	

LSTU 517S The Law and Strategies Surrounding Cybersecurity

LSTU 539S Compliance Communications

Legal Studies (Law School) Faculty

John Cannan, JD (*University of Maryland School of Law*). Adjunct Professor. Legal research and analysis; Masters Capstone.

James Castagnera, JD (*Case Western Reserve Law School*). Adjunct Professor. Human Resources Compliance.

Lisa Detwiler, JD (*University of Pittsburgh School of Law*). Adjunct Professor. Financial regulatory compliance.

Tracye Edwards, JD (*Duke University*). Assistant Professor. Human Resources Compliance.

Veronica Finkelstein, JD (*Emory University*). Adjunct Professor. Criminal law.

Jordan Fischer, JD (*Drexel University School of Law*). Assistant Teaching Professor. Cybersecurity and Information Privacy Compliance

Paul Flanagan, JD (*Creighton University School of Law*) *Director of the Privacy, Cybersecurity and Compliance Program*. Assistant Professor. Compliance; privacy; legal issues in the health care industry.

Leeza Garber, JD (*University of Pennsylvania Law School*). Adjunct Professor. Cybersecurity and Information Privacy Compliance

Micheal Gioffre, JD (*Delaware Law School*). Adjunct Professor. Financial Regulatory Compliance

James Goepel, JD (*George Mason University*). Adjunct Professor. Cybersecurity and Information Privacy Compliance

Sara Goldstein, JD (*Drexel University*). Adjunct Professor. Health Care Compliance

David Haendler, JD (*University of Chicago*). Adjunct Professor. Legal Research and Analysis

David R. Hoffman, JD (*University of Pittsburgh*). Practice Professor of Law. Health Care Compliance, Master Capstone

Beau Howard, JD, MBA (*Rutgers Law School, Monmouth University*). Adjunct Professor. Financial Regulatory Compliance

Aaron Hurley, LL.M., JD (*University of Washington, Gonzaga University*). Adjunct Professor. Financial Regulatory Compliance

Daniela Ivancikova, JD (*Drexel University*). Adjunct Professor. Corrections Law, Risk Assessment and Management.

Laura Jacobus, JD (*Santa Clara University School of Law*). Adjunct Professor. Compliance Skills, Risk Assessment and Management, Compliance Communications.

Aimée Kahan, JD (*University of Pennsylvania School of Law*) *Director of Master of Legal Studies Program*. Associate Professor. Health care quality, patient safety, and risk management

Bruce Levine, JD (*New York University*). Associate Clinical Professor. Educational policy, school law, public-private partnerships, intersection of business and education.

Lisa Lewis, JD (*Duke University School of Law*). Adjunct Professor. Criminal Law

Laurel Lichty, LL.B., LL.M. (*City University London; George Washington University*). Adjunct Professor. Introduction to the US Legal Systems.

Jane Massey Licata, PhD, JD (*University of Hawaii, Rutgers-Camden School of Law*). Adjunct Professor. Health Care and Pharmaceutical Compliance

Michele Mathes, JD (*University of Pennsylvania*). Adjunct Professor. Ethics and professional standards.

Jody Mooradian, JD (*Delaware Law School of Widener University*). Adjunct Professor. NCAA Compliance

David Oldham, JD (*Drexel University School of Law*). Adjunct Professor. Higher Education Compliance

Pakapon Phinyowattanachip, JD (*Washington and Lee University School of Law*). Adjunct Professor. Higher Education Compliance

Rebecca Rakoski, JD (*Widener University School of Law*). Adjunct Professor. US Legal Systems, Risk Assessment

Mark Stanisz, JD (*Harvard Law School*). Adjunct Professor. Higher Education Compliance

Tracy Tripp, JD (*Drexel University*). Adjunct Professor. Criminal procedure.

Joel Trotter, JD (*Temple University Beasley School of Law*). Adjunct Professor. Healthcare and Pharmaceutical Law

Neal Wiley, JD (*Drexel University Thomas R. Kline School of Law*). Adjunct Professor. Thesis Writing

Allison Wirth, JD (*University of Nevada-Las Vegas, Williams S. Boyd School of Law*). Adjunct Professor. Financial Regulatory Compliance

Trial Advocacy and Dispute Resolution

Major: Trial Advocacy and Dispute Resolution

Degree Awarded: Master of Laws (LLM)

Calendar Type: Semester

Total Credit Hours: 24.0

Classification of Instructional Programs (CIP) code: 22.0101

Standard Occupational Classification (SOC) code: 23-1022

About the Program

The LLM in Trial Advocacy and Dispute Resolution will train students to become more effective client advocates in a variety of dispute-related settings. These include client interviewing and counseling, pre-trial advocacy, jury selection, and appellate advocacy. The program is designed to both re-train attorneys whose work has not previously demanded, or taught, such skills, as well as to improve the advocacy skills of attorneys who already work in this area.

The LLM may be taken either part-time or full-time. Students may maintain part-time status by enrolling in a minimum of 5.0 credits per semester. To maintain full-time status, students must enroll in a minimum

of 9.0 credits per academic semester. The program is designed to be completed in either one or two years.

Additional information about the Thomas R. Kline School of Law (<http://drexel.edu/law/>) is available on the school's website.

Admission Requirements

The LLM program is open to applicants who have received a JD, an LLB, or a comparable law degree. International applicants must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL) or similar examination. In addition to test scores, telephone or Skype interviews may also be used for foreign applicants.

Applications will be accepted on a rolling basis, but new students will typically begin in the Fall semester.

Degree Requirements

The LLM is a 24-credit program, with 17.0 credits made up of required courses:

Required Courses

LAW 637S	Advanced Evidence	3.0
LAW 646S	Mediation and Arbitration	3.0
LAW 904S	Advanced Trial Advocacy: Civil	3.0
or LAW 906S	Advanced Trial Advocacy: Criminal	
LAW 811S	Expert Witnesses	3.0
LAW 882S	Litigation Drafting	2.0
LAW 981S	Litigation Technology	3.0

In addition, students must complete additional credits through electives. Students may complete:

LAW 982S	Jury Selection	2.0
LAW 904S	Advanced Trial Advocacy: Civil	3.0
or LAW 906S	Advanced Trial Advocacy: Criminal	
LAW 660S	E-Discovery & Digital Evidence	2.0
LAW 910S	Appellate Advocacy	2.0
LAW 900S	Pre-Trial Advocacy	2.0
LAW 890S	Improvisation for Lawyers	1.0

* Students may select the version of Advanced Trial Advocacy they did not select in fulfillment of the core requirement.

The LLM degree will be conferred only after the student completes 24.0 credits. A student must maintain a GPA of 2.20 each semester and at program completion.

Sample Plan of Study

Students may complete the LLM in one or two years, depending on whether the student chooses to pursue the degree on a full-time or part-time basis. A potential plan of study for a full-time student would be as follows:

First Year		
Fall		Credits
LAW 637S	Advanced Evidence	3.0
LAW 906S	Advanced Trial Advocacy: Criminal	3.0
LAW 981S	Litigation Technology	3.0

LAW 882S	Litigation Drafting	2.0
Term Credits		11.0

Total Credit: 11.0

First Year

Spring		Credits
LAW 646S	Mediation and Arbitration	3.0
LAW 811S	Expert Witnesses	3.0
Electives		7.0
Term Credits		13.0

Total Credit: 13.0

School of Law Faculty

Tabatha Abu El-Haj, PhD, LLM, JD (*New York University; Georgetown University Law Center; New York University School of Law*). Professor. Constitutional law (specifically, First Amendment and election law), popular constitutionalism, administrative law, and the sociology of law.

Bret D. Asbury, JD (*Yale Law School*) Associate Dean for Academic Affairs. Professor. Civil procedure; law and literature.

Adam Benforado, JD (*Harvard Law School*). Professor Emerita. Law and mind sciences, corporate law and contract law.

Amelia Boss, JD (*Rutgers-Camden School of Law*). Trustee Professor. Commercial law, including electronic payment systems, bankruptcy and contracts.

Susan Brooks, JD (*New York University*) Associate Dean for Experiential Learning. Professor. Clinical and co-op education; family law; children's rights; legal ethics.

Chapin Cimino, JD (*University of Chicago Law School*). Professor. Contract law; constitutional law; law and humanities; higher education law.

David S. Cohen, JD (*Columbia University School of Law*). Professor. Constitutional law; civil rights; sex discrimination.

Clare Keefe Coleman, JD (*Villanova University School of Law*) Director of International Student Programs. Associate Professor. Writing specialist.

Rose Corrigan, PhD (*Rutgers University*) Director of the Center for Law, Policy, and Social Action. Associate Professor. Women, public law, American politics and policy.

David DeMatteo, PhD, JD (*MCP Hahnemann University; Villanova University School of Law*) Director of the JD-PhD Program in Law and Psychology. Professor. Psychopathy, forensic mental health assessment, drug policy; offender diversion.

Roger J. Dennis, JD (*Northwestern University School of Law*) Founding Dean Emeritus. Professor Emeritus. Corporate law; business organizations; civil procedure; law and economics.

Tracye Edwards, JD (*Duke University*). Assistant Professor. Human Resources Compliance.

Nicole El, JD (*New England School of Law*). Supervising Attorney, Criminal Litigation Field Clinic. Criminal litigation.

Robert I. Field, PhD, JD, MPH (*Columbia University*) Director of the JD-Master of Public Health Program. Professor. Department of Health Management and Policy. Health law; public health law; health system

structure; ethics of vaccines; public policy and legal aspects of health reform; genetic privacy.

Daniel M. Filler, JD (*New York University School of Law*) Dean. Professor. Criminal law and procedure; sentencing and death penalty; law and society; law and humanities.

Richard H. Frankel, LLM, JD (*Georgetown University Law Center; Yale Law School*) Director of the *Federal Litigation and Appeals Clinic*. Associate Professor. Appellate litigation, access to justice in areas including consumer, administrative, and immigration law.

Barry Furrow, JD (*Harvard Law School*) Director of the *Health Law Program*. Professor. Health law; torts.

Eamon Gallagher, JD (*Drexel University Kline School of Law*) Director of the *Entrepreneurial Law Clinic*. Corporate transactional law; entrepreneurship and law

Alex Geisinger, LLM, JD (*Harvard Law School; University of Connecticut School of Law*) Associate Dean for Faculty Development and Research. Professor. Environmental law; torts; commercial law; behavioral law and economics.

Deborah Gordon, JD (*New York University School of Law*). Associate Professor. Trusts and estates, gift tax, legal methods.

Wendy Greene, LLM, JD (*George Washington University School of Law; Tulane University School of Law*). Professor. Natural hair discrimination; race and the law; employment law

Beth L. Haas, JD (*Villanova University School of Law*) Associate Dean of Graduate Studies and Online Learning. Associate Professor. Aviation litigation, product liability defense and toxic torts.

Abbie Heller, JD (*Drexel University Kline School of Law*) Assistant Director of Trial Advocacy..

Katelyn Hufe, JD (*Drexel University Kline School of Law*) Co-Director of the *Federal Litigation and Appeals Clinic*. Professor. Immigration law; refugee and asylum; domestic violence.

Nicole Iannarone, JD (*Yale Law School*). Assistant Research Professor. Financial industry regulation; consumer and securities issues; law and technology.

Yolanda Ingram, JD (*Washburn University School of Law*) Director of *Bar Support*. Assistant Teaching Professor. Higher education compliance; diversity and inclusion

Aimée Kahan, JD (*University of Pennsylvania School of Law*) Director of *Master of Legal Studies Program*. Associate Professor. Health care quality, patient safety, and risk management

Anil Kalhan, MPPM, JD (*Yale School of Management; Yale Law School*). Professor. Immigration and citizenship law, constitutional law, comparative law and criminal law.

Lauren Katz-Smith, JD (*Drexel University Kline School of Law*). Assistant Clinical Professor.

Nancy C. Kraybill, JD (*University of California-Los Angeles School of Law*) Director of *Academic Skills*. Professor. Arbitration, mediation, civil litigation and academic skill development.

Elizabeth Kukura, LLM, JD (*London School of Economics and Political Science; Temple University School of Law; New York University School of Law*). Visiting Assistant Professor. Reproductive rights; women's health care.

Amy Landers, JD (*University of California*) Director of the *Intellectual Property Law Program*. Professor. Patents and intellectual property law.

Rachel Lopez, LLM, JD (*Universite Paris 1, Pantheon-Sorbonne; University of Texas School of Law*) Director of the *Stern Community Lawyering Clinic*. Associate Professor. Appellate law and the functioning of court and judicial systems; bioethics; reproductive rights; intersection of law and religion.

Amy Montemarano, JD (*Rutgers University School of Law – Camden*). Associate Professor. Legal research and writing.

Kevin P. Oates, LLM, JD (*Temple University School of Law; Pace University School of Law*) Senior Associate Dean of Students and Administration. Professor. Legal methods; evidence; conflicts of law; legal ethics.

Karl Okamoto, JD (*Columbia University School of Law*) Director of the *Business and Entrepreneurship Law Program*. Professor. Entrepreneurship; business organizations; corporate law; venture finance; securities law.

Reena E. Parambath, JD (*Temple University School of Law*) Director of the *Co-op Program*. Associate Professor.

Pammela Quinn, JD (*Duke University School of Law*). Associate Professor. International law and enforcement of legal norms at the international and domestic levels.

Rebecca Rich, JD (*University of Illinois at Urbana-Champaign; Boston College Law School*) Director of the *Legal Research Center*. Assistant Teaching Professor. Disability law; law and technology; administrative law; bioethics.

Jared Rosenblatt, JD (*Hofstra University School of Law*) Associate Director of *Trial Advocacy Program*. Associate Professor. Criminal law, trial advocacy, evidence, professional responsibility, sports law

Terry Jean Seligmann, JD (*New York University School of Law*) Arlin M. Adams Professor of *Legal Writing Emerita*. Professor Emerita. Legal methods; education and special education law.

Arly Smith-Pearson, JD (*Tulane University School of Law*) Supervising Attorney. Civil Litigation Field Clinic. Civil litigation.

Norman P Stein, JD (*Duke University School of Law*). Professor. Pension law; employee benefits; tax law.

Gwen Roseman Stern, JD (*Temple University School of Law*) Director of *Trial Advocacy Program*. Professor. Medical malpractice and product-liability law, trial advocacy and community awareness of legal procedures.

Donald F. Tibbs, PhD, LLM, JD (*Arizona State University; University of Wisconsin Law School; University of Pittsburgh School of Law*). Associate Professor. The overlapping issues of law, civil rights, criminal procedure, race and punishment and professional responsibility.

Lisa Tucker, JD (*Harvard Law School*). Associate Professor. Legal methods; United States Supreme Court practice, family law.

Emily B. Zimmerman, JD (Yale Law School) Director of the Criminal Law Program. Professor. Legal methods; criminal law and procedure.

Emeritus Faculty

Donald Bersoff, JD, PhD (Yale University, New York University). Professor Emeritus. Law and psychology; mental health law.

Certificate in Criminal Law

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Semester

Expected Time to Completion: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 45.0401

Standard Occupational Classification (SOC) Code: 19-3041

About the Program

The certificate in Criminal Law is a post-baccalaureate non-degree program designed for individuals to develop and improve career-related skills in the diverse fields that relate to criminal law, such as law enforcement, probation and parole, corrections, social work, immigration and customs, and the military. The program includes a core of legal compliance and risk assessment classes and study of central issues in criminal law.

Admission Requirements

- A completed application
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools attended)
- Resume
- Additional Requirements for International Students

This program is designed to be completed on a part-time basis and requires 15.0 semester credits. Students may apply for transfer in to the Master of Legal Studies program prior to completing their certificate, and apply all earned credits toward the Master of Legal Studies (p. 412).

Program Requirements

LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
LAW 558S	Criminal Law	3.0
LAW 670S	Criminal Procedure: Investigations	3.0
LSTU 530S	Corrections Law	3.0
LSTU 507S	Risk Assessment and Management	3.0
Total Credits		15.0

Certificate in Health Care Compliance

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Semester

Expected Time to Completion: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 51.0717

Standard Occupational Classification (SOC) Code: 13-1041

About the Program

The certificate in health care compliance is a post-baccalaureate, non-degree program designed for individuals to develop and improve career-related skills in the focused area of health care compliance. The program includes a core of legal compliance and risk assessment classes, and in-depth study of crucial issues in health care regulation. Ideal candidates include individuals working in the health care field who would benefit from focused legal knowledge regarding compliance, as well as individuals seeking career changes.

Admission Requirements

- A completed application
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools attended)
- Resume
- Additional Requirements for International Students

This program is designed to be completed on a part-time basis and requires 15.0 semester credits. Students usually finish this program in 1.5 years. If a student needs to decelerate, they should not exceed 2.5 years. Students may apply for transfer in to the Master of Legal Studies program prior to completing their certificate, and apply all earned credits toward the Master of Legal Studies (p. 412).

Required Courses

LSTU 504S	Health Care Rules and Regulations	3.0
LSTU 505S	Health Care Quality, Patient Safety and Risk Management	3.0
LSTU 506S	Patients and Privacy: HIPAA and Related Regulations	3.0
LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
LSTU 507S	Risk Assessment and Management	3.0
Total Credits		15.0

Sample Plan of Study

First Year

Fall		Credits
LSTU 507S	Risk Assessment and Management	3.0
LSTU 505S	Health Care Quality, Patient Safety and Risk Management	3.0
Term Credits		6.0

Spring

LSTU 504S	Health Care Rules and Regulations	3.0
LSTU 506S	Patients and Privacy: HIPAA and Related Regulations	3.0
Term Credits		6.0

Second Year

Fall		Credits
LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
Term Credits		3.0

Total Credit: 15.0

Higher Education Compliance

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Semester

Expected Time to Completion: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 13.0403

Standard Occupational Classification (SOC) Code: 11-9039

About the Program

The goal of the certificate in higher education compliance is to train professionals to understand and respond to legal issues within this specialized and highly regulated environment. While a historical approach is valuable in understanding the context of the legal issues, this program offers a compliance focus that will allow students a chance to look at issues in higher education through the lens of the law.

Admission Requirements

- A completed application
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools attended)
- Resume
- Additional Requirements for International Students

This program is designed to be completed on a part-time basis and requires 15.0 semester credits. Students usually finish this program in 1.5 years. If a student needs to decelerate, they should not exceed 2.5 years. Students may apply for transfer in to the Master of Legal Studies program prior to completing their certificate, and apply all earned credits toward the Master of Legal Studies (p. 412).

Program Requirements

LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
LSTU 507S	Risk Assessment and Management	3.0
LSED 532S	Legal Landscape of Student Rights and Campus Safety	3.0
LSED 533S	Institutional Compliance: Aid and Accreditation	3.0
LSED 534S	Higher Education Institutions: Financial Rules and Regulations	3.0
Total Credits		15.0

Sample Plan of Study

First Year (Part-Time)

Fall		Credits
LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
LSTU 507S	Risk Assessment and Management	3.0
Term Credits		6.0

Spring

LSED 532S	Legal Landscape of Student Rights and Campus Safety	3.0
LSED 533S	Institutional Compliance: Aid and Accreditation	3.0
Term Credits		6.0

Second Year (Part-Time)

Fall		Credits
LSED 534S	Higher Education Institutions: Financial Rules and Regulations	3.0
Term Credits		3.0

Total Credit: 15.0

Certificate in Human Resources Compliance

Certificate Level: Graduate

Admission Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Semester

Expected Time to Completion: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 52.1099

Standard Occupational Classification (SOC) Code: 13-1071

About the Program

The Certificate in Human Resources Compliance is a post-baccalaureate non-degree program designed for individuals to develop and improve career-related skills in the focused area of human resources compliance. The certificate program includes a core of legal compliance and risk assessment classes, and in-depth study of crucial issues in human resources rules and regulation. Ideal candidates include individuals working in human resources and related fields who would benefit from focused legal knowledge regarding compliance, as well as individuals seeking career changes.

Admission Requirements

- A completed application
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools attended)
- Resume
- Additional Requirements for International Students

The program is designed to be completed on a part-time basis and requires 15.0 semester credits. Students usually finish this program in 1.5 years. If a student needs to decelerate, they should not exceed 2.5 years. Students may apply for transfer in to the Master of Legal Studies program prior to completing their certificate, and apply all earned credits toward the Master of Legal Studies (p. 412).

Program Requirements

LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
LSTU 507S	Risk Assessment and Management	3.0
LSTU 520S	Legal Issues in Employee Hiring and Termination	3.0
LSTU 521S	Human Resources Compliance: Managing the Employer/ Employee Relationship	3.0
LSTU 522S	Human Resources in Practice: Negotiation, Mediation, and Alternative Dispute Resolution	3.0
Total Credits		15.0

Sample Plan of Study

First Year

Fall		Credits
LSTU 507S	Risk Assessment and Management	3.0
LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
Term Credits		6.0

Spring

LSTU 520S	Legal Issues in Employee Hiring and Termination	3.0
LSTU 522S	Human Resources in Practice: Negotiation, Mediation, and Alternative Dispute Resolution	3.0
Term Credits		6.0

Second Year

Fall

LSTU 521S	Human Resources Compliance: Managing the Employer/Employee Relationship	3.0
Term Credits		3.0

Total Credit: 15.0

Certificate in NCAA Compliance

Certificate Level: Graduate

Admissions Requirements: Bachelor's degree

Certificate Type: Post-Baccalaureate

Number of Credits to Completion: 15.0

Instructional Delivery: Online

Calendar Type: Semester

Expected Time to Completion: 1.5 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 31.0504

Standard Occupational Classification (SOC) Code: 25-1193

About the Program

The certificate in NCAA compliance is a post-baccalaureate non-degree program designed for individuals to develop and improve career-related skills in the focused area of compliance with NCAA—National Collegiate Athletic Association—rules and regulations. The certificate program includes a core of legal compliance and risk assessment classes, and in-depth study of crucial issues in NCAA regulatory compliance. Ideal candidates include individuals working in collegiate sports programs who would benefit from focused legal knowledge regarding compliance, as well as individuals seeking career changes.

Admission Requirements

- A completed application
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools attended)
- Resume
- Additional Requirements for International Students

The program is designed to be completed on a part-time basis and requires 15.0 semester credits. Students usually finish this program in 1.5 years. If a student needs to decelerate, they should not exceed 2.5 years. Students may apply for transfer in to the Master of Legal Studies program prior to completing their certificate, and apply all earned credits toward the Master of Legal Studies (p. 412).

Program Requirements

Required Courses

LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
LSTU 507S	Risk Assessment and Management	3.0
LSTU 510S	NCAA Governance Process	3.0
LSTU 511S	NCAA Rules I and Infractions Cases	3.0
LSTU 512S	NCAA Rules II and Enforcement Process	3.0
Total Credits		15.0

Sample Plan of Study

First Year

Fall		Credits
LSTU 501S	Compliance Skills: Auditing, Investigation & Reporting	3.0
LSTU 511S	NCAA Rules I and Infractions Cases	3.0
Term Credits		6.0

Spring

LSTU 507S	Risk Assessment and Management	3.0
LSTU 512S	NCAA Rules II and Enforcement Process	3.0
Term Credits		6.0

Second Year

Fall

LSTU 510S	NCAA Governance Process	3.0
Term Credits		3.0

Total Credit: 15.0

Course Descriptions

- Quarter (p. 420)
 - Graduate (p. 420)
 - Undergraduate (<http://catalog.drexel.edu/coursedescriptions/quarter/undergrad/>)
- Semester (p. 727)
 - Graduate (p. 727)
 - Undergraduate (<http://catalog.drexel.edu/coursedescriptions/semester/undergrad/>)

Quarter

- Graduate (p. 420)
- Undergraduate (<http://catalog.drexel.edu/coursedescriptions/quarter/undergrad/>)

Graduate

Antoinette Westphal College of Media Arts & Design (A)

Animation (ANIM) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/anim/>)
 Architecture (ARCH) (p. 425)
 Art History (ARTH) (p. 427)
 Arts Administration (AADM) (p. 427)
 Arts Administration and Museum Leadership (AAML) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/aaml/>)
 Design Research (DSRE) (p. 497)
 Digital Media (DIGM) (p. 498)
 Fashion Design (FASH) (p. 552)
 Game Art and Production (GMAP) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/gmap/>)
 Interior Design (INTR) (p. 581)
 Museum Leadership (MUSL) (p. 618)
 Retail & Merchandising (RMER) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/rmer/>)
 Screenwriting & Playwriting (SCRIP) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/scrp/>)
 Television Management (TVMN) (p. 723)
 Urban Strategy (URBS) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/urbs/>)
 Visual Studies (VSST) (p. 726)
 Westphal Studies (WEST) (p. 727)

College of Arts and Sciences (AS)

Bioscience & Biotechnology (BIO) (p. 438)
 Chemistry (CHEM) (p. 447)
 Communication (COM) (p. 455)
 Communication, Culture & Media (CCM) (p. 459)
 Creative Writing (CW) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/cw/>)
 Environmental Policy (ENVP) (p. 547)
 Environmental Science (ENVS) (p. 547)
 History (HIST) (p. 569)
 Linguistics (LING) (p. 589)
 Mathematics (MATH) (p. 600)

Physics (PHYS) (p. 664)
 Political Science (PSCI) (p. 666)
 Psychology (PSY) (p. 674)
 Public Policy (PLCY) (p. 685)
 Publishing (PUB) (p. 686)
 Science, Technology and Society (SCTS) (p. 691)

LeBow College of Business (B)

Accounting (ACCT) (p. 421)
 Business Statistics (STAT) (p. 442)
 Economics (ECON) (p. 503)
 Finance (FIN) (p. 554)
 General Business (BUSN) (p. 559)
 Human Resource Management (HRMT) (p. 572)
 International Business (INTB) (p. 583)
 Legal Studies (BLAW) (p. 588)
 Management (MGMT) (p. 589)
 Management Information Systems (MIS) (p. 592)
 Marketing (MKTG) (p. 594)
 Operations Management (OPM) (p. 648)
 Operations Research (OPR) (p. 649)
 Organizational Behavior (ORGB) (p. 650)
 Production Operations Mgmt (POM) (p. 667)
 Sport Management (SMT) (p. 703)
 Taxation (TAX) (p. 710)

Close School of Entrepreneurship (C)

Entrepreneurship and Innovation (ENTP) (p. 541)
 TranSCEND (SCED) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/sced/>)

College of Computing and Informatics (CI)

Computer Science (CS) (p. 465)
 Computing & Security Technology (CST) (p. 470)
 Data Science (DSCI) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/dsci/>)
 Homeland Security Management (HSM) (p. 569)
 Information Science & Systems (INFO) (p. 573)
 National Security Management (NSM) (p. 620)
 Software Engineering (SE) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/se/>)

College of Engineering (E)

Architectural Engineering (AE) (p. 424)
 Chemical Engineering (CHE) (p. 445)
 Civil Engineering (CIVE) (p. 450)
 Civil, Architectural & Environmental Engr (CAEE) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/caee/>)
 Construction Management (CMGT) (p. 471)
 Elec & Comp Engr-Computers (ECEC) (p. 521)
 Elec & Computer Engr-Electroph (ECEE) (p. 525)
 Elec & Computer Engr-Power Eng (ECEP) (p. 528)
 Elec & Computer Engr-Systems (ECES) (p. 531)
 Electrical & Computer Engr (ECE) (p. 520)
 Engineering Geology (EGEO) (p. 535)
 Engineering Management (EGMT) (p. 535)
 Engineering Technology (ET) (p. 539)
 Engineering, General (ENGR) (p. 541)
 Environmental Engineering (ENVE) (p. 543)

Materials Engineering (MATE) (p. 596)
 Mechanical Engr & Mechanics (MEM) (p. 608)
 Peace Engineering (PENG) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/peng/>)
 Project Management (PROJ) (p. 671)
 Property Management (PRMT) (p. 673)
 Real Estate (REAL) (p. 687)
 Systems Engineering (SYSE) (p. 707)
 Telecommunications (ECET) (p. 721)

Goodwin College of Professional Studies (GC)

Nonprofit Management (NPM) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/npm/>)
 Professional Studies (PRST) (p. 670)

Graduate College (GD)

Interdisciplinary Graduate Course (GRAD) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/grad/>)

College of Nursing & Health Professions (NH)

Behavioral & Addictions Couns (BACS) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/bacs/>)
 Complementary & Integrative Therapy (CIT) (p. 462)
 Couple & Family Therapy (CFTP) (p. 473)
 Creative Arts Therapies (CATX) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/catx/>)
 Creative Arts in Therapy (ARTS) (p. 482)
 Creative Therapies & Counseling (CTCN) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/ctcn/>)
 Food Science (FDSC) (p. 557)
 Food Systems and Studies (FOOD) (p. 556)
 Health Services Administration (HSAD) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/hsad/>)
 Hotel & Restaurant Management (HRM) (p. 570)
 Inter Professional Studies (IPS) (p. 584)
 Medical Family Therapy (MFTP) (p. 617)
 Neuroscience (NEUR) (p. 620)
 Nursing (NURS) (p. 620)
 Nursing & Health Professions (NHP) (p. 644)
 Nutrition & Food Science (NFS) (p. 646)
 Physical Therapy Rehab Science (PTRS) (p. 652)
 Physician Assistant (PA) (p. 658)
 Rehabilitation Sciences (RHAB) (p. 688)
 Research (RSCH) (p. 690)

Dornsife School of Public Health (PH)

Biostatistics (BST) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/bst/>)
 Community Health and Prevention (CHP) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/chp/>)
 Environmental & Occupational Health (EOH) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/eoh/>)
 Epidemiology (EPI) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/epi/>)
 Health Management and Policy (HMP) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/hmp/>)
 Public Health (PBHL) (p. 681)

School of Biomedical Engineering, Science & Health Systems (R)

Biomedical Engineering & Sci (BMES) (p. 430)

School of Education (T)

Adult Education (EDAE) (p. 424)
 Creativity Studies (CRTV) (p. 495)
 E-Learning Leadership (ELL) (p. 502)
 Education Human Resource Devel (EHRD) (p. 507)
 Education Improvement & Transformation (EIT) (p. 509)
 Education Learning Technologies (EDLT) (p. 510)
 Education Lesson Study (EDUL) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/edul/>)
 Education Practitioner (EDUP) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/edup/>)
 Education Thesis (EDUT) (<http://catalog.drexel.edu/coursedescriptions/quarter/grad/edut/>)
 Education:Global & International Education (EDGI) (p. 564)
 Educational Administration (EDAM) (p. 513)
 Educational Lifelong Literacy (EDLS) (p. 515)
 Educational Policy (EDPO) (p. 519)
 Geography Education (EDGE) (p. 563)
 Higher Education (EDHE) (p. 566)
 Mathematics Education (MTED) (p. 605)
 Museum Education (MUSM) (p. 617)
 Special Education (EDEX) (p. 695)
 Sport Coaching Leadership (SCL) (p. 701)
 Teacher Education (EDUC) (p. 712)

University Courses (X)

Career Integrated Education (CIE) (p. 445)
 Cooperative Education (COOP) (p. 473)

Accounting

Courses

ACCT 510 Essentials of Financial Reporting 2.0 Credits

This course introduces how economic events are captured in financial statements, including the Balance Sheet, Income Statement, Statement of Retained Earnings, and Statement of Cash Flows using Generally Accepted Accounting Principles (GAAP). It also introduces how financial statements are used in investing and other business decisions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 600 Accounting Analysis & Theory 3.0 Credits

This course focuses on going from text book to no book, helping students move from HOW you do something to WHY you are doing it. The four main areas of discussion are the FASB, the SEC, the Big 4/Public Accounting, and the IRS. Within each of those areas, students dive into the rules, regulations, and resources available that will help answer abstract accounting questions and support authoritative responses.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 323 [Min Grade: C] or ACCT 627 [Min Grade: C]

ACCT 601 Managerial Accounting 3.0 Credits

Explores the concepts and tools managers use to measure, monitor, and motivate performance. The course emphasizes value-added, practical applications of analytical tools and applies them to strategic and operational planning. This includes combining quantitative and qualitative information as well as measuring financial and non-financial performance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 501 [Min Grade: C] or ACCT 510 [Min Grade: C]

ACCT 603 Strategic Cost Management 3.0 Credits

The ability to understand and manage costs is vital to an organization's success. Using tools from practice and theory, this course exposes students to the ways that companies measure costs and make strategic decisions about them. Quantitative analysis is mixed with discussions of organizational strategy and environment to inform these decisions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 604 International Financial Reporting 3.0 Credits

Examines the international dimensions of financial reporting with primary emphasis on financial reporting and disclosure under International Financial Reporting Standards.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 605 Assurance Services 3.0 Credits

Focuses on emerging issues related to assurance services and involves researching and resolving practice-oriented problems. In addition to other relevant topics selected by the instructor, the course covers issues related to the audit of a company's internal controls.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 606 Current Issues in the Accounting Profession 3.0 Credits

This course focuses on key issues facing the profession. Students hear from speakers in the accounting profession about a variety of topics, including personal career issues, keys to professional success, and profession-wide developments.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 607 Forensic Investigation 3.0 Credits

Study of the process of locating, investigating, and documenting fraud in a business environment. Topics include: discussion of criminal statutes related to financial crimes, techniques used in solving financial crimes, interviewing, rules of evidence, sources of information, forensic accounting procedures, and current issues in financial investigations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 608 Government and Not-for-Profit Accounting 3.0 Credits

The course focuses on the role of accounting information as a means of communicating a mission, accomplishments, and fulfillment of fiduciary responsibility that are unique to not-for-profit and government organizations. The emphasis is on executive leadership and decision-making. Students will study the creation, use, presentation, and analysis of budgets as well as financial reporting unique to these sectors.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 622 Advanced Financial Accounting 3.0 Credits

Studies theory and practice related to business combinations, consolidated financial statements, and other selected topics. Students who have taken advanced accounting at the undergraduate level should not enroll in this course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ACCT.

Prerequisites: ACCT 323 [Min Grade: C] or ACCT 627 [Min Grade: C]

ACCT 625 Financial Accounting Theory I 3.0 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 current assets.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 626 Financial Accounting Theory II 3.0 Credits

Continues study of financial accounting theory and current practice. The emphasis is on generally accepted accounting principles underlying the measurement, recognition and reporting of long-lived tangible and intangible assets and long-term liabilities including bonds, pensions, and leases.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 625 [Min Grade: C]

ACCT 627 Financial Accounting Theory III 3.0 Credits

Extends study of financial reporting to higher level accounting topics and serves as a bridge to more advanced accounting topics. Its focus is generally accepted accounting principles underlying equity transactions and reporting, accounting for income taxes, investments, accounting changes, and preparation of the statement of cash flows.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 626 [Min Grade: C]

ACCT 628 Accounting Valuation Issues 3.0 Credits

This course is designed to provide students with exposure to the field of valuation for asset and liability appraisal, mergers & acquisitions and other key business transactions and financial reporting activities that require application of valuation tools and techniques. The course materials are based on information from the AICPA and NACVA organizations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 631 Cost Accounting 3.0 Credits

The course delves deeper into cost management and planning topics by exploring recent innovations and problems facing today's businesses. Students will integrate theory and practice to evaluate current issues, apply appropriate tools and techniques, and design solutions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 601 [Min Grade: C] or ACCT 603 [Min Grade: C]

ACCT 640 Auditing Theory and Philosophy 3.0 Credits

This course is designed to provide a basic overview of the audit profession, role and responsibilities of the external auditor and the audit process. You will become familiar with concepts, processes and procedures that an external auditor utilizes during the scope of an audit engagement.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 322 [Min Grade: C] or ACCT 626 [Min Grade: C]

ACCT 644 Internal Auditing 3.0 Credits

Internal auditing provides an organization with independent, objective assurance and consulting activity designed to add value and improve an organization's operations. Topics covered vary at the discretion of the instructor and frequently include: the Institute of Internal Auditor's International Professional Practices Framework, risk assessment including internal control system evaluation and enterprise wide risk assessment, corporate governance, and the relationship of management and employee fraud to the internal audit process. The course includes outside speakers and cases to highlight current issues.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 648 Introduction to Accounting Research 3.0 Credits

The objective of this course is to provide a framework for understanding academic accounting research. The course will introduce the scientific method and the philosophy of science, development of research questions, research paradigms and methods, and academic writing. To give this context, students will explore foundational research studies as well as current research issues in accounting.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 650 Accounting Information Systems 3.0 Credits

Examines the relationships and distinctions between accounting information systems (AIS) and the total management information system, with major emphasis on computerized AIS. Covers oral and written communication, objectives and procedures of internal control, proper system documentation through flowcharts and other techniques, and systems analysis and design methodologies.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 653 Analytical Accounting and Systems 3.0 Credits

The rapid evolution and diffusion of information technology (IT) is transforming businesses and managed organizations. This course will introduce a number of key concepts and contemporary issues related to Accounting Information System applications in organizations, including: understanding of the processes related to the flow of accounting information, using accounting information to identify risks, controls used to protect business resources and conduct a sustainable business. Students will use Microsoft VISIO to document the business processes following UML guidelines. Additionally, students will use tools such as Tableau, among others, for converting large quantities of data from accounting information systems.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 790 Seminar in Accounting 3.0 Credits

Examines selected accounting topics from the standpoint of historical background, current theory, and future application to financial reporting. Requires oral and written reports.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 910 Research Methods in Accounting 3.0 Credits

Provides in-depth analysis of the application of research methodologies in accounting.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

ACCT 912 Applied Research Methods in Accounting 3.0 Credits

The primary objective of this course is to develop the academic skills necessary for the selection and utilization of various research methodologies when investigating an accounting issue.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 921 Empirical Research in Accounting I 3.0 Credits

An introduction to empirical research concerning financial accounting and the capital markets.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

ACCT 922 Empirical Research in Accounting II 3.0 Credits

This course builds upon the material in ACCT 921 and examines topics in empirical research in financial accounting and the capital markets.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 921 [Min Grade: C]

ACCT 931 Behavioral Research in Accounting I 3.0 Credits

Seminar involving an in-depth analysis and critique of the experimental design, conclusions, use and choice of subjects, and statistical techniques of judgment and decision-making in accounting.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

ACCT 941 Doctoral Seminar in Managerial Accounting 3.0 Credits

The objective of this course is to cultivate an appreciation of the breadth and depth of managerial accounting research and develop the skills necessary to conduct managerial accounting research.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 942 Doctorial Seminar in Auditing Research 3.0 Credits

This course provides an introduction into research issues in auditing. It is intended to develop an understanding of auditing theory, practice, and empirical research methods.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ACCT 998 Dissertation Research in Accounting 1.0-12.0 Credit

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ACCT I599 Independent Study in ACCT 0.0-12.0 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 I699 Independent Study in ACCT 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

ACCT I799 Independent Study in ACCT 0.0-12.0 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 I899 Independent Study in ACCT 0.0-12.0 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 I999 Independent Study in ACCT 3.0 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 9 credits

ACCT T580 Special Topics in ACCT 0.0-12.0 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 T680 Special Topics in ACCT 0.5-9.0 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 T780 Special Topics in ACCT 0.0-12.0 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 T880 Special Topics in ACCT 0.0-12.0 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 T980 Special Topics in ACCT 0.5-9.0 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

Adult Education

Courses

EDAE 601 Foundations of Adult Education 3.0 Credits

This course examines the history of adult education, philosophical foundations, and the practice and the profession of the field.

Philosophical, sociological and political foundations of adult education will be explored. Insights gained from the course will require students to develop philosophy and historical perspective papers.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Architectural Engineering

Courses

AE 510 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 544 Building Envelope Systems 3.0 Credits

Science and engineering fundamentals in analysis and design of building envelopes and wall systems. Architectural, structural and environmental (thermal and moisture) concerns; features of selected cladding systems; air and moisture leakage, thermal deficiency, structural distress and premature deterioration; building envelop construction, condition evaluation, maintenance and retrofit.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is CIVE.

Prerequisites: AE 391 [Min Grade: C] or CIVE 371 [Min Grade: C]

AE 550 Comfort Analysis and Indoor Air Quality 3.0 Credits

This course covers characteristics and interaction of thermal, acoustical, luminous and spatial comfort; different types and sources of indoor pollution; models for air filtration; building ventilation requirements, energy use interaction with ventilation, models and simulation programs for IAQ; monitoring and control equipment.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is CIVE.

AE 551 Building Energy Systems I 3.0 Credits

This course covers inverse modeling as a scientific approach to data analysis, different types of inverse methods as applied to building & HVAC & refrigeration equipment energy use, calibrated simulation approach, current research trends.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is CIVE or major is MECH.

Prerequisites: AE 550 [Min Grade: B]

AE 552 Building Energy Systems II 3.0 Credits**College/Department:** College of Engineering**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if major is AE or major is CIVE or major is MECH.**Prerequisites:** AE 550 [Min Grade: B]**AE 561 Airflow Simulation in Built Environment 3.0 Credits**

Introduce concepts about both computational and physical modeling of airflow in and around buildings. Help students to acquire skills in using computation fluid dynamics (CFD) techniques as design tools for buildings via the use of commercial software packages.

College/Department: College of Engineering**Repeat Status:** Not repeatable for credit**AE 997 Architectural Engineering Research 1.0-12.0 Credit**

Requires students to select a topic for investigation and obtain the approval of the student's PhD advisor or committee. The hours and credits are determined for each individual. The student will communicate about their progress with the advisor on a regular basis throughout the duration of the research effort.

College/Department: College of Engineering**Repeat Status:** Can be repeated multiple times for credit**AE 998 Architectural Engineering Dissertation 1.0-12.0 Credit**

Requires students to write and defend their PhD dissertation. The hours and credits are determined for each individual. The student will communicate about their progress with the advisor on a regular basis throughout the duration of the dissertation development.

College/Department: College of Engineering**Repeat Status:** Can be repeated multiple times for credit**AE I599 Independent Study in AE 0.0-12.0 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**AE I699 Independent Study in AE 0.0-12.0 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**AE I799 Independent Study in AE 0.0-12.0 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**AE I899 Independent Study in AE 0.0-12.0 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**AE I999 Independent Study in AE 0.0-12.0 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**AE T580 Special Topics in AE 0.0-12.0 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 T680 Special Topics in AE 0.0-12.0 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 T780 Special Topics in AE 0.0-12.0 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 T880 Special Topics in AE 0.0-12.0 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 T980 Special Topics in AE 0.0-12.0 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 701 Contemporary Issues Studio 6.0 Credits

Investigates theoretical issues concerning human responses to the making of place. Design projects would include building types that are not of the ordinary such as monastery, civil buildings, or cultural facilities. Specific topics will be announced a year in advance so that students can plan their programs. May be repeated for credit if topic varies.

College/Department: Antoinette Westphal College of Media Arts Design**Repeat Status:** Not repeatable for credit**ARCH 702 Urban Design Studio I 6.0 Credits**

This course introduces urban design through case studies that demonstrate the relationships among buildings, the man-made environment, and natural environment. An urban design analysis is undertaken to learn the design process that solves problems at the urban scale and develops architectural solutions within the urban context.

College/Department: Antoinette Westphal College of Media Arts Design**Repeat Status:** Not repeatable for credit

ARCH 703 Urban Design Studio II 6.0 Credits

This course continues ARCH 702. Architectural and urban design studies are undertaken to develop the project begun in the previous term. It requires developing a normative position of urban design and producing a design that responds to critical urban concerns. Specific topics will be announced a year in advance so students can plan their programs. May be repeated if topic varies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 702 [Min Grade: C]

ARCH 704 Traditional Architecture Studio I 6.0 Credits

This course focuses on developing designs based on historical precedents such as classical, vernacular and other styles of architecture. Requires research into the principles of traditional architecture, proportional systems and compositional schemes. Investigates techniques of representation and introduces design through small design projects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 705 Traditional Architecture Studio II 6.0 Credits

This course continues ARCH 704 by increasing the scale of projects to large residential and civic buildings. Specific topics will be announced a year in advance so that students can plan their programs. May be repeated for credit if topic varies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARCH 704 [Min Grade: C]

ARCH 706 Design Research Studio 6.0 Credits

This course investigates social issues facing contemporary architectural design. It includes a student research project and literature analysis to develop design guidelines and design concepts. Problems may include housing, health care, social institutions, or community design. Requires developing a publishable document. May be repeated for credit if topic varies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 707 Architecture and Technology Studio 6.0 Credits

This course addresses the relationship of form, program, and theory within the constraints of building systems. It investigates new technologies to strengthen the student's ability to solve complex problems in architecture. It stresses the coordination of architectural criteria in the design of complex architectural problems. May be repeated for credit if topic varies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

ARCH 730 Topics in Architecture and Management 3.0 Credits

This course covers selected advanced topics in the principles and practices of administering and managing architectural activities. Special topics will be announced a year or so in advance so that students can plan their programs. May be repeated for credit when different topics are offered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH 740 Topics in Architecture History and Theory 3.0 Credits

Covers selected advanced topics in architectural history and theory. Special topics will be announced a year in advance so that students can plan their programs. May be repeated for credit when different topics are offered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH 747 Summer Study Abroad 3.0 Credits

This is an intense three week study of Rome or Paris and its environment. Study combines site visits, sketching, and analysis. The travel portion of the course is preceded by lectures and reading assignments and is followed by preparation of analytical reports.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH 760 Topics in Architecture and Technology 3.0 Credits

Covers selected advanced topics in architecture and technology. Special topics will be announced a year in advance so that students can plan their programs. May be repeated for credit when different topics are offered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

ARCH I599 Independent Study in Architecture 0.0-12.0 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

ARCH I699 Independent Study in Architecture 0.0-12.0 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

ARCH I799 Independent Study in Architecture 0.0-3.0 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 multiple times for credit

ARCH I899 Independent Study in Architecture 0.0-12.0 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

ARCH I999 Independent Study in Architecture 0.0-12.0 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

ARCH T580 Special Topics in Architecture 0.0-12.0 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

ARCH T680 Special Topics in Architecture 0.0-12.0 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

ARCH T780 Special Topics in Architecture 0.0-3.0 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

ARCH T880 Special Topics in Architecture 0.0-3.0 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

ARCH T980 Special Topics in Architecture 0.0-12.0 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

Art History

Courses

ARTH 530 History of Modern Design 3.0 Credits

This course examines the products of the decorative arts and applied design during the past 150 years. Material includes examples of furniture, household objects, industrial design, fashion, and graphic design. The emphasis is not upon a particular design profession or medium, but rather upon how design functions in relation to political, economic, and social history.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ARTH 102 [Min Grade: D] or ARTH 103 [Min Grade: D]

Arts Administration

Courses

AADM 505 Overview of the Arts 3.0 Credits

Examines the role of culture in communities and how it is manifested. Explores how arts, culture, and creativity are valued in society through examinations of the role of professional artists, the history of the field, cultural heritage, cultural democracy, and current trends in research and professional practice.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 510 Writing for the Arts 3.0 Credits

Covers strategies for writing non-marketing materials in the arts such as funding proposals, advocacy letters, board communications, and persuasive speeches.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 520 Creative Enterprise and Innovation 3.0 Credits

Explores the wide range of enterprises that make up the arts, cultural, and creative sector with an emphasis on successful business structures and practices. The role of innovation and innovative practices in start-up creative entities as well as established cultural institutions is studied as a means to develop leadership skills to create sustainable and resilient programs and organizations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 610 Financial Accounting for Non-Profit Arts Organizations 3.0 Credits

Covers accounting principles, accounting procedures and internal control, forecasting, balance sheet analysis, budgeting procedures, and financial reporting for non-profit arts organizations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: ACCT 110 [Min Grade: D] or ACCT 115 [Min Grade: D]

AADM 620 Legal and Ethical Issues in the Arts 3.0 Credits

Explores legal and ethical issues in the arts, including copyright, trademark, intellectual property, contracts, advocacy and lobbying, conflicts of interest, governance and boards of directors, governing documents, the US legal system, mission statements and organizational purpose, and obscenity and defamation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 650 Revenue Development in the Arts 3.0 Credits

Explores how arts and cultural entities attract financial resources, and the kinds of money needed for different purposes and types of cultural organizations. Topics covered include donor cultivation and stewardship, capitalization, grant writing and the grants process, earned income, contributed income, public funding, and recent trends in fund development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 660 International Cultural Policy 3.0 Credits

The course explores some of the major themes in international cultural policy today: globalization, culture and development, diversity and identity, and cultural diplomacy, in five different regions of the world (Western Europe, Eastern Europe, Latin America, Asia and Africa).

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 675 Marketing and Engagement in the Arts 3.0 Credits

This course examines marketing and engagement theory, research and practices for arts entities, including the development and marketing of arts programming that arises from an understanding of one's community.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 710 Leadership, Strategy and Planning in the Arts 3.0 Credits

This capstone course for the AADM program examines leadership theory and practice, strategic thinking and planning, and the theory and practice of organizational and program planning in the arts.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 720 Leadership in the Arts 3.0 Credits

Explores the concepts of leadership and examines leadership experiences and potential as they relate to the field of non-profit arts and culture.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 731 Human Resources Management in the Arts 3.0 Credits

Examines human resource management and labor relations specific to non-profit arts and cultural organizations. Students will learn about labor union contract negotiations when working with performing and visual arts institutions.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 740 Production Laboratory in the Arts 3.0 Credits

Provides practical experience in artistic production or management. This course may be used for a student's individual exploration of any area of arts production or management, as approved by the program director.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Can be repeated multiple times for credit

AADM 741 Arts Entrepreneurship 3.0 Credits

Provides students with hands-on learning and practice related to the development and implementation of an arts enterprise, program, or service. Students will have the opportunity to use the course to take a creative idea from conception to implementation. Working individually or in small groups, students can pursue any type of creative enterprise, program or service, from new arts ventures to new programs in existing organizations to creating services for the sector.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 742 Advanced Fund Development 3.0 Credits

This course covers an advanced level of fundraising and development topics, including major gifts, planned giving, and capital campaigns. Building upon knowledge gained from the program's two core courses in development and fundraising, this is an elective for students who wish to gain a deeper knowledge of development policies and practices in order to further focus their education, and possibly their master's thesis and/or careers, on this aspect of arts administration.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 745 Arts in Education 3.0 Credits

This course examines arts education with a focus on improving educational programs within schools, community groups and arts organizations. Concentration is placed on educational best practices, creating and cultivating school and community connections, and evaluating organization needs. Topics covered include advocacy, assessment, curriculum standards and national trends.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 746 Creative Placemaking 3.0 Credits

This course explores art practices that bear location and geography in mind, and seek to transform place through the inclusion of creative interventions. It includes examination of the economic and social impacts of arts, arts-led gentrification and neighborhood change, and the contemporary state of placemaking practices in the field. The course offers students the chance to be up to date on one of the driving issues of today's arts funding landscape.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 751 Management Techniques In the Arts 3.0 Credits

Examines the theory and practice of managing arts organizations, including organizational development, capacity building, internal and external communications, evidence-based decision making, human resources management, and organizational assessment.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 752 Performing Arts Management 3.0 Credits

Provides an introduction to and overview of management practices of non-profit performing arts organizations. The primary focus will be on current theory and practice in day-to-day operations, management, and associated planning for the performing arts: theatrical, dance and music organizations.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit
Prerequisites: AADM 751 [Min Grade: C]

AADM 753 Visual Arts Organization Management 3.0 Credits

Special problems and challenges related to managing visual arts organizations. The course will build on learning from foundation-level courses, discussing issues related to managing art museums, art schools, galleries, public art programs, and more.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 755 Community Cultural Planning 3.0 Credits

This course explores the practice of community cultural planning, investigating the work from technical and philosophical approaches. Students will learn the stages of a community cultural planning process and various methods for implementing such a process. Throughout the course, attention will be given to: the intersections of arts, culture, and community; the responsibilities of leading or participating in a community cultural planning process; and, ways to thoughtfully and authentically engage with a community in this work.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 757 Political Activism in the Arts 3.0 Credits

Course examines the strategies, trends and dynamics of arts based issues from a variety of political perspectives. Using case studies, class will explore systems that influence activism in politics and the arts and instances when art has been politically controversial, its causes and consequences.

College/Department: Antoinette Westphal College of Media Arts Design
Repeat Status: Not repeatable for credit

AADM 758 Ethics in Arts Organizations 3.0 Credits

Examines ethical issues in managing arts organizations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AADM.

AADM 759 Cultural Organizations in Transition 3.0 Credits

Identifies issues and trends that will have an impact on cultural organizations of today and extends the examination of those impacts into the future through forecasting and scenario creation. Uses multiple disciplines such as economics, technology, and organizational development to assess influence.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 770 Technology Tools for Cultural Managers 3.0 Credits

Enables students to understand and deploy technology to administer arts organizations and market arts programming. Topics include the theory and practice of social media strategy, customer relations management, website design and other digital tools and platforms.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 775 Technology Management in the Arts 3.0 Credits

Examines the function and strategic use of technology tailored to the future arts and cultural leader. Through an interactive learning process, students gain an understanding of the role and impact of technology in the non-profit arts and cultural organization. A prior technology course or background in technology is not required.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 780 Applied Research Methods 3.0 Credits

This course provides students with an overarching understanding of many of the applied research methodologies that are relevant to scholars and practitioners in the arts administration field. This course stresses the identification of and the advantages and disadvantages of each appropriate research methodology.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 785 Research Design in the Arts 3.0 Credits

This course covers research design for the arts and culture field, including qualitative, quantitative and mixed methods. Students identify and shape a research question related to the arts and culture field, then conduct an in-depth literature review, shape a methodology for researching questions, and report their findings in a thesis.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

AADM 798 Thesis Development 3.0 Credits

Enables students to begin work on original research related to the thesis, a scholarly work related to the student's individual research interest. In the first term, students conduct primary research, including fieldwork such as interviews, observations, focus groups and surveys. In the second term, students write and revise their written thesis document.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: AADM 785 [Min Grade: C]

AADM 799 Thesis Completion 0.5 Credits

This course allows the student to work with a thesis advisor to complete the thesis, which began during AADM 798. This optional course will be taken only by students needing more than two terms to complete the thesis.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 5 times for 3 credits

Prerequisites: AADM 798 [Min Grade: CR]

AADM I599 Independent Study in AADM 0.0-12.0 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

AADM I699 Independent Study in AADM 0.0-12.0 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

AADM I799 Independent Study in AADM 0.0-12.0 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

AADM I899 Independent Study in AADM 0.0-12.0 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

AADM I999 Independent Study in AADM 0.0-12.0 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

AADM T580 Special Topics in AADM 0.0-12.0 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

AADM T680 Special Topics in Arts Administration 0.0-12.0 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

AADM T780 Special Topics in Arts Administration 0.5-9.0 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

AADM T880 Special Topics in Arts Administration 0.0-12.0 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

AADM T980 Special Topics in Arts Administration 0.0-12.0 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

Biomedical Engineering & Science

Courses

BMES 501 Medical Sciences I 3.0 Credits

First course in a three-course sequence designed to acquaint students with the fundamentals of biology and physiology from an engineering perspective. This first course covers evolution, genetics, molecular biology and basic cellular physiology.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 502 Medical Sciences II 3.0 Credits

Second course in a three-course sequence designed to introduce students to the fundamentals of biology and physiology from an engineering perspective. This second course covers important concepts in cell physiology and highlights applications of these concepts in biomedical engineering.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 501 [Min Grade: C]

BMES 503 Medical Sciences III 3.0 Credits

Third course in a three-course sequence designed to introduce students to the fundamentals of biology and physiology from an engineering perspective. This third course focuses on understanding physiology from the cellular to systems scales, with an emphasis on biological control systems and applications in biomedical engineering.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 502 [Min Grade: C]

BMES 505 Mathematics for Biomedical Sciences I 3.0 Credits

This course is for students of biology and related medical fields aimed at bridging the gap between qualitative and quantitative approaches in the study of biological processes. Topics include single and multivariable calculus infinite series, etc.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 506 Mathematics for Biomedical Sciences II 3.0 Credits

This course for students of biomedical science or biomedical engineering is designed to permit the student to go on to advanced studies in engineering and science in which differential equations are needed. Biological applications are emphasized.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 505 [Min Grade: C]

BMES 507 Mathematics for Biomedical Sciences III 3.0 Credits

This course covers topics in Fourier series and orthogonal functions, partial differential equations, and boundary value problems. Applications are made to problems in neuro-physiology, cellular transport, and biological oscillations.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 506 [Min Grade: C]

BMES 508 Cardiovascular Engineering 3.0 Credits

This course emphasizes engineering approaches to the analysis of the cardiovascular system focusing on fundamental mechanics and emerging technologies.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 501 [Min Grade: B] and BMES 502 [Min Grade: B]

BMES 509 Entrepreneurship for Biomedical Engineering and Science 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 510 Biomedical Statistics 4.0 Credits

This course introduces the graduate student to the fundamentals of inferential statistics with biomedical applications. It covers topics in data presentation, sampling, experimental design, probability and probability distributions, significance tests, and clinical trials.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 511 Principles of Systems Analysis Applied to Biomedicine I 3.0 Credits

Covers formulation of biological problems by rigorous mathematical techniques, including application of conservation laws, network theorems, and mesh and nodal analysis.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 512 Principles of Systems Analysis Applied to Biomedicine II 3.0 Credits

Continues BMES 511. Emphasizes input/output transfer function problems, linear systems and linear operations, and impulse response.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 511 [Min Grade: C]

BMES 513 Biomedical Electronics 3.0 Credits

Physical principles in the operation of both integrated circuits and discrete components. Analysis and design of transducers, amplifiers, oscillators, logic circuits, etc., with particular application to biomedical problems. (BMS).

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 515 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 510 [Min Grade: C]

BMES 517 Intermediate Biostatistics 3.0 Credits

The purpose of this course is to acquaint students with some of the statistical tools commonly used in biomedical and health sciences research. The course will provide the student with a basic theoretical background on the procedures of repeated measures ANOVA and selected multivariate statistical tests. It will familiarize students with the use of computer-based statistical analyses.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 510 [Min Grade: C]

BMES 518 Interpretation of Biomedical Data 3.0 Credits

The focus of this course is on understanding the methods used to analyze and interpret the results of quantitative data analyses in the biomedical and health sciences and determine their meaningfulness (clinical significance). Fundamental to this process is an understanding of the interrelatedness of statistical power, effect size, sample size and alpha.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 510 [Min Grade: C]

BMES 524 Introduction to Biosensors 4.0 Credits

An introductory course in the general area of microsensors covering basic sensing mechanisms and various types of conductometric, acoustic, silicon, optical and MEMS microsensors. Two case studies involving biosensors and acoustics sensors allow students to acquire in-depth knowledge in the theory and design of microsensors.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 525 Advanced Biosensors 4.0 Credits

The second course in a two-course sequence, this course covers aspects of modern biosensor design methods and addresses challenges associated with fabrication technologies and instrumentation techniques. Topics covered include the theory and modeling of biosensors, fabrication steps, and testing methods.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 528 Pediatric Engineering I 3.0 Credits

This course will introduce students to concepts related to childhood injury and disease and to current treatment paradigms for pediatric patients.

The objective is for students to develop a fundamental understanding of childhood injury and disease, healthcare, and treatment strategies which underscore the need for new and innovative therapies for pediatric patients. Instructors will discuss how the needs of pediatric patients vary considerably due to differences in size, rates of growth, critical development periods, anatomy, physiological differences, and physical activity levels.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 529 Pediatric Engineering II 3.0 Credits

This course will leverage the content from BMES 528 by introducing students to the challenges and limitations of current treatment paradigms for pediatric patients and by studying the landscape of pediatric medical device development. Focus will be on the scientific and engineering concepts, methods, and approaches to address healthcare challenges with direct relevance to pediatric patients, including pediatric medical devices and unmet clinical needs. There is and has been a compelling and recognized need for the development of new medical devices and therapies for pediatric patients. The objective is to train the next-generation of students for future scientific and technical careers in pediatric engineering, healthcare, entrepreneurship, and innovation that will have a lasting impact on global health.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 528 [Min Grade: B-]

BMES 531 Chronobioengineering I 3.0 Credits

This course advances the student's knowledge of biological time-keeping and adaptive functions of biological clocks. It includes such topics as biochemical and physiological models of biological clocks, adjustment to environmental cycles and rhythms in behavior and models.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 502 [Min Grade: C]

BMES 532 Chronobioengineering II 3.0 Credits

This course continues BMES 531. It covers topics in the patterns, rhythms, evolution, neurology, psychology and overall functions of sleep.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 531 [Min Grade: C]

BMES 534 Design Thinking for Biomedical Engineers 3.0 Credits

This course is a studio-seminar exploring 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: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 535 Introduction to Product Design for Biomedical Engineers 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: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 534 [Min Grade: D] or PROD 101 [Min Grade: C]

BMES 538 Biomedical Ethics and Law 3.0 Credits

Introduces a wide spectrum of ethical, regulatory, and legal issues facing health care practitioners and biomedical researchers. The course helps students become aware of the ethical and legal issues involved in their work while increasing the student's understanding of how legal and ethical decisions should be made in biomedical research, 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

BMES 541 Nano and Molecular Mechanics of Biological Materials 3.0 Credits

This course aims to provide students with the fundamental knowledge and latest scientific developments in molecular mechanics of biological materials. The first half of the course will introduce interdisciplinary theoretical background including molecular physics, electrostatics, colloidal science, biocompatibility and polymer mechanics. The second half will describe the most recent advances in nanotechnology and nanomechanics-related biomechanical and biomedical research. Students are expected to understand the fundamental knowledge of the molecular-level phenomena in biological systems, and to grasp the basic design and operation principles of nanomechanical instruments.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 543 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

Prerequisites: BMES 546 [Min Grade: B] or BMES 550 [Min Grade: B]

BMES 544 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 highthrough experimental 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

BMES 545 Biosystems Modeling 4.5 Credits

This course provides hands-on experience in advanced computational methods used in systems biology: pathway and circuitry, feedback and control, cellular automata, sets of partial differential equations, stochastic analysis, and biostatistics.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 502 [Min Grade: C] and (BMES 512 [Min Grade: C] or BMES 561 [Min Grade: C])

BMES 546 Biocomputational Languages 4.0 Credits

This course aims to develop the computational skills relevant to Bioinformatics and related fields. MATLAB will be the primary programming languages utilized in this course, and some exposure to Python will be provided. The focus will be on gaining hands-on knowledge in these programming languages and in the biocomputing toolboxes and libraries available for them.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 547 Machine Learning in Biomedical Applications 3.0 Credits

Machine Learning is a computational approach for construction of algorithms that can learn from and make predictions on data. The focus of the course is to deliver a practical approach that can help appropriate utilization of machine learning methods for data exploration and prediction tasks in biomedical applications. Applications will be drawn from bioinformatics, neuro-engineering, and biomedical image analysis, with special emphasis given to feature extraction and representation strategies specific to the data types prevalent in these domains. The machine learning concepts and methods will include parameter density estimation, dimension reduction, supervised and unsupervised learning, neural networks, and support vector machines.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 546 [Min Grade: B] or BMES 550 [Min Grade: B]

BMES 548 Structural Bioinformatics and Drug Design 3.0 Credits

This is an interdisciplinary course that introduces students to protein structure and drug design, using computational methods. Experimental and computational modeling methods for biomolecular structures will be discussed and state of the art software tools will be introduced for homology modeling, protein design, drug design, and molecular docking applications.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 543 [Min Grade: B] (Can be taken Concurrently) (BMES 546 [Min Grade: B] or BMES 550 [Min Grade: B])

BMES 549 Genomic and Sequencing Technologies 3.0 Credits

This course provides an introduction to modern genomic and sequencing technologies, focusing on genomic technologies to extract information from three primary biological molecules, DNA RNA, and protein. The course takes an engineering approach that studies the key technological advancements driving the development and utilization of these methods. In addition to a technical investigation of these technologies, the course will also discuss biomedical applications of these technologies and introduce basic data analysis algorithms developed for processing their output. This course will involve both lectures and hands-on lab experience.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 501 [Min Grade: B] and (BMES 546 [Min Grade: B] or BMES 550 [Min Grade: B])

BMES 550 Advanced Biocomputational Languages 4.0 Credits

This course provides hands-on education in programming languages used in biomedical applications. Specific programming languages explored will reflect the current state of practice and may include one or more of MATLAB, Python, R, Php, C/C++, and Java languages. This course focuses on advanced programming topics including data communication, high performance computing, database systems, web interactions, and graphical and web interfaces. The principal application areas to be investigated include Bioinformatics (algorithms on strings and sequences), image analysis, feedback and control systems, and network modeling and simulation.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 551 Biomedical Signal Processing 3.0 Credits

Introduces discrete time signals and systems; origin and classification of biomedical signals; data acquisition, filtering, and spectral estimation of medical signals; compression of medical signals; new processing approaches and time-frequency representation and wavelets.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 561 Introduction to Systems Analysis in Biomedical Engineering & Science 3.0 Credits

This course acquaints students with the methods of dynamical systems analysis as used to understand biological phenomena. Uses mathematical/engineering models from several areas of biological/medical research to describe the function of systems.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 563 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

BMES 565 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 563 [Min Grade: B]

BMES 566 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 565 [Min Grade: B]

BMES 571 Biological Evolution: Applications to Human Health and Performance 4.0 Credits

This course is designed to provide students with an evolutionary perspective on health and disease. The focus is on humans as products of evolution by natural selection and as such, subject to the same relationships and historical precedents that govern the rest of the natural world. Topics to be covered include ecological damage and emerging diseases, sociobiological perspectives on behavioral disorders, the development of resistance in pathogens, and adaptation and maladaptation of humans to urban environments.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 588 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

BMES 596 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

BMES 604 Pharmacogenomics 3.0 Credits

Covers the interaction between chemical agents and biological systems at all levels of integration. Discusses general classes of drugs, with particular emphasis on general concepts and problems of medical importance.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 609 Emerging Technologies in the Healthcare System 3.0 Credits

The course provides a robust understanding of the current healthcare landscape and offers a view into the "future-state" of the quickly changing environment. Students will learn to address the complexities of the healthcare industry and global challenges faced by 4P's (pharma, patient, payer, and provider) through innovative problem solving. Students will gain insights about the application of emerging technologies and data to tackle the future-states of the healthcare system.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 611 Biological Control Systems I 3.0 Credits

Introduces the basic concepts of feedback control systems, including characterization in terms of prescribed constraints, study of input and output relationship for various types of biological systems, and stability and time delay problems in the pupillary reflex/eye-hand coordination system.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 612 Biological Control Systems II 3.0 Credits

Covers receptors, skeletal-muscle control systems, vestibular feedback, and sampled-data models.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 613 Biological Control Systems III 3.0 Credits

Covers mathematical models of biological 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

BMES 621 Medical Imaging Systems I 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

BMES 622 Medical Imaging Systems II 4.0 Credits

Introduces medical visualization techniques based on ultrasound propagation in biological tissues. Includes 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

Prerequisites: BMES 621 [Min Grade: C]

BMES 623 Medical Imaging Systems III 4.0 Credits

Introduces elements of wave imaging, including wave propagation, Fourier optics and acoustics, limitations on resolution, ultrasound transducer characterization, and synthetic aperture systems. Examines MRI imaging in detail, including physical principles and scanning methodologies. Includes aspects of the psychophysics of human vision.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 622 [Min Grade: C]

BMES 628 Ultrasound Wave Motion in Solids and Piezoelectrics 3.0 Credits

This course provides an introduction to the physics of wave propagation in solids, acquainting the student along the way with the necessary tensor formalism. The origin and behavior of longitudinal and shear bulk waves, surface waves, and plate waves are derived. The ultrasound behavior of piezoelectrics is analyzed and the results are applied to the analysis of piezoelectric transducers and ultrasound signal-processing devices.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 631 Tissue Engineering I 4.0 Credits

This course is designed to familiarize students with advanced concepts of cellular and molecular biology relevant to tissue engineering. This is the initial course in a three-course sequence combining materials from life science, 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

Prerequisites: BMES 502 [Min Grade: B]

BMES 632 Tissue Engineering II 4.0 Credits

This course familiarizes students with advanced concepts of developmental and evolutionary biology relevant to tissue engineering. The second part of a three-course sequence combines materials from cellular/molecular biology, evolutionary design, and biomaterials to education students in the principles and methods of tissue engineering.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 631 [Min Grade: B]

BMES 641 Biomedical Mechanics I 4.0 Credits

Designed to acquaint students with the response of biological tissues to mechanical loads and with the mechanical properties of living systems. Covers topics in musculoskeletal anatomy and functional mechanics; a review of mechanical principles, statics, dynamics, and materials; soft and hard tissue mechanics; mechano-pathological conditions in biological tissues and their correction; and prosthetics.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 642 Biomedical Mechanics II 4.0 Credits

Continues BMES 641.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 643 Biomedical Mechanics III 4.0 Credits

Continues BMES 642.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 644 Cellular Biomechanics 3.0 Credits

This course of cellular bioengineering focuses on mechanics and transport. Material builds upon undergraduate engineering education to place engineering mechanics into the context of biological function at the cellular level.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 651 Transport Phenomena in Living Systems I 3.0 Credits

Covers physical principles of momentum, energy, and mass transport phenomena in blood and other biological fluids; diffusion and convection at the microcirculatory level; physiology of arteries and veins; and local and systemic blood flow regulation and vascular disease.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 660 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

BMES 661 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: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

BMES 672 Biosimulation I 3.0 Credits

This course focuses upon the mathematical analysis of biomedical engineering systems. As the first course in the biosimulation sequence, the course is a blend of analytical and numerical methods with strong emphasis on analytical approaches. The class concentrates on the application of mathematical concepts to biomedical problems drawn from physiological systems, cellular and molecular systems, bioimaging and biomedical device design.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 673 Biosimulation II 3.0 Credits

The second in a two-course sequence, this course focuses upon the mathematical modeling and subsequent computational analysis of complex biological systems. Specific examples are drawn physiological systems, cellular and molecular systems, bioimaging and biomedical device design and analysis. Topics covered include: modeling of complex bioengineering systems; parameter estimation and optimization of such models; and application of probability and statistical approaches as required.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 672 [Min Grade: C]

BMES 675 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

Prerequisites: BMES 660 [Min Grade: C-] and BMES 661 [Min Grade: C-] and BMES 631 [Min Grade: C-] and BMES 632 [Min Grade: C-]

BMES 676 Software Development for Health Science Instruction 3.0 Credits

This course presents the planning, development and evaluation of computer software for instruction and clinical decision support in the area of health care. Particular emphasis is given to the Macintosh computer and the preparation of compiled "stand-alone" programs.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 685 Experimental Methods in Neuroengineering 2.0 Credits

This course explores an exciting field of neuroengineering, brain computer interfaces (BCI), in a hands-on laboratory setting. The course addresses both the human and computational elements of the technology emphasizing an engineering perspective while utilizing and modifying common paradigms in electroencephalogram (EEG)-based BCIs such as motor imagery and the P300 speller. Students are expected to understand the EEG signal and develop good recording techniques to assess and modify data collection and processing in real time. This course will also discuss how the techniques and algorithms addressed in this class translate to other modalities such as fNIR as well as more invasive systems. This course includes a lecture and laboratory component.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 710 Neural Signals 3.0 Credits

This course covers aspects of neural signaling, including fundamentals of action potential generation, generator potentials, synaptic potentials, and second messenger signals. Students learn Hodgkin-Huxley descriptions, equivalent circuit representations and be able to derive and integrate descriptive equations and generate computer simulations.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 711 Principles in Neuroengineering 3.0 Credits

This course is an in-depth student of some of the cutting-edge technologies in neuroengineering. The course draws on faculty in the College of Medicine and School of Biomedical Engineering, Science and Health Systems to present and investigate three topics in neuroengineering.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 710 [Min Grade: B]

BMES 722 Neural Aspects of Posture and Locomotion I 3.0 Credits

Studies physiology of sensory/motor systems, with emphasis on modeling of neural systems and biomechanical aspects of functional tasks. Begins with an analysis of the transportation of materials in and out of cells, followed by an examination of the origin and maintenance of membrane potentials. Discusses intra-and extracellular and surface measurement of potentials, generation and transmission of action potentials, synaptic processes, and the structure/function of muscle. Combines these elements to study reflex systems as well as vestibular and ocular effects on posture. Culminates in the study of the control of motor systems with respect to bipedal locomotion.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 725 Neural Networks 3.0 Credits

Explores the mathematical and biological bases for neurocomputing. Involves construction by students of computer simulations of important models and learning algorithms. Discusses applications to pattern recognition, vision, speech, control, and psychological modeling.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 821 Medical Instrumentation 3.0 Credits

Provides a broad overview of the applications of health care technology in diagnosis and therapy. Reflects the persuasiveness of biomedical engineering in medicine by describing medical instrumentation and engineering technology used in most of the main areas of specialization in medicine.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 822 Medical Instrumentation II 3.0 Credits

The objective of this course is to prepare the student for following an industry-accepted standard for designing a medical device. Students will work in teams to identify and design a response to medical need. The resulting design will either address an unmet medical need or present an improved approach to an existing solution. After identifying a particular project, the students will learn and implement particular processes for both design and documentation.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 823 Medical Instrument Laboratory 2.0 Credits

Provides laboratory exercises, including pulmonary function testing, stress testing, EKG, electrosurgery, and x-ray.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 821 [Min Grade: C]

BMES 825 Hospital Administration 3.0 Credits

Provides an analysis of the administrative process, including planning, organization, design, decision-making, leadership, and control. Presents methodologies and techniques that can contribute to the effective performance of administrative responsibilities examined in the light of significant and unique factors in hospital health care administration.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 826 Hospital Engineering Management 3.0 Credits

Covers the wide range of responsibilities of a clinical engineer, including managing a clinical engineering department, setting up an electrical safety program, establishing an equipment maintenance program, approaches for equipment acquisition, pre-purchase evaluation, and incoming inspection. Includes medical legislation, liability, and risk management.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

Prerequisites: BMES 825 [Min Grade: C]

BMES 864 Seminar 0.0 Credits

An invitation seminar for discussion of research topics in biomedical engineering and science.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated 2 times for 3 credits

BMES 866 Seminar II 2.0 Credits

Continues BMES 865.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 867 Seminar III 2.0 Credits

Continues BMES 866.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 897 Research 1.0-12.0 Credit

Requires investigation of a biomedical problem under the direction of a faculty adviser.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

BMES 898 Master's Thesis 0.5-20.0 Credits

Requires the study and investigation of a research or development problem. Requires results to be reported in a thesis under the direction of a faculty adviser. No credit granted until the thesis is completed and approved.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Not repeatable for credit

BMES 998 Ph.D. Dissertation 1.0-12.0 Credit

Requires the study and investigation of a research or development problem. Requires results to be reported in a dissertation under the direction of a faculty adviser. No credit granted until the dissertation is completed and approved.

College/Department: School of Biomedical Engineering, Science Health Systems

Repeat Status: Can be repeated multiple times for credit

BMES I599 Independent Study in BMES 0.0-12.0 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 I699 Independent Study in BMES 0.0-12.0 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 I799 Independent Study in BMES 0.0-9.0 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 I899 Independent Study in BMES 0.0-12.0 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 I999 Independent Study in BMES 0.0-12.0 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 T580 Special Topics in BMES 0.0-12.0 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 T680 Special Topics in BMES 0.0-9.0 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 T780 Special Topics in BMES 0.0-12.0 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 T880 Special Topics in BMES 0.0-12.0 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 T980 Special Topics in BMES 0.0-12.0 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

Bioscience & Biotechnology

Courses

BIO 500 Biochemistry I 3.0 Credits

Covers the fundamentals underlying the energetics and kinetics of macromolecular interactions of enzymes, membranes and nucleic acids in living systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

BIO 501 Biochemistry Laboratory I 2.0 Credits

Accompanies BIO 500.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C], BMES 501 [Min Grade: C] (Can be taken Concurrently)

BIO 509 Comparative Physiology Laboratory 2.0 Credits

Computational laboratory examining quantitative facets of vertebrate physiology through simulation experiments. Complements BIO 510 Comparative Physiology. Example systems examined include gas and solute exchangers, open vs. closed circulations, and thermoregulatory controllers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 510 [Min Grade: C] (Can be taken Concurrently)

BIO 510 Comparative Physiology 3.0 Credits

Physiology of vertebrate and invertebrate animals focusing on how organisms meet environmental challenges (e.g., aquatic respiration). Focus is on mechanisms of homeostasis, particularly those significantly different from processes in human physiology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

BIO 530 Microbial Genetics 5.0 Credits

Covers genetic organization and regulation in viruses (primarily bacteriophages), bacteria, fungi, and algae; techniques of genetic manipulation of microbial genomes; genetic interactions of microbes under natural conditions; and the use of microbial modification in industrial processes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 534 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

BIO 535 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

BIO 540 Readings in Molecular and Cellular Bioscience and Biotechnology 3.0 Credits

A reading course for first year graduate students based on current manuscripts from the primary literature. The goals of this course are from students to be exposed to the most current findings using primary literature, become skilled in critically reading the primary literature, and to gain experience in making presentation based on a set of papers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 548 Neuroscience: From Cells to Circuits 3.0 Credits

This courses 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

BIO 549 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

BIO 551 Genetic Regulation of 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

Prerequisites: BIO 500 [Min Grade: C]

BIO 566 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 will be included.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

BIO 570 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

BIO 601 Research Methods 3.0 Credits

This course will provide graduate students in the biological and environmental sciences with the fundamentals needed to develop effective research questions and to design sound approaches to address these questions. A critical component of this course will be development of a research proposal with feedback from the instructor and student colleagues.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BIO or major is ENVS.

BIO 610 Biochemistry of Metabolism 3.0 Credits

Covers how enzymes function and form metabolic pathways, how the pathways fit into cell physiology, and how these pathways are regulated. Overall considers how organisms digest nutrients and utilize them to support life. The terminology and technology commonly employed in contemporary biochemistry laboratories are emphasized.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 611 Biochemistry Laboratory II 2.0 Credits

Accompanies BIO 610.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Corequisite: BIO 610

BIO 613 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

BIO 614 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

BIO 615 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 500 [Min Grade: C]

BIO 616 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

Prerequisites: BIO 500 [Min Grade: C]

BIO 620 Biomembranes 3.0 Credits

Covers biochemical properties of membranes and membrane components, including phase properties, structure, organization, permeability, transport, and biosynthesis of membrane components.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 625 Nucleic Acids 3.0 Credits

Discusses nucleic acid biochemistry. Emphasizes nucleic acid separation techniques, sequencing, and synthesis techniques, as well as methods of physical analysis. Uses current and classical literature as information sources.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 626 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

BIO 630 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

Prerequisites: BIO 500 [Min Grade: C]

BIO 632 Advanced Cell Biology 3.0 Credits

Advanced Cell Biology is an up-to-date examination of the basic components and processes of the eukaryotic cell with the goal of understanding how these processes are integrated to drive complex cell behavior. Specifically, the course focuses on the molecular principles, modules and functions that sustain cell motility by integrating the essential concepts presented in class, including energy production, intracellular signaling, vesicular trafficking, and cell adhesion. Students will present cutting edge research publications and ideas spanning cell biology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 633 Bioinformatics I 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

Prerequisites: BIO 631 [Min Grade: C] (Can be taken Concurrently)

BIO 635 Advanced Genetics and Molecular Biology 3.0 Credits

Covers classical prokaryotic and eukaryotic genetics; DNA/RNA structure; DNA replication, transcription, translation and their regulation; major molecular techniques used in the analysis of genes and genomes. Includes readings from primary literature, covering recent advances and classical experiments in genetics, genomics and molecular biology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 636 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

BIO 640 Biometry 3.0 Credits

Provides a computational introduction to probability and data analysis via descriptive and inferential statistics for biological scientists with an emphasis on understanding statistics as probability statements about the inherently noisy data commonly encountered by biologists.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

BIO 641 Data Analysis in Biosciences 3.0 Credits

Covers the application of computer programs to the analysis of biological data. Focuses on the use of software for microcomputers and mainframes (SAS) for analysis of data and interpretation of results. Also covers use of computers for experiment design. Offered once per year in alternate terms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

BIO 642 Modeling Methods in Biology I 3.0 Credits

Offers practical experience in modeling simple biological systems. Presents applications of linear, trigonometric, and exponential functions in biology. Covers 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

Prerequisites: MATH 122

BIO 643 Modeling Methods in Biology II 3.0 Credits

Offers a practical introduction to modeling of dynamic biological processes, including deterministic and stochastic processes. Emphasizes the development and construction of working models of real biological systems and interpretation of results. Discusses both mechanistic and empirical/predictive models. Covers Euler and Runge-Kutta techniques, and feedback loops. Emphasizes practical simulation throughout. Allows students to 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: Can enroll if major is BMS.

Prerequisites: BIO 642 [Min Grade: C]

BIO 644 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 of cancer, gene therapy, stem cell research and human genomics and biotechnology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 646 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

Prerequisites: BIO 500 [Min Grade: C]

BIO 648 Signal Transduction 3.0 Credits

This course will focus on the mechanisms of cell-cell communication and signal transduction in eukaryotic organisms. It will present an overview for the general mechanisms of different signaling pathways, and will also discuss in detail the molecular mechanisms by which these signal transduction pathways are regulated in a developmental context.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 649 Recombinant DNA Laboratory 5.0 Credits

This course gives a practical introduction to the basis of recombinant DNA manipulation in the laboratory. Students learn the theory behind how DNA functions and how to experimentally test these functions in the laboratory setting. Basic and advanced techniques are covered in this course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 650 Virology 3.0 Credits

Discusses 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

Prerequisites: BIO 500 [Min Grade: C]

BIO 653 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

Prerequisites: BIO 500 [Min Grade: C]

BIO 660 Microbial Physiology 3.0 Credits

Covers the physiology and metabolism of microorganisms. Emphasizes aspects unique to prokaryotes, including envelope structure, chemotaxis, 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

Prerequisites: BIO 500 [Min Grade: C]

BIO 661 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. Classes will include both lectures and discussion of recent papers from the scientific literature.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 662 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

BIO 663 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.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 532 [Min Grade: C]

BIO 664 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

BIO 670 Medical Microbiology 3.0 Credits

Covers infectious diseases in humans, including mechanisms of pathogenicity, techniques of diagnosis, modes of transmission, and methods of treatment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 675 Advanced Immunology 3.0 Credits

Covers failure in host defense, immunotherapies, clinical concepts in immunology, and emerging concepts in immunology research. Material is presented in a combination of a Lecture and Journal club format with a focus on class participation, presentation and discussion.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 526 [Min Grade: C]

BIO 679 Issues in Scientific Research 3.0 Credits

The course will cover topics related to the appropriate and correct conduct of personnel in a research setting. Issues will be discussed dealing with choosing a research mentor, how to record data, authorship and publication, and the correct and ethical treatment of animal and human subjects.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: BIO 500 [Min Grade: C]

BIO 864 Graduate Research Seminar 1.5 Credit

This research seminar is a forum for Biology PhD students to present on their research to faculty and graduate student peers. Discussion of the scientific content as well as feedback on presentation style and quality follows every presentation.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is BIO or major is ENVS and program is MS or MSES or PHD.

BIO 865 Biology Department Research Seminar 1.5 Credit

This weekly research seminar provides a forum for international and national leaders in Biology to present the latest finding from their specialty.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO 898 Master's Thesis 0.5-20.0 Credits

Master's thesis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

BIO 997 Research in Bioscience 0.5-20.0 Credits

Research.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO 998 Ph.D. Dissertation 1.0-12.0 Credit

Ph.D. dissertation.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

BIO I599 Independent Study in BIO 0.0-12.0 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 I699 Independent Study in BIO 0.0-12.0 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 I799 Independent Study in BIO 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 multiple times for credit

BIO I899 Independent Study in BIO 0.0-12.0 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 I999 Independent Study in BIO 0.0-12.0 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 T580 Special Topics in Bioscience & Biotechnology 0.0-9.0 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

BIO T680 Special Topics in Bioscience & Biotechnology 0.0-9.0 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

BIO T780 Special Topics in Bioscience & Biotechnology 0.0-9.0 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

BIO T880 Special Topics in Bioscience & Biotechnology 0.0-9.0 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

BIO T980 Special Topics in Bioscience & Biotechnology 0.0-9.0 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

Business Statistics

Courses

STAT 510 Introduction to Statistics for Business Analytics 2.0 Credits

This course studies the basic principles and implementation techniques of descriptive statistics, sampling, hypothesis testing, one-way ANOVA, and regression analysis. In addition, this course will emphasize how these analytical tools can be used in business decision making.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

STAT 601 Business Statistics 3.0 Credits

This course covers the basic principles and implementation techniques of descriptive statistics, sampling, statistical inference, analysis of variance, and regression analysis. An understanding of how these tools can support managerial decision making is emphasized.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

STAT 610 Statistics for Business Analytics 3.0 Credits

This course covers the basic principles and implementation techniques of analysis of variance, simple and multiple regression analysis. An understanding of how these tools can support business analytics is emphasized. The course covers not just methods, but theory, too.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

STAT 628 Applied Regression Analysis 3.0 Credits

Covers techniques used in simple and multiple regression analysis, including residual analysis, assumption violations, variable selection techniques, correlated independent variables, qualitative independent and dependent variables, polynomial and non-linear regression, regression with time-series data and forecasting. Applications related to business decision-making will be emphasized.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 601 [Min Grade: B-] or STAT 610 [Min Grade: B-] or STAT 510 [Min Grade: B-]

STAT 630 Multivariate Analysis 3.0 Credits

An introduction to multivariate statistics that focuses on the use of statistical methods for exploring and discovering information in large business datasets. Topics will be drawn from clustering and discriminate analysis for classification, principle components analysis for data exploration and variable reduction, factor analysis for indentifying latent variables, and other traditional multivariate topics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or STAT 510 [Min Grade: C]

STAT 632 Datamining for Managers 3.0 Credits

Datamining focuses on extracting knowledge from large datasets. This course introduces the student to several key datamining concepts including classification, prediction, data reduction, model comparison and data exploration. Software and datasets are employed to illustrate the concepts.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 601 [Min Grade: B-] or STAT 610 [Min Grade: B-] or STAT 510 [Min Grade: B-] or ECON 540 [Min Grade: B-]

STAT 634 Quality & Six-Sigma 3.0 Credits

This course covers the current theory and practice in quality, with a focus on Six-Sigma Implementation. Topics will include the dynamic nature of quality, the roles of management in planning and guiding quality efforts, as well as the fundamentals of statistical methods for quality monitoring and improvement.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 601 [Min Grade: B-] or STAT 610 [Min Grade: B-] or STAT 510 [Min Grade: B-] or ECON 540 [Min Grade: B-]

STAT 636 Experimental Design 3.0 Credits

Introduces design of experiments. Covers topics including scientific approach to experimentation, completely randomized designs, randomized complete block designs, Latin square designs, factorial designs, two-factorial designs, fractional factorials, nested and split plot designs, response surfaces designs, and Taguchi methods.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 601 [Min Grade: B-] or STAT 610 [Min Grade: B-] or STAT 510 [Min Grade: B-]

STAT 638 Advanced Statistical Quality Control 3.0 Credits

Covers advanced topics in statistical process control. Covers topics including cumulative sum (CUSUM) control charts, exponentially weighted moving average (EWMA) control charts, multivariate control charts, economic design and evaluation of control charts, performance specifications, process capability and improvement, and computer applications. Usually includes several guest speakers from service and manufacturing firms.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 634 [Min Grade: C]

STAT 642 Data Mining for Business Analytics 3.0 Credits

This course introduces students to the methods of data mining and how to apply them to business problems. Included are logistic regression, trees, neural networks, support vector machines, and marketbasket analysis. Data preparation, visualization, and feature selection also are addressed, as are boosting and random forests.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

Prerequisites: STAT 610 [Min Grade: C]

STAT 699 Independent Study in Quantitative Methods 0.0-12.0 Credits

STAT Independent Study.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Prerequisites: STAT 601 [Min Grade: B-] or STAT 610 [Min Grade: B-]

STAT 920 Stochastic Processes I 3.0 Credits

The focus of this course is on the construction of stochastic models for decision problems and the analysis of their properties. The course introduces Markov Chains and the classification of their convergence, and moves on to queuing models.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 931 [Min Grade: B-] or STAT 932 [Min Grade: B-]

STAT 922 Statistical Methods in Experimental Design 3.0 Credits**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**STAT 924 Multivariate Analysis I 3.0 Credits**

An introduction to multivariate statistics with topics that may include but are not limited to Matrix Algebra, the Multivariate Normal Distribution, Multivariate Analysis of Variance, Tests on Covariance Matrices, Discriminant Analysis, Multivariate Regression, Canonical Correlation, Principle Component Analysis, factor Analysis, and Cluster Analysis.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**STAT 925 Multivariate Analysis II 3.0 Credits**

This course is the sequel of STAT 924. STAT 924 discussed linear regression, PCA, EFA, CFA, cluster analysis, ANOVA, discriminant analysis, logit, canonical correlation, and MDS Using SAS. This course builds on that baseline by continuing into GLM models and then exploratory regression models.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**Prerequisites:** STAT 924 [Min Grade: B]**STAT 931 Statistics for Economics 3.0 Credits**

This course will cover the traditional introductory statistics topics; descriptive statistics, probability theory, random variables, discrete and continuous probability distribution, sampling distributions, estimation, and hypothesis testing. Then we'll move on to a more advanced topic: regression analysis.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if program is PHD.**STAT 932 Statistics for Behavioral Science 3.0 Credits**

This course provides a non-theoretical coverage of common statistics topics for students in the behavioral sciences. These may include, but are not limited to descriptive statistics, probability theory, random variables, discrete and continuous probability distributions, sampling distributions, estimation, hypothesis testing, analysis of variance, & regression.

Emphasis is put on and examples are of behavioral topics.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if program is PHD.**STAT 997 Research Activity for PhD Student in STAT 0.5-12.0 Credits**

PhD candidates in Decision Sciences and MIS in their second year undertake research activity with their advisor prior to defending their dissertation proposal. This course is designated to record that activity. The student is expected to conduct all major numerical studies and provide all theoretical support for their work, in the case of analytical modeling research, or to have built the model and started on the data collection, in the case of empirical research. It is expected that upon completion of this requirement, the student will make any final minor edits and submit the paper to a leading conference, preferably a referred one, by the end of the summer quarter.

College/Department: LeBow College of Business**Repeat Status:** Can be repeated multiple times for credit**STAT 998 Dissertation Research in Statistics 1.0-12.0 Credit**

Dissertation Research.

College/Department: LeBow College of Business**Repeat Status:** Can be repeated 12 times for 24 credits**STAT I599 Independent Study in STAT 0.0-12.0 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 I699 Independent Study in STAT 0.0-12.0 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 I799 Independent Study in STAT 0.0-12.0 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 I899 Independent Study in STAT 0.0-12.0 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 I999 Independent Study in STAT 3.0 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 9 credits**STAT T580 Special Topics in STAT 0.0-12.0 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 T680 Special Topics in STAT 0.5-9.0 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 T780 Special Topics in STAT 0.0-12.0 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 T880 Special Topics in STAT 0.0-12.0 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 T980 Special Topics In STAT 0.5-9.0 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

Career Integrated Education

Courses

CIE 601 Graduate Career Integrated Education and Internship Comp 0.0-12.0 Credits

This is the Masters equivalent of the career integrated experience. It is a companion course to supplement the internship/CIE F/T requirement.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

Chemical Engineering

Courses

CHE 502 Mathematical Methods in Chemical Engineering 3.0 Credits

Emphasizes formulation of ordinary and partial differential equations and their analytical and approximate solutions governing steady and unsteady chemical and biochemical engineering phenomena and processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CHE 513 Chemical Engineering Thermodynamics I 3.0 Credits

Examines thermodynamic principles from a classical viewpoint, including properties of materials, equations of state of mixtures, and chemical and phase equilibria of complex mixtures.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CHE 525 Transport Phenomena I 3.0 Credits

Presents a unified treatment of the continuity of conserved quantities of momentum, energy, and mass, with emphasis on analytical and approximate solution methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 502 [Min Grade: B-]

CHE 531 Fundamentals of Solar Cells 3.0 Credits

Focuses on fundamentals of solar cells, covering 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

CHE 532 Electrochemical Engineering 3.0 Credits

Covers the principles and applications of electrochemical equilibria, kinetics, and transport processes with a focus on system operation and design, drawing examples and applications from topics that include batteries and fuel cells, electroanalytical chemistry, electroplating, and corrosion protection.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CHE 533 Introduction to Rheology 3.0 Credits

Introduces the concepts of how science defines and conceptualizes the behavior of "real" fluids. Covers concepts such as how to characterize, quantify, and simulate non-newtonian behavior in real fluids.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CHE 543 Kinetics & Catalysis I 3.0 Credits

Covers chemical reaction kinetics in chemical engineering, including gas and liquid phase reaction mechanisms, reaction rate theories, and heterogeneous kinetics and catalysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 502 [Min Grade: B-]

CHE 554 Process Systems Engineering 3.0 Credits

Covers basic concepts of the systems engineering approach to the design and operation of chemical engineering processes, including methods for developing process control strategies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 502 [Min Grade: B-]

CHE 560 Transport Phenomena in Biological Systems 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

CHE 561 Principles of Colloid Science 3.0 Credits

Focuses on fundamental principles of colloid science from a biological perspective, covering 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

CHE 562 Bioreactor Engineering 3.0 Credits

Covers growth and product formation kinetics, batch and continuous stirred tank bioreactors, tower reactors, immobilized-cell reactors, and immobilized-enzyme reactors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CHE 564 Unit Operations in Bioprocess Systems 3.0 Credits

Covers liquid-liquid extraction, membrane separation, chromatographic separation, filtration, and centrifugation in bioprocessing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CHE 571 Pharmaceutical & Medical Device Manufacturing I 3.0 Credits

Covers engineering and regulatory processes in the manufacture of pharmaceutical, biopharmaceutical and medical devices, including Good Manufacturing Practice and Medical Device Regulations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CHE 572 Pharmaceutical & Medical Device Manufacturing II 3.0 Credits

Covers design of unit operations and critical systems used in the manufacture of pharmaceutical, biopharmaceutical and medical devices, and engineering design and validation of manufacturing facilities.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 571 [Min Grade: B-]

CHE 590 Research Methods and Practices 3.0 Credits

Introduces general process for scientific inquiry and engineering research, providing good practices for conducting and communicating scientific research, including approaches for effective technical writing and oral presentations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CHE 614 Chemical Engineering Thermodynamics II 3.0 Credits

Covers theory and application of statistical mechanics, with emphasis on prediction of volumetric and thermal properties of pure fluids and mixtures, and phase equilibrium. Covers also non-equilibrium statistical mechanics, with emphasis on linear response theory for chemical kinetics. Introduces modern methods in applied statistical mechanics, including Monte Carlo and molecular dynamics simulations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 513 [Min Grade: B-]

CHE 626 Transport Phenomena II 3.0 Credits

Covers advanced analysis of transport phenomena involving mass, energy, and momentum transport, with emphasis on application of numerical methods for solving systems of nonlinear algebraic equations, initial value problems, and boundary value problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CHE 525 [Min Grade: B-]

CHE 897 Research 1.0-12.0 Credit

Requires research in chemical engineering. Hours and credits to be arranged.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CHE and classification is PhD.

CHE 898 Master's Thesis 0.0-9.0 Credits

Requires thesis research in chemical engineering. Hours and credits to be arranged.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHE 998 Ph.D. Dissertation 1.0-9.0 Credit

Requires dissertation research in chemical engineering. Hours and credits to be arranged.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CHE I599 Independent Study in CHE 0.0-12.0 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 I699 Independent Study in CHE 0.0-12.0 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 I799 Independent Study in CHE 0.0-12.0 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 I899 Independent Study in CHE 0.0-12.0 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 I999 Independent Study in CHE 0.0-12.0 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 T580 Special Topics in CHE 0.0-12.0 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 T680 Special Topics in CHE 0.0-12.0 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 T780 Special Topics in CHE 0.0-12.0 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 T880 Special Topics in CHE 0.0-12.0 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 T980 Special Topics in CHE 0.0-12.0 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

Chemistry

Courses

CHEM 521 Inorganic Chemistry I 3.0 Credits

Covers the principal models of inorganic chemistry: structure and bonding, interactions in the solid state, coordination compounds, complexation equilibria, and acid-base models.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 522 Inorganic Chemistry II 3.0 Credits

Covers group theory in inorganic chemistry, including crystal field descriptions of transition metal chemistry and qualitative molecular orbital approach to and spectroscopic methods for inorganic molecules.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 521 [Min Grade: C]

CHEM 523 Inorganic Chemistry III 3.0 Credits

Covers constitutions and properties of organometallic compounds, including carbonyls and nitrosyls. Also covers kinetic properties of mononuclear and bimetallic centers. Includes computer modeling/display of inorganic structures.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 522 [Min Grade: C]

CHEM 530 Analytical Chemistry I 3.0 Credits

Covers principles and techniques of optical methods of analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 531 Analytical Chemistry II 3.0 Credits

Covers physical and chemical methods of separation, including distillation, solvent extraction, and chromatographic and ion-exchange techniques.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 532 Analytical Chemistry III 3.0 Credits

Covers electroanalytical principles and techniques of potentiometry, voltametry, and coulometry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 541 Organic Chemistry I 3.0 Credits

Covers spectroscopic methods for the determination of the structure of organic molecules.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 542 Organic Chemistry II 3.0 Credits

Covers static and dynamic stereochemistry; conformational theory; relationships between structure and reactivity in organic reactions; and applications to asymmetric synthesis, physical measurements, and biochemical mechanisms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 543 [Min Grade: C]

CHEM 543 Organic Chemistry III 3.0 Credits

Covers mechanisms of organic reactions and the techniques of studying them.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 551 Radiochemistry 3.0 Credits

Covers radioactivity; interaction of radiation with matter; radiation detectors; nuclear reactors; hot atom chemistry; carbon-14 dating; and neutron activation analysis and its applications to pottery dating, environment, lunar studies, and forensics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 554 Chemical Kinetics 3.0 Credits

Focuses on experimental and theoretical consideration of chemical reaction rates.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 555 Quantum Chemistry Of Molecules I 3.0 Credits

Covers general properties of operators; Schrodinger's equation and its solutions for a particle in a box; harmonic oscillator, tunneling problems, rigid rotor, and the hydrogen atom; approximation methods; and absorption of radiation and selection rules.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 557 Physical Chemistry I 3.0 Credits

Schrodinger's equation and particle-wave duality, atomic structure and spectra, optical spectroscopy on molecules (rotational, vibrational and electronic spectra) molecular symmetry, design of modern spectrometers, magnetic resonance spectroscopy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 558 Physical Chemistry II 3.0 Credits

Covers statistical mechanics of distinguishable and indistinguishable particle systems, and thermodynamic functions for both systems and chemical equilibrium.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 557 [Min Grade: C]

CHEM 561 Polymer Chemistry I 3.0 Credits

Covers step growth, polymerization (including polyesters, polycarbonate, nylon, epoxies, urethanes, and formaldehyde-based polymers), step growth kinetics, molecular weight distributions, infinite networks and gelation, techniques of polymerization, ring opening polymerization, thermodynamics of polymer solutions, biological polymers, inorganic polymers, biomedical applications, and electrically conducting polymers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 562 Polymer Chemistry II 3.0 Credits

Includes chain growth polymerization (free radical, ionic, coordination, group-transfer, radiation-induced, and electrochemical polymerizations), kinetics of chain growth polymerization, molecular weight distributions, polymerization/depolymerization equilibria, techniques of polymerization, kinetics of polymerization, reactions of polymers, degradation of polymers, chain conformation and configuration, rubber elasticity, and copolymerization.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 563 Polymer Chemistry III 3.0 Credits

Covers polymer characterization and analysis; morphology; molecular weight determination, including end group analysis, and colligative properties (vapor pressure lowering, ebullometry, cryoscopy, osmometry); light scattering; viscosity; gel permeation chromatography; sedimentation; diffusion and permeation; polymer identification; plasticizers; x-ray diffraction; thermal behavior; and spectroscopic techniques.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 561 [Min Grade: C]

CHEM 571 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

CHEM 656 Quantum Chemistry of Molecules II 3.0 Credits

Continues CHEM 555. Covers matrix theory and group theory, atomic structures, and self-consistent field methods including the Hartree-Fock theory. Introduces theory of chemical bonding.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 555 [Min Grade: C]

CHEM 657 Quantum Chemistry of Molecules III 3.0 Credits

Continues CHEM 656. Covers the theory of chemical bonding, scattering theory, and detailed Hartree-Fock calculations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 656 [Min Grade: C]

CHEM 659 Physical Chemistry III 3.0 Credits

Covers interaction of molecules with electromagnetic radiation, including internal quantum states and structure of atoms and simple molecules, applications of atomic and molecular spectroscopy, and lasers in chemistry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 558 [Min Grade: C]

CHEM 751 Magnetic Resonance In Chemistry 3.0 Credits

Covers basic principles of electron spin resonance and nuclear magnetic resonance; interpretation of chemical shifts, spin-spin couplings, and spin relaxation; and two-dimensional nuclear magnetic resonance.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 752 Biophysical Chemistry 3.0 Credits

Thermodynamics and kinetics to aqueous biological systems. Properties and behavior of biological macromolecules.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 753 Chemical Instrumentation 0.0-5.0 Credits

Provides hands-on training in the use of various spectroscopic (FT-IR, UV/VIS, fluorescence, AA), chromatographic (packed and capillary column GC, HPLC), and electrochemical (potentiometry, coulometry, polarography) techniques. Involves lectures with self-paced laboratory work.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

CHEM 755 Mass Spectrometry 3.0 Credits

Covers basic interpretive skills for organic and biochemical analysis; basic ion optics design using SIMON; survey of ionization methods, ion selection or separation techniques, and detectors; and applications in chemistry and biology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 767 Chemical Information Retrieval 0.5-20.0 Credits

Examines methods for retrieving literature information, via standard tabulations, journals, and abstracts, using 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 771 Organometallic Chemistry 3.0 Credits

Covers compounds with metal-carbon bonds, including molecular and electronic structures and bonding descriptions, constitutions, reactivities, and syntheses of main-group and transition metal carbonyl, alkene, alkyne, alkyl, and arene complexes and clusters.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 521 [Min Grade: C]

CHEM 772 Inorganic Biochemistry 3.0 Credits

Covers chemistry of metal ions in biological systems and biomimetic ligands and complexes. Includes metal ion chemistry in aqueous environments and structure and behavior of metalloproteins.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 521 [Min Grade: C]

CHEM 773 The Solid State 3.0 Credits

Covers types of bonding in solids, lattice specific heat, phonons, thermal conductivity, free electron gas, band theory of metals and semiconductors, intrinsic and extrinsic semiconductivity, and magnetic properties and superconductivity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 774 Electrochemistry for Chemists 4.5 Credits

Covers potentiometric, coulometric, voltammetric, and potential-step methods for eliciting electron-transfer thermodynamic and kinetic information from chemical and biological systems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 780 Nuclear Magnetic Resonance Laboratory 3.0 Credits

This course provides theory and technical applications of Nuclear Magnetic Resonance to the solution of structural problems in Chemistry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 782 Electronics for Chemical Instrumentation 4.0 Credits

Covers digital electronics for chemical instrumentation, including Boolean algebra and its applications to digital circuits, implementation of basic Boolean operations with solid-state devices, and applications of digital circuits to chemical instrumentation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 783 Electronics for Chemical Instrumentation II 3.0 Credits

Instrument components such as temperature, pressure, and light radiance controllers, etc. will be designed in the lectures and built and tested in the laboratory on the test board built by the student. It contains regulated +15, -15 and 5 regulated power supplies. Same sided wire wrap sockets allow amplifiers and other circuit elements to be easily and reliably mounted and connected. The test board belongs to the student.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 788 Atmospheric Radioactivity 0.5-20.0 Credits

Covers naturally occurring and anthropogenic radionuclides of significance in the earth's atmosphere, including their application as tracers of air mass movement, atmospheric dynamics, and other characteristics. Discusses important methods and techniques of measurement. Requires a term paper from students receiving 5 hours of credit.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 789 Experimental Design and Statistics in Chemistry 3.0 Credits

Covers descriptive statistics; single and multiple linear regression techniques for analytical calibration; analysis of variance methods; basic experimental design, including full and fractional factorial techniques; and experimental optimization using steepest ascent and simplex techniques.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 792 Advanced Organic Synthesis I 3.0-5.0 Credits

Covers organic functional group transformation and manipulation. Includes oxidations, reductions, additions to pi bonds, substitution reactions including aromatic substitutions, and reactions of electron-deficient intermediates.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM 793 Advanced Organic Synthesis II 3.0,5.0 Credits

Covers carbon-carbon bond forming reactions, organometallic reagents, cycloaddition reactions, and multistep synthesis of complex organic molecules including natural products.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CHEM 794 Topics in Organic Reactor Mechanics 0.5-9.0 Credits

Covers current topics in organic reaction mechanisms, with emphasis on understanding the fundamental rules that govern the course and reactivity of chemical reactions.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Prerequisites: CHEM 541 [Min Grade: C] and CHEM 542 [Min Grade: C]

CHEM 796 Heterocyclic Chemistry 0.5-20.0 Credits

Explores general trends in the synthesis, reactions, and properties of oxygen, nitrogen, and sulfur heterocycles, with emphasis on their applications to the synthesis of bioactive materials.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 541 [Min Grade: C]

CHEM 797 The Organic Chemistry of Sulfur and Selenium 0.5-20.0 Credits

Covers fundamentals of organosulfur and organoselenium chemistry, with emphasis on the application of these elements to asymmetric synthesis and the synthesis of natural products.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: CHEM 541 [Min Grade: C] and CHEM 542 [Min Grade: C]

CHEM 862 Topics in Inorganic Chemistry 0.5-9.0 Credits

Covers specialized principles of inorganic chemistry plus contemporary advances in the field. May be repeated for credit when topics vary.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM 865 Chemistry Research Seminar 0.0-9.0 Credits

Provides presentation and discussion of current research topics in chemistry.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM 866 Topics in Polymer Chemistry 3.0 Credits

Covers fundamental concepts in conductivity, magnetism and optical properties, or organic and polymeric materials; elements of the organic solid state; chemical and electrochemical synthesis; structure characterization; and properties and applications of these polymers.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM 868 Topics in Analytical Chemistry 0.0-5.0 Credits

Surveys new or developing instrumental or chemical analysis techniques. Covers spectroscopic, chromatographic, and/or electrochemical techniques for analysis of solutions or surfaces.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM 898 Master's Thesis 0.5-9.0 Credits

M.S. thesis.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM 997 Research 1.0-12.0 Credit

Requires students to select a topic for investigation and obtain the approval of the staff member in charge of the project. The hours and credits are determined for each individual.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CHEM 998 Ph.D. Dissertation 1.0-12.0 Credit

Ph.D. dissertation.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CHEM.

CHEM I599 Independent Study in CHEM 0.0-12.0 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 I699 Independent Study in CHEM 0.0-12.0 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 I799 Independent Study in CHEM 0.0-12.0 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 I899 Independent Study in CHEM 0.0-12.0 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 I999 Independent Study in CHEM 0.0-12.0 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 T580 Special Topics in Chemistry 0.0-9.0 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

CHEM T680 Special Topics in Chemistry 0.0-9.0 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

CHEM T780 Special Topics in Chemistry 0.0-9.0 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

CHEM T880 Special Topics in Chemistry 0.0-9.0 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

CHEM T990 Special Topics in CHEM 0.0-9.0 Credits

Special Topics in Chemistry.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

Civil Engineering

Courses

CIVE 501 Model Analysis of Structures 3.0 Credits

Open to advanced undergraduates. Covers application of models for the analysis and design of complex structures, including development of laws of similitude, methods of fabricating, and testing and instrumentation of models.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 510 Prestressed Concrete 3.0 Credits

Open to advanced undergraduates. Covers definitions and general principles, anchorage systems, and loss of prestress; analysis and design of simple beams for flexure, shear, bond, and bearing; partial prestressed and post-tensioned reinforcement; and continuous beams.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 520 Advanced Concrete Technology 3.0 Credits

This course covers the mechanical, physical and chemical properties of concrete: characteristics of concrete in the fresh, setting and hardening states; high performance concrete. Factors influencing the mechanical performance of concrete are discussed as well as field testing methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is CIVE or major is EGE0.

CIVE 530 Geotechnical Engineering for Highways 3.0 Credits

Covers design of stable right-of-way, USDA classification, frost and swell expansion, capillary moisture retention, subgrade compaction, beam on elastic foundation pavement model, loads and resistance of buried pipes, subdrainage, basic slope stability and retaining structures.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 531 Advanced Foundation Engineering 3.0 Credits

Covers design of shallow foundations (footing and mats), deep foundations (piles, augered, drilled shafts) and retaining structures for stability and deformation performance.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 540 Forensic Structural Engineering 3.0 Credits

Investigation of structural failures which includes partial or total collapse or the inability of structures to function as intended. Using structural failure case studies and hypothetical failure scenarios, the course will cover the forensic engineering process, types and causes of structural failures, mechanisms and modes of structural failures, structural condition assessment, load testing, structural retrofitting, structural failure investigation and analysis. The technical, ethical and legal ramifications of structural failures and the role of the expert witness are also discussed, and students will be expected to prepare failure investigation reports.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 542 Incorporating Sustainability Principles in Design 3.0 Credits

This course considers different approaches to green and sustainable design. It introduces the concept of regenerative design, which seeks to restore ecological balance and health in communities and ecosystems. Students will apply ecological engineering principles to design of resilient and sustainable built environments.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 560 Introduction to Coastal & Port Engineering 3.0 Credits

Provides an overview of coastal engineering problems and their solution, including shoreline erosion, ocean waves and wave theories, wave generation, diffraction, refraction, harbor hydraulics, coastal currents, and tidal inlet hydraulics and sedimentation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 561 Introduction to Hydrology 3.0 Credits

Covers climate and weather, precipitation, evaporation and transpiration, drainage basins, and hydrographs.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGEO 700 [Min Grade: C]

CIVE 562 Introduction to Groundwater Hydrology 3.0 Credits

Covers the fundamentals of fluid flow in porous media, groundwater supply, pollution problems, well and aquifer hydraulics, and groundwater flow modeling.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 564 Sustainable Water Resource Engineering 3.0 Credits

Objective is to enable students to incorporate sustainability concepts into the planning, design, and management of water resources, accomplished through critique of historical agricultural, industrial, and urban water infrastructure in the context of their ecological, social justice, and economic impacts. Global case studies featured and discussed. Also involves a research/design project with an actual "class client".

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman or Sophomore

CIVE 565 Urban Ecohydraulics 3.0 Credits

Will enable students to incorporate an understanding of ecohydrologic patterns and processes into the design of built landscapes and engineered infrastructure. Students will be introduced to techniques for analyzing and modeling rainfall-runoff processes and will learn how to develop ecosystem water budgets in urban contexts. Case studies and field trips will expose students to both ecosystem restoration and green infrastructure projects in the mid-atlantic region.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 320 [Min Grade: D] and CIVE 330 [Min Grade: D] and CIVE 430 [Min Grade: D]

CIVE 567 Watershed Analysis 3.0 Credits

This course focuses on land use change (LUC) and the hydrologic cycle in agricultural and forest (non-urban) watersheds. Using climate, hydrology, and agricultural models, students will investigate how changes in hydroclimatology and landscape-scale land cover affect surface water flow, runoff, and water quality in selected watersheds. The course will explore emerging topics pertaining to water and energy that course through rural watersheds, with the goal of interpreting data output from models into an environmental life cycle assessment (LCA) framework. LCA is a systems analysis framework that feeds information on life cycle environmental damages/consequences back into design and decision making. This course focuses specifically on watershed analysis models and how their output feed into design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 320 [Min Grade: B-] and CIVE 330 [Min Grade: B-] and CIVE 240 [Min Grade: B-]

CIVE 585 Transportation Planning and Capacity 3.0 Credits

Open to undergraduates. Covers prediction of travel demand; principles of highway and transit capacity; level-of-service concepts; uninterrupted and interrupted flow; traffic characterization by volume, speed, and density; operational analysis and design of freeways, highways, and urban streets; intermodal systems, intelligent transportation systems (ITS), and mass transit.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 605 Advanced Mechanics Of Material 3.0 Credits

Open to advanced undergraduates. Covers shear flow and shear center, unsymmetrical bending, torsion of non-circular and open sections, bending of curved beams, stress at a point, and failure theories.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

CIVE 615 Infrastructure Condition Evaluation 3.0 Credits

This course covers the tools necessary for the inspection and evaluation of infrastructure. Non-destructive testing (NDT) techniques are introduced and applications and limitations of NDT techniques for a variety of structures are illustrated. Also covered are the policies for determining the physical condition and maintenance needs for highway bridges.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is CIVE or major is EGEO.

Prerequisites: CIVE 250 [Min Grade: D] and CIVE 520 [Min Grade: C]

CIVE 632 Advanced Soil Mechanics 3.0 Credits

Consolidation magnitude and time rate of settlement, secondary compression, mitigating settlement problems, shear strength of cohesive and non-cohesive soils, critical state soil mechanics, undrained pore pressure response, SHANSEP undrained strength.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 635 Slope Stability and Landslides 3.0 Credits

Slope process and mass wasting; landslide characteristics, features and terminology; limit equilibrium slope stability analysis, including Bishop, Janbu, Spenser, Morgenstern-Price methods; effects of water on slope stability; dynamic (earthquake) stability analysis methods; introduction to rock slopes, slope stability investigations, and design and repair.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 636 Ground Modification 3.0 Credits

This course covers the improvement of soil properties to meet project requirements, including surface and in situ technologies: compaction, densification, precompression, stabilization with admixtures, grouting and dewatering.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 640 Environmental Geotechnics 3.0 Credits

This course covers the analysis and control of subsurface exploration, groundwater remediation, pollutant-soil interaction and waste containment barriers and drains.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 650 Geosynthetics I 3.0 Credits

Open to advanced undergraduates. Presents a basic description of the various products, relevant aspects of polymeric materials, and an overview of each category of geosynthetics. Covers geotextile testing and design on the basis of primary application function: separation, reinforcement, filtration, drainage, barrier, and combined.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

CIVE 651 Geosynthetics II 3.0 Credits

Continues CIVE 650. Covers design and testing of geogrids for reinforcement applications and geonets for drainage applications. Presents geomembrane design and testing from an applications perspective in the areas of environmental, geotechnical, transportation, and hydraulic engineering.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 650 [Min Grade: C]

CIVE 652 Geosynthetics III 3.0 Credits

Continues CIVE 651. Covers design and testing of geosynthetic clay liners as a hydraulic/gas barrier and geopipes as drainage materials in numerous application. Presents geocomposites in separation, reinforcement, filtration, drainage, and barrier applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 651 [Min Grade: C]

CIVE 660 Hydrology-Stream Flow 3.0 Credits

Covers precipitation, runoff, evaporation and transpiration, streamflow, floodflow, and minimum flow. Pays special attention to factors affecting water supply and quality.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

Prerequisites: CIVE 561 [Min Grade: C]

CIVE 663 Hydrodynamics II 3.0 Credits

Extends the theory of perfect fluids to cover fluid forces and moments on bodies, free streamline theory, and extension of vorticity theory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 662 [Min Grade: C]

CIVE 664 Open Channel Hydraulics 3.0 Credits

Covers principles of flow in open channels, conservation laws, uniform flow, critical flow, gradually varied flow, backwater computations, channel design, and numerical computation of flows having a free surface.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is Senior.

CIVE 665 Computational Hydraulics I 3.0 Credits

This course continues CIVE 664 to cover the application of mathematical and numerical techniques to model complex open channel hydraulic processes. At each stage the fundamental hydraulic principles are reviewed to assure proper construction of a modeling algorithm and to assist in interpretation of results.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CIVE.

Prerequisites: CIVE 664 [Min Grade: C] and CIVE 330 [Min Grade: D] and (CIVE 341 [Min Grade: D] or ENVE 416 [Min Grade: D]) and CIVE 430 [Min Grade: D]

CIVE 701 Structural Analysis I 3.0 Credits

Covers basic principles of structural analysis, including elastic deflection; elastic analysis of statically indeterminate structures by methods of virtual work, Castigliano's theorems, and moment distribution; and the Muller-Breslau principle and application to influence lines for continuous members and frames. Introduces numerical techniques.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CIVE 702 Structural Analysis II 3.0 Credits

Covers matrix analysis of structures using finite elements, including elastic analysis of structures by influence coefficients, Argyris force method, direct stiffness method, and the displacement method. Introduces the finite-element method for planar structures.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 701 [Min Grade: C]

CIVE 703 Structural Analysis III 3.0 Credits

Covers development of stiffness functions for planar and three-dimensional finite elements, and application to frame, plate, shell, and massive structures. Introduces the general application of finite elements to continuum problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 702 [Min Grade: C]

CIVE 704 Behavior and Stability of Structural Members I 3.0 Credits

Covers development of the basic differential equations of member behavior, including second-order effects, in-plane beam-column behavior, column buckling, elastic and inelastic behavior, energy methods, and approximate methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 705 Behavior and Stability of Structural Members II 3.0 Credits

Covers general torsion of thin-walled open, closed, and combined open-and-closed cross-sections; lateral torsional buckling; biaxial bending; elastic and inelastic behavior; approximate methods; and frame buckling.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 704 [Min Grade: C]

CIVE 710 Design and Structure of Integrity Building Systems 3.0 Credits

Covers integration of design and building cycle, building envelope, structural morphology, composite structures, thermal and moisture design, fire and smoke, sound and vibration, building failure, and repair and restoration.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 711 Engineered Masonry I 3.0 Credits

Covers masonry materials, structural behavior of masonry assemblages, and deformational characteristics of brick and block masonry; performance of load-bearing wall systems and design of unreinforced masonry elements; and special design and construction topics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 712 Engineered Masonry II 3.0 Credits

Covers fundamental concepts of reinforced masonry, reinforced wall design, column and pilaster design, seismic resistance of masonry structures, prestressed masonry, and applied design of low-and high-rise buildings.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 714 Behavior of Concrete Structures I 3.0 Credits

Covers reinforced concrete members; relationship between results of research and current specifications for design of members subjected to axial loads, flexure, combined axial load and flexure, combined shear and flexure, long columns, bond and anchorage, and limit design; application to design of determinate and indeterminate reinforced concrete frames; and development of current code provisions for design of floor slabs in buildings.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 715 Behavior of Concrete Structures II 3.0 Credits

Continues CIVE 714.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 714 [Min Grade: C]

CIVE 717 Behavior of Metal Structures I 3.0 Credits

Covers load and resistance factor design, including tension, bolted and welded connections, block-shear, compression, built-up compression members, lateral-torsional instability, light-gauge metal buckling and post-buckling strength, and behavior.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 605 [Min Grade: C]

CIVE 718 Behavior of Metal Structures II 3.0 Credits

Covers load and resistance factor design, including design and behavior of metal structural members and connections, flexural members including plate girders, bracing and lateral-torsional buckling resistance, torsion and other combined loading, and composite beams and columns.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 717 [Min Grade: C]

CIVE 719 Behavior of Metal Structures III 3.0 Credits

Covers load and resistance factor design, including idealization and design of structures and their connections, frame bracing and sway, frame design philosophy, optimization, fatigue, and fracture.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 718 [Min Grade: C]

CIVE 730 Experimental Soil Mechanics I 3.0 Credits

Covers methods and techniques of soil testing, including interpretation and evaluation of test data, and fundamentals of soil behavior.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 632 [Min Grade: D]

CIVE 731 Experimental Soil Mechanics II 3.0 Credits

Continues CIVE 730.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 632 [Min Grade: C]

CIVE 732 Experimental Soil Mechanics III 3.0 Credits

Continues CIVE 731.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 731 [Min Grade: C]

CIVE 737 Seismic Geotechnics 3.0 Credits

Introduction to earthquake hazards and seismology; strong ground motion parameters, deterministic and probabilistic seismic hazard analysis, influence of subsurface conditions and topography and ground motion, soil liquefaction, and brief coverage of seismic slope stability, design of retaining structures, and soil-structure interaction.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 632 [Min Grade: C]

CIVE 754 Properties and Processes of Polymeric Construction Materials 3.0 Credits

This course focuses on the uses and characteristics of polymeric materials used in civil and architectural engineering infrastructure. Also covered are micro-structure, physical and chemical properties and mechanical behavior, and the effects of manufacturing on the properties of the products.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AE or major is CIVE or major is MATE.

Prerequisites: CIVE 250 [Min Grade: D] and TDEC 211 [Min Grade: D]

CIVE 755 Durability of Polymeric Construction Materials 3.0 Credits

This is a continuation of CIVE 754 and concentrates on protecting and predicting service lifetimes. It covers physical aging, mechanical stabilization and chemical degradation of polymeric materials and the products in which they are incorporated for field use. Covered in this course is the fundamental degradation mechanisms of different polymeric materials commonly used in Civil Engineering practice. Also covered are test methods and extrapolation methodologies for predicting long-term performance.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 754 [Min Grade: C]

CIVE 756 Evaluation of Polymeric Construction Materials 3.0 Credits

This lab course is designed to integrate and extend the coverage of CIVE 754 and 755 so that students have a full concept of the behavior of polymeric construction materials. A series of thermal analysis and physical, chemical, and mechanical tests are included. The stress relaxation, stress cracking, oxidation, and applications of test results in infrastructure and environmental applications are discussed, including problems in comparative analysis of test results and their implications in design and specification.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 754 [Min Grade: D] and CIVE 755 [Min Grade: D]

CIVE 801 Dynamics of Structures I 3.0 Credits

Covers formulation of equations of motion, including generalized single-degree-of-freedom systems, free vibration response, undamped and damped systems, harmonic analysis, resonance and vibration isolation, response to periodic loading, impulsive loading, response to general dynamic loading, non-linear structural response, and Rayleigh's method and other variational techniques. Introduces multi-degree-of-freedom systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 802 Dynamics of Structures II 3.0 Credits

Covers formulation of multi-degree-of-freedom equations of motion, including evaluation of structural property matrices; elastic properties, mass properties, damping, and external loading; geometric stiffness; undamped free vibrations; analysis of dynamic response; practical vibration analysis; Stodola method; Holzer method; reduction of degrees of freedom; matrix iteration and other techniques; analysis of non-linear systems; variational formulation of the equations of motion; partial differential equations of motion; and free vibrations of beams.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 801 [Min Grade: C]

CIVE 803 Dynamics of Structures III 3.0 Credits

Covers distributed parameter dynamic systems, equations of motion, free and forced vibrations, analysis of structural response to earthquakes, seismological background, deterministic analysis of single-degree-of-freedom and multi-degree systems, multi-degree-of-freedom and distributive parameter systems, soil-structure interaction, non-linear response to earthquakes and current design code requirements, dynamics of complex structures, modeling, and use of large computer codes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 811 Plates and Shells I 3.0 Credits

Covers analysis of circular, rectangular, and continuous plates by classical and approximate methods, including the folded plate theory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 831 Deep Foundations 3.0 Credits

Covers topics including mat foundation design using plate theory, continuous beam design using beam-on-elastic foundation theory, and pile design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 833 Earth Retaining Structures 3.0 Credits

Covers lateral earth pressure theories, analysis and design of temporary and permanent retaining structures, surcharge load, excavations, and loads on buried conduits.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 838 Soil Behavior 3.0 Credits

Particle-scale behavior of soil and assemblages; clay mineralogy; soil formation, composition, structure and properties; soil water interaction; clay-water-electrolyte systems, adsorption-desorption and ion exchange; conduction phenomena; micromechanics; volume change behavior; strength and deformation behavior.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 632 [Min Grade: C]

CIVE 839 Geomechanics Modeling 3.0 Credits

This course covers constitutive laws in geomechanics, including linear elastic, quasi-linear (hyperbolic) elastic, linear elastic-perfectly plastic and elasto-plastic models based on critical state soil mechanics. The finite element method is used to solve geotechnical boundary value problems incorporating different constitutive models.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CIVE 632 [Min Grade: C]

CIVE 898 Master's Thesis 0.5-20.0 Credits

Involves investigation of an approved topic. Required of full-time master's degree students.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CIVE 997 Research 1.0-12.0 Credit

Research.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CIVE 998 Ph.D. Dissertation 1.0-12.0 Credit

Involves investigation of an approved topic. Required of Ph.D. students.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

CIVE I599 Independent Study in CIVE 0.0-12.0 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 I699 Independent Study in CIVE 0.0-12.0 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 I799 Independent Study in CIVE 0.0-12.0 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 I899 Independent Study in CIVE 0.0-12.0 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 I999 Independent Study in CIVE 0.0-12.0 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 T580 Special Topics in CIVE 0.0-12.0 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 T680 Special Topics in CIVE 0.0-12.0 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 T780 Special Topics in CIVE 0.0-12.0 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 T880 Special Topics in CIVE 0.0-12.0 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 T980 Special Topics in CIVE 0.0-12.0 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

Communication

Courses

COM 500 Reading & Res Communication 3.0 Credits

Introduces graduate study in the communication program. Presents issues and concepts for this course and other graduate courses. Focuses on issues such as reading complex texts, both theoretical and research-oriented. Also introduces the range of fields in professional communication.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 505 Sports Journalism 3.0 Credits

This course enables students to gain a deeper understanding of the meaning-making power of sports journalism. The changing role of the sports journalist, from the mythmaking and hero-worship seen during the field's infancy, to the detachment and devotion to the craft of journalism that marked sports reporting beginning in the mid-20th Century, are explored.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 510 Technical Writing 3.0 Credits

An intensive workshop course in writing technical abstracts, proposals, manuals and reports. Focuses on developing reader-centered documents for a variety of audiences and purposes through the use of a number of styles. Aids students in developing greater awareness of the varieties of rhetorical situations and styles found in their careers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 515 Cultural Significance of Fame 3.0 Credits

This course explores our fascination with fame and celebrity, and the desire of so many people to achieve fame: from Alexander the Great to American Idol. Key issues include: the mass media's role in creating the cultural significance of fame, psychological characteristics of fame seekers, and changes in what it means to be a fan of the famous.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 516 Campaigns for Health and Environment 3.0 Credits

This reading and writing intensive, seminar-style course explores theories and practical aspects of environmental information campaigns and community-based social marketing campaigns. The theories and frameworks presented in this course apply to health issues as well as environmental issues. This course has a strong applied component.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 517 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

COM 520 Science Writing 3.0 Credits

An intensive workshop course in communicating scientific information to the public, including reading and discussion of science journalism. Focus is placed on how to translate and reinterpret technical and scientific information for a general readership.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 525 Document Design and Usability 3.0 Credits

Examines research and theory on the design of documents. Introduces research methodologies appropriate for the evaluation of scientific and technical communications. Examines research in document design and usability, testing and other strategies for collecting, analyzing and presenting data.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 530 Techniques and Science of Photography 3.0 Credits

Introduces the techniques of photography. Enhances students understanding of photography to better enable them to use photographs and services of photographers as communicative media.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 535 Digital Publishing 3.0 Credits

This course provides students with applied and theoretical knowledge of the current state of digital publishing, which includes a diverse range of digital media and channels including: email, websites, blogs, forums, DVDs, CD-ROMs and electronic books. Students will focus on issues relating to writing text optimized for online consumption and integrating text and graphics to create and publish a professional, branded and visually appealing blog, website, and other electronic artifacts, such as email newsletters/promotions, custom social media graphics and/or an infographic. Students will also consider how issues in document design and usability can be used to evaluate websites and other digital publications. The ethical issues of digital publishing and sources for copyright free photo/image use are explored.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 536 Strategic Social Media Communication 3.0 Credits

Students explore the evolution of social media and the impact that "media convergence" culture has on brands and organizations. Social media platforms facilitated by Web-based and mobile technologies are explored and evaluated. Theoretical approaches and research-based best practices for strategic social media marketing plans and integrating social platforms/tools and technologies into existing marketing plans and legacy media are explored. Students will analyze how real brands are using social media, engage in social media activities and develop and implement elements of a strategic social media plan for an organization or business including: creation of a social media space, evaluation plan that will utilize native or third-party analytic tools and a plan for best practices for social media use in a crisis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 540 Technical and Science Graphics 3.0 Credits

Covers the design and production of graphic materials for technical and scientific purposes. Allows students to begin to understand the visual aspects of communication. Focuses on the use of type, art, and photographs to reinforce the written message.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 541 Foundations of Public Relations 3.0 Credits

This foundations course is designed for students who are new to public relations. This course introduces students to the basic theories, strategies, tactics and skills that form the foundation of public relations practice. Students will learn about public relations as a professional field, and the importance of public relations as a strategic tool to interact with internal and external audiences. This course will cover tactics such as corporate social responsibility and reputation management, and will provide students with basic skills related to media relations, public relations research and PR writing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 542 Public Relations Writing 3.0 Credits

This course teaches students the preparation of advanced public relations materials such as public service announcements, press statements, backgrounders, brochures, facts sheets, features, opinion pieces and other related communication materials. It will consider the preparation of materials for different outlet (e.g. writing for print/websites as opposed to writing for radio and TV). This course also provides a brief introduction to speech writing. This is a workshop oriented class with a focus on persuasive writing. To enroll in this class you must first earn a grade of "B" or better in COM 541 Foundations of Public Relations or get permission from the MS COM advisor to waive this requirement.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 541 [Min Grade: B]

COM 543 Public Relations Planning 3.0 Credits

This graduate level course will enable students to put into practice the theoretical knowledge, research skills, interpersonal and group skills, writing skills, and creative problem solving abilities developed throughout their public relations studies. This course will help students approach public relations strategically so they will be able to apply public relations techniques and theories to the creation, execution and management of public relations plans and campaigns. To enroll in this class you must first earn a grade of "B" or better in COM 541 Foundations of Public Relations or get permission from the MS COM advisor to waive this requirement.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: COM 541 [Min Grade: B]

COM 544 Media Relations 3.0 Credits

Today's media consumption is rapidly changing as consumers continue to shift toward digital devices for their news and away from old staples like newspapers and TV. There are hundreds of millions of digital news sites, all looking to break the story of the day or tell the best feature. With less full time journalists and more freelancers, it has become increasingly difficult for brands and companies to get their voice into the media. Those that succeed are ones with good media relations strategies. This course will focus on media relations strategy and how brands can consistently win earned media.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 550 Video Production for Science & Technology 3.0 Credits

Introduce the techniques of studio and field video production for technical and science subjects. Teaches students to produce their own video for training purposes or information access.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 562 International Negotiations 3.0 Credits

This course examines theoretical and practical elements of international negotiations. Students are taken into the work of diplomats, policymakers, and corporate leaders negotiating agreements and are guided through psychological, sociological, and political dimensions of the talks process. By the end of this course students will be able to analyze negotiations scientifically and professionally.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 563 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.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 565 Journalists, 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

COM 567 Technical Documentation and Software 3.0 Credits

Technical writers have to be able to communicate complex information and processes clearly, concisely and accurately, both to internal and external audiences. But before they can create documentation for software, they must first understand how applications and websites work. Using a popular application, students will explore all facets of the application, from how to read code to diagramming complex steps. Students will then learn how to gather, analyze and organize content to generate end-user help files and internal documentation for project development teams. Various authoring and publishing tools will be explored.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 570 Technical, Science and Health Editing 3.0 Credits

Covers techniques of formal editing, including project and copy editing. Requires students to read, discuss and edit numerous types of documents from professional, government and industry sources.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 575 Grant Writing 3.0 Credits

Students develop the skills needed to write an effective grant proposal. Topics include idea development, analyzing a team's capabilities to complete a project, developing a clear plan of attack, locating funding sources, honing research skills, and effectively using graphic elements in proposal design.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 576 Nonprofit Communications 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

COM 577 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

COM 578 Focus Groups 3.0 Credits

This qualitative research methods course will discuss the use of focus groups to collect data for social science inquiry from both an academic and a consumer research perspective. We will take an in-depth look at how to plan, implement, and analyze data collected through a focus group process, including: purposes and uses of focus group interviews, human subjects research considerations, participant recruitment, sampling, question design, facilitation techniques, recording options, transcription, analysis, and reporting of data.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 586 International Communication 3.0 Credits

This course is taught within the paradigm of media ecology. Such issues as the historical context, theoretical concepts, economic and structural aspects of international communication is considered. The effects of culture, language, religion, history, politics, and tradition on the process of international communication are also examined.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 600 Graduate Seminar in Communication 3.0 Credits

This is an upper-level graduate seminar in various topics in Communication, including but not limited to Public Relations, Journalism, and Non-profit Communication. Students will undertake an in-depth examination of critical texts or themes in Communication. The course is intended for graduate students in the MS Communication program and can be repeated for credit with a different topic. This course is open to all students at the graduate-level.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 4 times for 15 credits

COM 610 Theories of Communication and Persuasion 3.0 Credits

Examines the application of theories and models of communication and persuasion. Introduces theories underlying technical communication and issues informing the discipline. Draws readings from a number of disciplines, such as rhetoric, cognitive psychology, discourse analysis, linguistics, and communication.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 611 Interconnections: Science, Technology, Literature and the Arts 3.0 Credits

Examines issues concerning relations among science, technology, literature, and the arts, and leads students to learn something of the nature of science and technology and explore the contribution of literature, the arts, and aesthetic theory to effective science and the technical communication.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 612 Ethics for Technical, Science and Health Communication 3.0 Credits

Studies principles and concepts of ethics for technical, health and scientific writers, editors and publishers. Examines moral presuppositions of the profession as they pertain to technical, health and scientific communications, to the effects of computer technologies on ethical practices in the workplace, and to the responsibilities of editors for preventing fraud.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 613 Ethics for Public Communication 3.0 Credits

This course is a seminar in journalism and public relations ethics. Topics discussed include: professional responsibilities of journalists with respect to truth-telling and objectivity in reporting the news; ethical issues surrounding morally offensive radio and television content; ethical issues concerning what is and is not covered by the news and manipulative advertising.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 650 Telecommunications Regulation and Policy 3.0 Credits

The historical, governmental, social, economic and political structures of telecommunications policies are examined. Special emphasis is placed on how assumptions concerning living in an information age affect policies, philosophies, structures and outcomes, especially at a global level.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 660 Investigative Journalism 3.0 Credits

An intensive hands-on course in researching and writing investigative news stories. Students will select and cover beats and submit a series of in-depth articles on deadline.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 670 Medical Writing 3.0 Credits

Students learn about the major branches of medical writing and editing, for both medical and pharmaceutical contexts. The course includes the following topics: writing for professional, commercial and popular audiences, preparing FDA submissions, reading and researching medical literature, using medical statistics, interviewing subjects and writing ethically.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 673 Medical Journalism 3.0 Credits

This course teaches students how to research and write articles geared to the medical field for the mass media and public relations, and to evaluate the scientific merit of medical research relative to the pressures on scientists, doctors, researchers, companies and universities to garner media attention.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

COM 698 Creating and Managing Communication Professional Identities 3.0 Credits

In this course, students will explore the research literature regarding the professional identities of communication professionals. Students will also read scholarly literature pertaining to the use and impact of social media to create and manage professional identities in the field of communication. They will then work to develop a structure that allows them to draw upon this body of research to create a professional identity package from the work they have completed in the program as well as in their own areas of professional expertise. This professional package will demonstrate their aptitude, performance, and compatibility to experience success in their target career. This course should be taken in the final year of the program.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is COMM.

COM I599 Independent Study in COM 0.0-12.0 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 I699 Independent Study in COM 0.0-12.0 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 T580 Special Topics in Communication 0.0-9.0 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

COM T680 Special Topics in Communication 0.0-6.0 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

Communication, Culture and Media

Courses

CCM 510 Introduction to Cultural Studies 3.0 Credits

This course is an introduction to cultural studies and theory. We will discuss current trends and discussions in cultural studies, and raise questions about culture, politics, subalternity, sexuality, gender, feminism, urban studies, revolutions, ethnicity, and multiculturalism, among others. Students will apply the theoretical approaches and methodologies of cultural studies to the analysis of various aspects of material culture found in contemporary society from products to media.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 550 Marxist Analysis and Critique 3.0 Credits

Through closely guided readings of the Communist Manifesto and Capital (1st Volume), this course introduces students to classical elements of Marxist theory, including conceptual vocabulary, dialectical methods of construction and explanation, and written theoretical analysis. As a sort of modified tutorial course, the pace of readings and the focus of analysis will be tied to both collective discussion and individual interests and background knowledge. Course work requires careful weekly reading notes and three short papers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 555 Ethnography of Communication 3.0 Credits

Following an examination of theories about interaction in speech, the course provides an in-depth look at qualitative communication studies. Both transcripts of talk in natural settings and videos of actual interactions will be used. Considers such topics as story telling (narrative), self-presentation in talk (performance and identity), the construction of gender in communication, literacy, and cross-cultural approaches to politeness.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 560 Political Comedy 3.0 Credits

This course will help students better understand the nature of humor, its role in social life generally, and in politics particularly. Along the way the course will examine what politics and rhetoric are and how humor and comedy are used to serve varying political functions. Of particular interest will be the way in which the journalistic equation of objectivity with neutrality actually departs from what is objective and how the new entertainment politics has engagingly punctured that stance.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 701 Contemporary Social Theory 3.0 Credits

This course familiarizes beginning graduate students with original works by major theorists of the late 19th century to the present. Students will especially examine the production of social theory as an ongoing conversation about the predicaments of modernity and post-modernity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 702 Communication Theory I: Persuasion and Media Effects 3.0 Credits

This course is an introduction to the study of persuasion and media effects. Readings include elements of persuasion and compliance seeking, as well as how persuasion takes effect through mass media. Course draws liberally from contemporary research in communication literature.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 703 Communication Theory II: Discourse and Semiotics 3.0 Credits

Through readings of major theoretical ideas and voices, and occasional case examples, this course introduces students to theories of discourse and semiotics. Major concepts include theories of the sign, and of genre, and the role(s) that language plays in social construction, structuralism and post-structuralism, discourse and post-modernity, and language ideology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 704 Research Methods in Communication, Culture and Media 3.0 Credits

This course familiarizes students with various quantitative research methods in communication research including analysis, survey research and experiments. Each state of the research process will be explored from hypotheses to defining and operationalizing variables, including effective sampling, analysis, and write-up. Also introduces students to a wide range of original research studies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 705 Data Analysis in Communication 3.0 Credits

Students are introduced to statistics for communication research, including quantitative analysis techniques for survey data and content analysis. Causal models, sampling and basic ideas of correlation and regression are discussed. Course is a hands-on approach with equal attention to technique and theoretical understanding, using SPSS software.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: STAT 201 [Min Grade: C]

CCM 710 Mass Communication and American Social Thought 3.0 Credits

Mass communication has been at the center of most of the hopes and anxieties of the 20th Century. Would mass communication promote democracy or totalitarianism, support the powers-that-be or challenge them, make us smarter or dumber, enhance real life or distort it, etc.? In the end, what do we want mass communication to be and do in the 21st Century? In this course we will examine these questions historically, while learning about the development of "media studies."

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 715 Media, Advocacy and Public Spaces 3.0 Credits

Half of the world's population lives in cities. With this increase, notions of public space, rights of access, land use and development become highly contested. Students will conduct their own ethnographic fieldwork in urban environments that address issues of conflict that take place in or engage with urban public spaces.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 720 Critical Theory 3.0 Credits

This course provides an overview of critical theory. It starts with the creation of the critical Frankfurt School, and reviews the works of Gramsci, Adorno, Horkheimer and Marcuse. It then focuses on the expansion of critical theory by Jurgen Habermas through consideration of his theory of communicative action.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 725 Political Communication 3.0 Credits

This course introduces students to the background concepts and literature in multiple areas of political communication. Material ranges from rhetoric and public relations to mass communication theory. The course objective is to equip students with the skills so that they can go on to pursue scholarly research in these areas on their own. Among other things, students will learn how to write and analyze speeches; evaluate more and less adroit responses to questions; and to assess media coverage of political affairs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 735 Material Culture 3.0 Credits

Stuff. Things. Goods. Possessions. This course explores the relationship between human beings and the material objects that surround us. Drawing from literature in anthropology, archaeology, cultural studies, communications, and science and technology studies, we will be exploring the cultural and social life of things: how they move across borders and through our lives, how they accumulate and disperse, how they define the difference between social groups and classes, and, most of all, how they lend our lives weight and meaning. We will also be exploring the status of things in the digital age, emergent notions of materiality, and cutting edge work in "new materialism" studies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 740 Consumer Culture 3.0 Credits

This course will engage with the rise of mass consumerism in the United States over the course of the 20th and early 21st centuries, and trace critical approaches to it using interdisciplinary approaches from the fields of history, media studies and communication, and cultural studies. Specifically, we will discuss the birth of critiques of capitalism, the rise of mass production and advertising, the role of consumerism in shaping conceptions of identity, citizenship, and taste, and contemporary trends in consumer culture.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 745 Digital Subjectivities 3.0 Credits

By asking about the mass media as an imaginative resource, this course will examine theoretical frameworks to understand types of self and subjectivity facilitated by new media. Through a survey of contemporary social thought on the subject of "the subject," as well as recent work on virtual subjectivity, we will explore the very meaning of "being digital," its cultural implications, its structural limitations, and its ontological consequences.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 750 Political Economy of Media 3.0 Credits

The political economy of media links media and communications systems to the workings of economic and political power. After a general introduction to approaches to political economy, students will concentrate on analysis of selected features of news media and social media in terms of their relation to commercial business interests, political power and the framing of public discourse.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 755 Mobilities and Mobile Media 3.0 Credits

This graduate level course will introduce concepts in mobilities theory relevant for understanding the development of mobile media (including mobile phones, mobile social networking, mobile locational services, mobile gaming, and mobile art). We will consider how new "hybrid" mobilities are re-shaping social and spatial relations of contemporary urbanism, locally and globally. Drawing on the interdisciplinary field of mobilities research, the course will examine diverse empirical research on specific mobile interfaces and new theoretical approaches to connected presence and hybrid digital space to explore the changing social meanings and cultural practices of mobile media.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 760 The Body Digital: Biopolitics and New Media 3.0 Credits

Students explore how new media is embroiled with the life sciences, medicine, agriculture and other related industries globally. In particular, we consider how the body, mostly human, but sometimes other, becomes a medium, an interface and a commodity in biocapitalism, as well as a site for mediated experimentation in arts, science and film.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 777 Communication Network Analysis 3.0 Credits

This course introduces communication network analysis to graduate students, emphasizing its theoretical, substantive, and methodological foundations. The main objective of this course is to allow students to acquire a sufficient grasp of both the classical and the contemporary network literature to enable them to pursue independent advanced study, and ultimately, to contribute original research results to their disciplines. The course covers key network concepts and principles; examines data collection, measurement, and computer analysis techniques; and investigates applications in social sciences, communication, media studies, information science, public health, organizational studies, and related disciplines.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

CCM 801 Seminar in Contemporary Theory 3.0 Credits

This is a special topics seminar course that will introduce students to different currents in contemporary social theory, especially through in-depth reading and discussion of a single major theorist, theoretical school, or theoretical concept. Course may be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

CCM 802 Seminar in Discourse and Semiotics 3.0 Credits

This is a special topics seminar course that will explore in-depth a particular theoretical or research approach to the study of language, discourse, and signs. Students will work with major theoretical approaches as well as recent research in the area. Course may be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

CCM 803 Seminar in Structural and Cultural Dynamics 3.0 Credits

Through in-depth exploration of a specific research topic, this seminar course will introduce students to what is called the sociological imagination. The course examines special topics that will illuminate such broad sociological approaches as political economy, cultural analysis, neo-institutionalism or post-modernism. Course may be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

CCM 804 Seminar in Research Methodology 3.0 Credits

This course focuses on a single research method. The course takes students through the inception of research ideas, research design, implementation and data-analysis/write up as the mean to understanding the limitations and possibilities of the research process according to methodology. Course paper involves student research design practicum. Course may be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

CCM 805 Seminar in Communication Ethics 3.0 Credits

By in-depth examination of a single issue in research ethics, this course develops student awareness of ethical issues in processes like peer review, human subjects research evaluation, and public consumption of knowledge generated by scholarly investigation. Course may be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

CCM 998 PhD Dissertation Research in Communication, Culture & Media 1.0-12.0 Credit

Requires supervised research, including literature research, data collection, and writing of doctoral thesis.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CCM I699 Independent Study in Communication, Culture & Media 1.0-12.0 Credit

Self-directed research, reading or other study; intermittent consultation with a designated instructor required.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CCM I899 Independent Study in Communication, Culture & Media 1.0-12.0 Credit

Self-directed research, reading or other study; intermittent consultation with a designated instructor required.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

CCM T580 Special Topics in Communication, Culture and Media 0.0-9.0 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

Complement & Integrative Therapy

Courses

CIT 501 Foundations of Phytotherapy 3.0 Credits

This course serves as a foundation for the safe, effective and rational approach to using some of the most commonly known herbs in clinical practice. Includes a review of primary uses, active constituents, pharmacological actions, known contraindications, drug interactions, potential side effects, and review of the clinical research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 502 Foundations of Complementary and Integrative Therapies 3.0 Credits

This course provides an overview of the history of medicine and reviews the theoretical foundation of selected CIT areas, including: botanical medicine, clinical aromatherapy, homeopathy, mind-body therapy, energy therapy, and humor and healthcare. It compares the CIT world view with the conventional medical model.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 503 Holistic Living For The Caregiver 3.0 Credits

This course is designed to take students on an experiential journey toward a holistic way of living that emphasizes a mind-body-spirit approach.

Emphasizes development of healthy, nutritious eating, effective exercise, and guidelines for incorporating basic supplementation. Students stress reduction and management techniques including breathing, walking and music. Integrates spiritual concepts.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 511 Spirituality, Health and Healing 3.0 Credits

Spirituality is an essential aspect of one's identity. For some, spirituality is expressed in terms of religious concepts while for others it is less formalized yet no less significant in contributing meaning and purpose to their lives. Health, illness, and healing are three major life experiences impacted upon by one's spirituality.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 512 Body Movement Therapies 3.0 Credits

This course is an overview of the history and theory of the following movement therapies: Dance Movement Therapy, Feldenkrais, Qigong, Yoga, and Pilates. The clinical application of these movement therapies to specific patient populations will be explored. Students will have the opportunity to "experience" an episode of each of the movement therapies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 513 Yoga for the Enlightened Practitioner 3.0 Credits

This course provides a framework for understanding and experiencing the holistic practice of yoga. It addresses yoga's ancient philosophy of universal wisdom and this philosophy's increasing relevance to humankind today. The eight limbs of yoga are incorporated for study throughout the course content modules to promote self awareness and conscious action in daily life experience. Holistic yoga application as a medical modality is reviewed based on evidence based practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 534 Witches, Wise Women and Women Healers 3.0 Credits

This course provides a chronicle of women healers throughout history from ancient to modern times--those who have served as priestesses, witches, wise women, and ultimately the healers who have helped to shape and form healthcare as we know it today. It examines the influence of religion, misogyny, science, politics, economics, and sexuality on the creation of the female archetype and the lasting impression that has influenced her role in healing practices. Students will also look at the role of modern healers and the evolving model of integrative healthcare in healing practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 552 Integrative Advanced Relaxation Techniques (I-ART) 3.0 Credits

This course presents evidence-based integrative mind-body-spirit healthcare strategies that are indicative of specific complementary and integrative therapies. These therapies include modified mindfulness meditation, progressive muscle relaxation, and yoga that are being employed by a growing number of healthcare providers and healthcare organizations across the country (e.g. Veterans Administrative Health Systems) to help address PTSD, anxiety, depression and insomnia.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 600 Foundations in Clinical Aromatherapy 3.0 Credits

This course provides a strong foundation for the safe and effective use of 20 therapeutic essential oils. Includes the clinical application of each essential oil, basic essential oil organic chemistry, safety, dosages and known contraindications. Reviews essential oil biosynthesis, specific plant morphological structures, extraction methodologies, primary avenues of absorption, and an overview of the history of aromatherapy. This course adheres to the educational standards (level one) set forth by the National Association for Holistic Aromatherapy (NAHA).

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 601 Integration of Complementary and Integrative Therapies 3.0 Credits

This course is an overview of the availability, utilization and integration of complementary and integrative therapies in the United States today. Emphasis is placed on the coordination of traditional and non-traditional healing practices and the roles and responsibilities of the provider as the coordinator of the patients' health care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CIT 501 [Min Grade: B] and CIT 502 [Min Grade: B] and CIT 503 [Min Grade: B]

CIT 602 Women's Integrative Health 3.0 Credits

This course presents an Integrative Mind-Body approach for supporting various states of health imbalance specific to women's health. Applied integrative strategies highlight the use of dietary and lifestyle changes, nutritional supplementation, botanical medicines and other specific healing modalities. Takes into account the eastern philosophy of anatomy energetics, the integration of the physical and the spiritual, psyche and soma, into a harmonious whole for addressing specific women's health conditions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: (CIT 501 [Min Grade: B] or NURS 551 [Min Grade: B]) and (CIT 502 [Min Grade: B] or NURS 529 [Min Grade: B]) and (CIT 503 [Min Grade: B] or NURS 539 [Min Grade: B])

CIT 617 Qigong: Bio-energy Therapy 3.0 Credits

This course teaches Qigong in the context of traditional Oriental medicine, and includes body movement and energy medicine for health and healing. The course provides students with principles of bio-energy (Qi) and practical ways of using them for healing. The key component of the course includes lectures, slow relaxing exercises, Qi meditations, and self-healing treatment techniques for specific symptoms. Lectures cover principles, history of bio-energy therapy, self-healing and treatment for special symptoms, case studies, and effects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 618 Principles of Holistic Nursing 3.0 Credits

This course provides a foundation of holistic nursing knowledge, understanding and insight, including holistic nursing theories, ethics, and beliefs. The course will focus on the American Holistic Nurses Association's Scope and Standards of practice, as well as the Holistic Nursing Core Values. Students will explore the concept of healing, evaluate current local and national trends and environmental conditions that affect health, and identify ways to incorporate the concepts of holistic nursing into professional practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 619 Principles of Bioenergy Therapies 3.0 Credits

Principles of Bioenergy Therapies examines the concept of human bioenergy fields and the healing modalities known as energy therapies that rebalance the bioenergy field to promote healing. The history and research into energy therapies is covered as students explore the paradigm shift in treatment of individuals in Western medicine.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 621 Spirituality in Hospice and Palliative Care 3.0 Credits

This course offers health care professionals the guidelines and tools necessary to provide compassionate spiritual care to patients and their families at the end of life, by examining spiritual beliefs, rituals and opportunities through the combined effort of patient, family and a multidisciplinary health care team. Techniques will be explored that acknowledge and support individual goals, values, wishes, through discovery, reverence, and tending of the spirit. This course will examine the ancient texts of death and dying, the use of scripture, and the unique energy of the ancient hospices in Europe.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 622 Holistic Therapies in Hospice and Palliative Care 3.0 Credits

This course introduces health care professionals to the use of complementary and integrative therapies (CIT) used during the end of life. Methods for assessment, the influence of the environment in healing, and therapeutic interventions for various stages of patient concerns will be explored. The current use of proven modalities in end of life care will be discussed, as well as the potential for expanding current practice. Care of the dying will be viewed from many disciplines, clinical and domestic.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 623 Cultural Perspectives in Hospice and Palliative Care 3.0 Credits

Culture plays an important role in an individual's view of death and in a health care provider's provision of care at the end of life. This course will explore culture, the learned behaviors, beliefs, and values that define an individual's experience, affecting their views of health, illness, dying, and life after death. The health care provider will develop skills necessary to recognize, assess, and address the psychological, social/religious perspectives, and cultural taboos realizing that different cultures may require significantly different approaches, ultimately, providing a meaningful context for dying.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 624 Foundations of Integrative Addiction Therapy 3.0 Credits

This course introduces the health care professional to the foundational principles of integrative healthcare. Reviews the neuroscience of addiction and the neuronutritional model of addiction. It provides the student with an understanding of complementary and integrative therapies (CIT) which can be used during the recovery phase of addiction treatment. Care of the recovering client will be viewed from many disciplines, allowing practitioners the perspective needed to enhance the physical, emotional/mental and spiritual aspects of healing throughout the recovery process.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 625 Spirituality, Empowerment, and Transformation 3.0 Credits

Advanced recovery from addiction requires the development of an expanded sense of self that is communal and spiritual in awareness. This course serves as an introduction to the significance of spiritual development using the 12-steps as spiritual practice and the wisdom of the great spiritual leaders, philosophers, and psychologists of our time. This course offers insight and practices that can energize the spirit, increase inner peace and work at the deepest root of the addiction process, providing students with the tools necessary to promote successful long-term recovery of those suffering from addictions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 626 Translational Research in Complementary and Integrative Health 3.0 Credits

This course provides a comprehensive synthesis of research methods in Complementary and Integrative Health (CIH) and how they are to be used collectively, including the role of comparative effectiveness research. Students are introduced to both general and specific factors, which need to be considered in assessing or developing research in complementary and integrative health. In addition, this course identifies aspects of CIH research, which are different than conventional research methods and reviews the types of research performed in specific complementary and integrative health therapies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CIT.

CIT 628 Special Topics in Complementary and Integrative Therapies 3.0 Credits

This course covers special topics of relevance and significance to complementary and integrative therapies in health care. This course may be repeated up to three times for credit, as topics vary from term to term.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 9 credits

CIT 631 Introduction to Nutritional Neuroscience 3.0 Credits

This course explores the emerging interdisciplinary field of nutritional neuroscience that relates directly to many healthcare and quality-of-life issues at the forefront of modern society, in particular to addictions. Students will review the foundational neuroscience of addiction and the neuronutritional model of addiction. This course examines specific neuronutritional agents that are now used for their effects on behavior or brain function as it relates to addictions, the primary focus of the field of nutritional neuroscience.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 656 Traditional Healing Systems 3.0 Credits

This course provides a survey of the fundamentals of traditional healing systems that form an integrated framework of thought and practice, followed by an in depth examination of their relevant worldviews. The traditional healing systems examined include Chinese medicine, Tibetan medicine, Ayurveda, as well as Unami, Native North American healing and Latin American Curanderismo, among others.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CIT 502 [Min Grade: B] or NURS 539 [Min Grade: B]

CIT 657 Functional Approach to Clinical Nutrition 3.0 Credits

This course introduces an evidence-based, functional medicine model of clinical nutrition, a science-based field of healthcare that examines core clinical imbalances that underpin specific conditions and associated symptoms. A functional approach to nutrition analyzes the multiple roles of various nutrients and focuses on how these key life-sustaining substances support health throughout the different systems of the body, as well as providing a broader perspective on deficiency symptoms and how to ameliorate them.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CIT.

CIT 658 Advanced Women's Integrative Health 3.0 Credits

This course continues in the presentation of women's integrative health strategies that incorporate a holistic Mind-Body-Spirit approach for addressing specific women's health conditions. Applied integrative health protocols will focus on the use of dietary and lifestyle changes, nutritional supplementation, botanical medicines and other specific healing modalities for supporting various states of health imbalance.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CIT 690 Independent Study 3.0 Credits

The student works under the guidance of a faculty member to study in depth a topic related to his or her program of study. Independent study courses may be undertaken when there is no specific formal coursework available to support the student's program of study. Specific objectives and requirements are negotiated individually and students will sign an Independent Study Contract. This course may be repeated three times for credit as topics vary from term to term.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

CIT 696 Integrative Health Strategies I 3.0 Credits

This course introduces the health care professional to clinically proven integrative health strategies that include preventative, non-invasive and natural treatment approaches that can be utilized as supportive therapies for specific health conditions. These therapies consist of dietary and lifestyle modifications, nutritional supplementation, phytochemicals, mind-body stress reduction techniques, and other natural therapies that promote an integrative health care approach in a comprehensive treatment plan.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: (CIT 501 [Min Grade: B] or NURS 551 [Min Grade: B]) and (CIT 502 [Min Grade: B] or NURS 529 [Min Grade: B]) and (CIT 657 [Min Grade: B] or NURS 657 [Min Grade: B])

CIT 697 Integrative Health Strategies II 3.0 Credits

This course expands on Integrative Health Strategies I, by introducing the health care professional to additional clinically proven integrative health strategies that include preventative, non-invasive and natural treatment approaches that can be utilized as supportive therapies for specific health conditions. These therapies consist of dietary and lifestyle modifications, nutritional supplementation, phytochemicals, mind-body stress reduction techniques, and other natural therapies that promote an integrative health care approach in a comprehensive treatment plan.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CIT 696 [Min Grade: B]

CIT 698 Graduate Seminar 3.0 Credits

This course builds upon CIT 697 and is designed to provide an opportunity to conduct an in-depth scholarly exploration of a contemporary issue relevant to Complementary and Integrated Health (CIH) and focuses on the comprehensive synthesis of current knowledge, identification of gaps in the literature, implications for practice and potential for future inquiry.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CIT 697 [Min Grade: B]

Computer Science

Courses

CS 500 Fundamentals of Databases 3.0 Credits

This course gives an introduction to data management at scale. Covered topics include ER and relational modeling, SQL, database application development, query processing, and data management on distributed platforms.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 510 Introduction to Artificial Intelligence 3.0 Credits

Well-formed problems; state spaces and search spaces; Lisp and functional programming; uninformed search; heuristic search; stochastic search; knowledge representation; propositional logic; first order logic; predicate calculus; planning; partial order planning; hierarchical planning.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 511 Robot Laboratory 3.0 Credits

Building and programming machines built out of construction pieces, a micro-controller, actuators, motors, sensors, that interact with the world using limited computational resources. Issues in mechanics, physics, electronics, real-time control, uncertainty, map building, path planning, and other topics in introductory robotics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 510 [Min Grade: C] or CS 583 [Min Grade: C]

CS 520 Computer Science Foundations 3.0 Credits

Survey of basic mathematics concepts needed for the study of computer science at the graduate level: induction, iteration, recursion; analysis of program running time; graphs and trees; predicate logic; regular expressions, Context Free Grammars, and Turing Machines.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 570 [Min Grade: C] (Can be taken Concurrently)

CS 521 Data Structures and Algorithms I 3.0 Credits

Techniques for analyzing algorithms: asymptotic notation, recurrences, and correctness of algorithms; divide and conquer: quick sort, merge sort, median and order statistics; elementary data structures: hashing, binary heaps, binary search trees, balanced search trees; graph algorithms: Depth and Breadth first searches, connected components, minimum spanning trees, shortest paths in graphs.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 522 Data Structures and Algorithms II 3.0 Credits

Discussion of algorithm design techniques, augmented data structures including Binomial and Fibonacci heaps and Splay tree; Amortized analysis of data structures, topics in pattern and string matching, network flow problem, matching in bipartite graphs, and topics in complexity theory including reduction and NP-completeness, and approximation algorithms.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 521 [Min Grade: C]

CS 525 Theory of Computation 3.0 Credits

Theory of computation introduces basic mathematical models of computation and the finite representation of infinite objects. These topics covered in the course include: finite automata and regular languages, context free languages, Turing machines, Partial recursive functions, Church's Thesis, undecidability, reducibility and completeness, and time complexity.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 530 Developing User Interfaces 3.0 Credits

This course examines the implementation of multimodal user interfaces within the context of interface design and evaluation. The course involves both practice implementing interfaces using current technologies and study of topical issues such as rapid prototyping, advanced input, and assistive technology.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 536 Computer Graphics 3.0 Credits

An introduction to the basic concepts of computer graphics, with a special emphasis on the mathematical representations of 3D objects (lines, curves, surfaces and solids), as well as the algorithms used to evaluate these objects. Topics such as drawing, clipping, color, viewing, rendering and animation will also be covered.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 537 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 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 540 High Performance Computing 3.0 Credits

Covers the design, evaluation and use of high-performance processors, including instruction set architecture, pipelining, superscalar execution, instruction level parallelism, vector instructions, memory hierarchy, parallel computing including multi-core and GPU, and high-performance I/O. Special attention is given to the effective utilization of these features, including automated techniques, in the design and optimization of performance-driven software.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 543 Operating Systems 3.0 Credits

Covers the classical internal algorithms and structures of operating systems, including CPU scheduling, memory management, and device management. Considers the unifying concept of the operating system as a collection of cooperating sequential processes. Covers topics including file systems, virtual memory, disk request scheduling, concurrent processes, deadlocks, security, and integrity.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 544 Computer Networks 3.0 Credits

To examine computer networks using networking models (TCP/IP, OSI and ATM) and break down computer networking, examine each layer and its duties and responsibilities. To analyze networking protocols and understand the design. To use the Internet and other example protocols to illustrate the theory and operation of each layer.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 550 Programming Languages 3.0 Credits

Covers basic concepts of the design and implementation of programming languages, including data representation and types, functions, sequence control, environments, block structure, subroutines and coroutines, storage management. Emphasizes language features and implementation, not mastery of any particular languages.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 551 Compiler Construction I 3.0 Credits

Provides a thorough study of modern compiler techniques. Topics include scanners, parsers with emphasis on LR parsing, and syntax-directed translation. Requires students to use a parser generator to write a compiler for a non-trivial language. Examines several advanced topics in depth, such as automatic code generation, error recovery, and optimization techniques.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 525 [Min Grade: C]

CS 552 Compiler Construction II 3.0 Credits

Continues CS 551. Examines several advanced topics in depth, such as automatic code generation, error recovery, optimization techniques, data flow analysis, and formal semantics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 551 [Min Grade: C]

CS 558 Game Engine Programming 3.0 Credits

Introduces the general principles and techniques required to build a game engine from scratch. We will cover basic programming techniques for games, but without focusing on any specific programming language nor platform. Topics will include game engine architecture, game loops, real-time 2D and 3D rendering, collision detection, input handling, networking, animation, scripting, Game AI, and 2D and 3D physics simulation. Additionally, students will also gain knowledge of existing game engines, such as OGRE.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 567 Applied Symbolic Computation 3.0 Credits

For users of symbolic computation (maple, mathematica, derive, macsyma) who wish to gain an understanding of fundamental symbolic mathematical methods. Includes introduction to a symbolic mathematical computation system and application to problems from mathematics, science and engineering. Also includes programming and problems specific to symbolic computation.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 570 Programming Foundations 3.0 Credits

Develops an understanding of the principles behind and skill in the practice of programming. For both students with no programming experience and those with a small amount of programming experience, this course will bring them up to speed and prepare them for graduate study in Computer Science.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CS 571 Advanced Programming Techniques 3.0 Credits

Covers the Unix operating system, bash shell programming, awk programming, python programming, and basic principles of software design, testing, and development. Students will learn how to apply software engineering principles and use tools, such as version control, in support of programming. This course provides an introduction to intermediate programming techniques for students with only basic programming experience.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 570 [Min Grade: C]

CS 575 Software Design 3.0 Credits

This course introduces fundamental software design principles and methodologies, covers: software architecture design in general, and focuses on service-oriented architecture in particular. Students will learn most influential papers in software engineering realm, design and implement a service-oriented project, and explore how to apply well-established theoretical principles into modern software design.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 576 Dependable Software Systems 3.0 Credits

Intended for CS and MSSE students; others must obtain departmental permission to enroll. Offers an in-depth treatment of software testing and software reliability, two components of developing dependable software systems. Testing topics include path testing, data-flow testing, mutation testing, program slicing, fault interjection and program perturbation, paths and path products, syntax testing, logic-based testing, testing within the software development process, test execution automation and test design automation tools. Reliability topics include reliability metrics, fault avoidance, cleanroom software development, fault tolerance, exception handling, N-version programming, recovery blocks, formal methods, functional specifications, and Z notation.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 583 Introduction to Computer Vision 3.0 Credits

Theoretical and algorithmic foundation and applications of computer vision. Covered topics include image formation, image sensing, image filtering, lightness, radiometry, motion, image registration, stereo, photometric stereo, shape-from-shading, and recognition with an emphasis on the underlying mathematics and computational models and complexity as well as computational implementation of representative applications through multiple programming assignments.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 590 Privacy 3.0 Credits

This course will motivate the need for privacy protection and introduce basic privacy properties such as anonymity, unlinkability or unobservability. Students will 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 571 [Min Grade: C] (Can be taken Concurrently)CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 610 Advanced Artificial Intelligence 3.0 Credits

Representation, reasoning, and decision-making under uncertainty; dealing with large, real world data sets, learning; and solving problems with time-varying properties; how to apply AI techniques toward building intelligent machines that interact with dynamic, uncertain worlds.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 510 [Min Grade: C]

CS 611 Game Artificial Intelligence 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." Specifically, the topics we will cover in class are basic AI techniques, algorithms, and data structures used for character movement, pathfinding, decision-making, strategy and machine learning in games.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 510 [Min Grade: C]

CS 612 Knowledge-based Agents 3.0 Credits

Fundamentals of agent-based computing; distributed AI; representations; agent communication languages; reasoning (expert, rule-based, case-based, production systems); network communication protocols; emergent behavior; swarm intelligence.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 510 [Min Grade: C]

CS 613 Machine Learning 3.0 Credits

This course studies modern statistical machine learning with emphasis on Bayesian modeling and inference. Covered topics include fundamentals of probabilities and decision theory, regression, classification, graphical models, mixture models, clustering, expectation maximization, hidden Markov models, Kalman filtering, and linear dynamical systems.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 571 [Min Grade: C] (Can be taken Concurrently) CS 520 [Min Grade: C] and CS 570 [Min Grade: C]

CS 615 Deep Learning 3.0 Credits

Introduces a machine learning technique called deep learning and its applications, as well as core machine learning concepts such as data set, evaluation, overfitting, regularization and more. Covers neural network building blocks: linear and logistic regression, followed by shallow artificial neural networks and a variety of deep networks algorithms and their derivations. Includes implementation of algorithms and usage of existing machine learning libraries. Explores the usage of deep learning on a variety of problems including image classification, speech recognition, and natural language processing. Concludes with student-chosen project demonstrations accompanied by a conference-style paper.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 520 [Min Grade: C] and CS 570 [Min Grade: C] and CS 571 [Min Grade: C]

CS 618 Algorithmic Game Theory 3.0 Credits

This course explores, from an algorithmic perspective, problems that arise at the interface of economics and computer science. After a short introduction to game theory, the focus will be on understanding how the incentives of strategic agents may affect these agents' decisions, and on designing mechanisms aiming to improve the outcomes of the interactions among the agents. The topics covered include the design of auctions, matching markets, online advertising markets, fair division, selfish routing, social choice, and preference aggregation.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 521 [Min Grade: C] or CS 522 [Min Grade: C]

CS 620 Advanced Data Structure and Algorithms 3.0 Credits

This course studies how advanced topics are used in the real world and generates an appreciation of where algorithms are used to understand various considerations that make a good algorithm. Topics: data compression, geometrical algorithms in search and indexing, pattern matching, sparse linear systems, applications of linear programming, and computational gene recognition.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 522 [Min Grade: C]

CS 621 Approximation Algorithms 3.0 Credits

Study of techniques for designing approximation solution to NP-hard problems. Classification of problems into different categories based on the difficulty of finding approximately sub-optimal solutions for them. The techniques will include greedy algorithms, sequential algorithms, local search, linear and integer programming, primal-dual method, randomized algorithms, and heuristic methods.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 522 [Min Grade: C]

CS 623 Computational Geometry 3.0 Credits

Introduction to algorithms and Data Structures for computational problems in discrete geometry (for points, lines and polygons) primarily in finite dimensions. Topics include triangulation and planar subdivisions, geometric search and intersections, convex hulls, Voronoi diagram, Delaunay triangulation, line arrangements, visibility, and motion planning.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 521 [Min Grade: C]

CS 630 Cognitive Systems 3.0 Credits

This course explores the principles of cognition and intelligence in human beings and machines, focusing in how to build computational models that, in essence, think and act like people. The course reviews existing frameworks for such models, studies model development within one particular framework, and discusses how models can be employed in real-world domains.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 510 [Min Grade: C] or CS 530 [Min Grade: C]

CS 634 Advanced Computer Vision 3.0 Credits

A research-intensive course on advanced topics that reflect the state-of-the-art of current research activities in computer vision. The course alternates between lectures on the fundamentals of, and paper presentations by the students on, selected topics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 583 [Min Grade: C]

CS 636 Advanced Computer Graphics 3.0 Credits

Rendering techniques (ray tracing, phong, radiosity, photon mapping); texture and bump mapping; particle systems; hierarchical models; photorealism; non-photorealistic rendering; mathematical structures for graphics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 536 [Min Grade: C] or CS 537 [Min Grade: C]

CS 643 Advanced Operating Systems 3.0 Credits

In-depth examination of operating systems issues expanding on topics covered in CS 543 (Operating Systems) including: Kernel services, memory management, input/output, file systems, interprocess communication, networking, device drivers, system initialization. Included discussion of production systems such as BSD Unix and Microsoft Windows.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 543 [Min Grade: C]

CS 759 Complexity Theory 3.0 Credits

Introduces formal models of computation, including inherent difficulty of various problems, lower bound theory, polynomial reducibility among problems, Cook's theorem, NP-completeness, and approximation strategies.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CS 525 [Min Grade: C]

CS 770 Topics in Artificial Intelligence 3.0 Credits

Covers issues in robotics, vision, and pattern recognition.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

Prerequisites: CS 610 [Min Grade: C]

CS 780 Advanced Topics in Software Engineering 3.0 Credits

A research-intensive course on advanced topics in software engineering suitable for students who are either pursuing or intend to pursue an advanced degree (M.Sc or Ph.D.) in software engineering. Although the specific topics in the course will vary, students will be asked to survey and study the academic literature in an area of software engineering, and work toward projects that have the potential to evolve into long-term research efforts.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 3 times for 9 credits

Prerequisites: CS 575 [Min Grade: C] or CS 576 [Min Grade: C]

CS 898 Master's Thesis 1.0-12.0 Credit

Master's thesis.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CS 997 Research in Computer Science 1.0-12.0 Credit

Research.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS 998 Ph.D. Dissertation 1.0-12.0 Credit

Hours and credits to be arranged.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 20 times for 45 credits

CS I599 Independent Study in CS 0.0-9.0 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 I699 Independent Study in Computer Science 1.0-6.0 Credit

Independent study in computer science under faculty supervision. After finding a willing Computer Science Department faculty supervisor and working out the term of study, students obtain approval to take this course from the department's graduate advisor.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 3 times for 18 credits

CS I799 Independent Study in CS 0.0-9.0 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 I899 Independent Study in CS 0.0-9.0 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 I999 Independent Study in CS 0.0-9.0 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 T580 Special Topics in CS 0.0-9.0 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 T680 Special Topics in Computer Science 0.0-12.0 Credits

Special Topics Covers topics of special interest to students and faculty.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

CS T780 Special Topics in CS 0.0-9.0 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 T880 Special Topics in CS 0.0-12.0 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 T980 Special Topics in CS 0.0-9.0 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

Computing & Security Technology

Courses

CST 510 Ethics, Privacy and Legal Issues 3.0 Credits

This course will provide an in-depth working knowledge of the ethics and laws pertaining to information systems security. Topics include the ethics of privacy, confidentiality, authenticity, medical information, copyright, intellectual freedom, censorship, social networking and cyberbullying. Issues related to creation, implementation, enforcement, and assessment of institutional codes of ethics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is MS.

CST 530 Applied Cryptography 3.0 Credits

Introduction to modern cryptographic techniques, algorithms and protocols related to the design and implementation of security-critical applications. Theory, methodology and hands-on lab projects necessary for students to design and implement security solutions utilizing cryptography. Topics include design and analysis of block and stream ciphers, hash functions and their uses, message authentication codes, authentication protocols, symmetric key and public key techniques, pseudo-random number generation, key establishment, key management, digital certificates and secret sharing.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is MS.

CST 540 Intrusion Detection 3.0 Credits

Theory and practice of intrusion detection and prevention (IDS) as part of an organization's overall security posture. Topics include network-based, host-based, and hybrid intrusion detection and prevention, attack pattern identification, damage assessment, data forensics, system recovery, continuity of operation and policy and legal issues surrounding the use of IDS.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is MS.

CST 604 Technology for Homeland Security 3.0 Credits

Presents the theory and methodology necessary to obtain a working knowledge of the strategic use of network-centric software for data aggregation, integration, collaboration, categorization, and pattern-recognition by homeland security defense. Topics include technology process, data mining, network-centric software, pattern recognition, and technology sensors. Students will conduct research on select topics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CST 609 National Security Intelligence 3.0 Credits

This course will present a broad overview of the intelligence community, objectives, methodology, organizational structure and role within the government. Topics include the intelligence process, organizational structure, collections, analysis, covert action, intelligence reform, foreign intelligence, and accountability. Students will conduct research on select topics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CST 614 Counterintelligence 3.0 Credits

This course will present the theory, techniques and procedures within the counterintelligence community. Objectives, methodology, organizational structure and role within government will be stressed. Topics include the mission, investigations, techniques, collection, analysis, counter-human intelligence techniques, counter-signals intelligence techniques and counter-imagery intelligence techniques. Students will conduct research on select topics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

CST I599 Independent Study in CST 0.0-9.0 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

CST I699 Independent Study in CST 0.0-9.0 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

CST T580 Special Topics in CST 0.0-9.0 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

CST T680 Special Topics in CST 0.0-9.0 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

Construction Management

Courses

CMGT 501 Leadership in Construction 3.0 Credits

This course is intended to introduce students to value-based, effective leadership principles and practices across the construction industry. Topics include prevailing theory, leadership traits & styles, emotional intelligence, motivation, collaborative environs and alliances, and change.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 505 Construction Accounting and Financial Management 3.0 Credits

This course presents the principles of accounting for construction projects. Topics include techniques of cost accounting and financial analysis employed by the construction practitioners. Specific topics include accounting principles to track and manage labor, material, equipment, overhead and other construction resources. Topics specific to construction include contract revenue, financial reporting, and tax considerations for conductors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 510 Construction Control Techniques 3.0 Credits

This course addresses the knowledge and skill sets required to successfully plan and control complex construction projects. Topics include procurement and contracts, pre-bid planning, contract budgets and cash flow, and planning case studies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 512 Cost Estimating and Bidding Strategies 3.0 Credits

This is an advanced course in construction estimating addressing competitive bidding strategies. Topics include profit objectives, analyzing the competition, and determining optimum combo of price, cost and volume.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 515 Risk Management in Construction 3.0 Credits

This course presents risk management techniques and practices specific to construction projects. Students will gain an understanding of the risks stemming from technical and business sources related to the construction process, and to identify, quantify, and develop the appropriate response strategies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 525 Applied Construction Project Management 3.0 Credits

This course presents the knowledge and skills required to successfully manage complex construction projects. Topics include the project management hard skills such as estimating and budgeting, time management, and planning.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CMGT 501 [Min Grade: C]

CMGT 528 Construction Contract Administration 3.0 Credits

This course introduces the managerial and legal aspects of construction contract administration. The student is introduced to basic concepts of contract law employed in construction and the rules of interpretation. Topics include changes and change orders, disputes, differing site conditions, and defective documents.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 530 Equipment Applications and Economy 3.0 Credits

This course provides an in-depth treatment of heavy construction equipment applications and covers the associated management practices. The application topics include techniques used to analyze and estimate equipment productivity, equipment selection, and optimization. The course includes a strong emphasis in equipment economics including owning and operating costs.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 532 International Construction Practices 3.0 Credits

This course provides an introduction to the strategic issues relating to the business of construction on a global scale. The course is intended to provide students with the knowledge of current best practices by construction organizations in America, Europe and Asia.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 535 Community Impact Analysis 3.0 Credits

This course provides an overview of community impact assessment, including the benefits of conducting such an assessment. It also provides general guidelines for conducting a community impact assessment, including types of impacts that should be addressed during the process and related issues.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 538 Strategic Management in Construction 3.0 Credits

This course presents concepts in strategic management within construction organizations. Topics include clients/constructors/competencies, portfolio management, and marketing strategies for construction firms.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 540 Schedule Impact Analysis 3.0 Credits

This is an advanced course that deals with the legal aspects of construction schedules. Topics include time impact analysis, applying CPM techniques to contract claims, and calculating delay damages.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CMGT 510 [Min Grade: C]

CMGT 545 Sustainable Principles & Practices 3.0 Credits

This course addresses the fundamentals of green building concepts and practices underlying sustainable construction from the perspective of the LEED Green Building rating system.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 546 Sustainable Technologies 3.0 Credits

This course addresses sustainable technologies in the built environment and is presented as a whole building design system. The course is organized into three major categories-Design Guidance, Project Management, and Operations & Maintenance.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 547 LEED Concepts 3.0 Credits

This course addresses the fundamental concepts and practices underlying the LEED green building rating system.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 548 Quality Management and Construction Performance 3.0 Credits

This course covers quality management of construction processes. Topics include designing and implementing quality management plans, establishing a quality management system and Information technology in quality management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CMGT 501 [Min Grade: C]

CMGT 550 Productivity Analysis and Improvement 3.0 Credits

The focus of this course is construction productivity measurement and improvement. Topics include roles of the individual stakeholders, quantifying labor and equipment productivity, and techniques to improve job site productivity.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 558 Community Sustainability 3.0 Credits

This course provides clear direction to students how to design cities and developments that are sustainable and reduce environmental harm.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 696 Capstone Project in Construction Management I 3.0 Credits

The capstone project is completed independently over two quarters under the direction of full-time Construction Management faculty and is intended to reinforce the knowledge and skills acquired through graduate study.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

CMGT 697 Capstone Project in Construction Management II 3.0 Credits

The capstone project is completed independently over two quarters under the direction of full-time Construction Management faculty and is intended to reinforce the knowledge and skills acquired through graduate study.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: CMGT 696 [Min Grade: C]

CMGT T580 Special Topics in Construction Management 3.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: College of Engineering

Repeat Status: Can be repeated 2 times for 9 credits

Cooperative Management

Courses

COOP 500 Career Management and Professional Development for Master's Degree Students 1.0 Credit

Prepares master's degree students enrolled in the co-op program to achieve success, personally and academically, in their cooperative education experience. Topics covered include career exploration, resume development, interview techniques, job search strategies, success in the workplace, and professionalism.

College/Department: University Courses

Repeat Status: Not repeatable for credit

COOP 501 Co-op Experience for Master's Degree Students 9.0 Credits

Cooperative Education program for master's degree students in select majors.

College/Department: University Courses

Repeat Status: Can be repeated 1 times for 18 credits

COOP 995 Graduate CO-OP Companion Course 1.0-9.0 Credit

A non-billable course that is paired with CO-OP 501 or CO-OP 601 to reflect the true commitment to experiential learning expected in those two courses. Applies to Master's Level Co-Op Programs in LeBow College of Business, College of Engineering; School of Biomedical Engineering, Information Science, and Health Systems.

College/Department: University Courses

Repeat Status: Can be repeated multiple times for credit

Couple & Family Therapy

Courses

CFTP 500 Introduction to Systems Theory 4.0 Credits

This course will present an overview of systems theory, particularly general systems theory and cybernetics. This course will include a critique of system theory from a feminist and cross-cultural perspective.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 501 Introduction to Family Therapy 4.0 Credits

The purpose of this course is to introduce the student to major family therapy theories and their relationship to general systems theory and cybernetics.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 502 Introduction to Family Therapy II 3.0 Credits

This course will include contemporary and evidence based family therapy models. Students must have successfully completed Systems Theory and Introduction to Family Therapy I prior to enrolling in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX or major is FATX.

Prerequisites: CFTP 501 [Min Grade: C] and CFTP 500 [Min Grade: C]

CFTP 503 Historical and Sociocultural Influences 4.0 Credits

This course will introduce students to an examination of the family in a broader social cultural context. This class will explore how sociocultural concepts define and affect social, interpersonal and professional interactions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

CFTP 504 Sociocultural Influences II 3.0 Credits

This course will teach students how to develop culturally competent couple and family therapy models. Special attention to issues of power, privilege and oppression will be infused throughout the course. Students must successfully complete Sociocultural Influences I prior to enrolling in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 503 [Min Grade: C]

CFTP 505 Bowen Theory 4.0 Credits

This course offers a brief review of the history and development of the life work of Murray Bowen, M.D., an overview of the resulting theory of human behavior, Bowen Theory, and use of its interactive components in clinical, research and organizational applications.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 506 Contextual Theory and Therapy 4.0 Credits

This course introduces students to present the basic tenets of Contextual Therapy and Clinical applications.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 507 Collaborative Approaches 4.0 Credits

This course is designed to introduce students to a variety of postmodern theoretical trends in the family therapy field.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 508 Structural Family Therapy 4.0 Credits

This course is designed to introduce students to the practice and principles of Structural Family Therapy. This course will identify interventions related to structural theory and person of the therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 509 Couples Therapy 4.0 Credits

This course will introduce students to the theory and practice of couple therapy. Couple theories, research, clinical practice and techniques will be studies and critiqued.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 510 Sex Therapy 4.0 Credits

This course will introduce students to the theory and practice of sex therapy. Sexual disorders and sexuality will be addressed from the perspective of the individual, couple and family or origin.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 509 [Min Grade: C] (Can be taken Concurrently)

CFTP 511 Object Relations Theory 4.0 Credits

The focus of this course is to understand Object Relations Theory, and its application to the treatment of individuals, couples and families.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 512 Behavioral Models of Family Therapy 4.0 Credits

This course introduces the basic behavioral approaches to Couple and Family Therapy. It includes an exposure to Behavioral Marital, Cognitive-Behavioral, Behavioral Family Therapy applications.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 513 DSM I: Adult Psychopathology 3.0 Credits

This is a survey of the major categories of adult psychopathological disturbance in the DSM-TR classification system. This course emphasizes the dynamics of diagnosis and biological treatment in relational therapy.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 514 DSM II: Child Psychopathology 3.0 Credits

This is a survey of the major categories of child psychopathological disturbances in the DSM-TR classification system. This course emphasizes the dynamics of diagnosis and biological treatments in relational therapy.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 513 [Min Grade: C]

CFTP 515 Introduction to Psychopharmacology 4.0 Credits

This course is designed to present a history and the most current trends in biological treatments in psychiatric disorders. While it focuses on biological treatments the students concurrently will be exposed to historical and contemporary trends in the philosophy and practice of psychopharmacology in the profession.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 516 Behavioral/Process Addictions 4.0 Credits

The process of behavioral addiction will be examined in the context of the family and the larger social system. Process addictions such as sex, gambling, food, exercise, spending, and shopping will be covered in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 517 Addictions in The Family 4.0 Credits

The process of addiction will be examined in the context of the family and the larger social system. A wide exposure to theory and treatment models will be utilized to aid students' assessment and intervention skills in treating families with substance abuse issues.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 518 Medical Family Therapy 4.0 Credits

This course is designed to prepare family therapists and other health professionals to work collaboratively in addressing the unique psychosocial problems of individuals, couples and families with acute and chronic medically related concerns.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

CFTP 519 Family Violence 4.0 Credits

This course will introduce students to research and practice of partner violence in the field of couple and family therapy.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 520 Family Life Cycle 4.0 Credits

This course integrates the interface of individual development with the social structure of coupling and family in family life cycle framework.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

CFTP 521 Human Development 4.0 Credits

This course will introduce students to the foundations of human development. It is designed to engage students in discussions of both traditional and contemporary human development models.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 522 Legal and Ethical Implications in Couple and Family Therapy Practice 4.0 Credits

This course will introduce students to ethical and legal issues that may arise in couple and family therapy treatment including confidentiality and its limits, record keeping, custody cases, abuse, privilege, licensure and informed consent.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

CFTP 523 Legal and Ethical Implications in Couple and Family Therapy Practice II 3.0 Credits

This course is a continuation of Legal and Ethical Implications I. Students must successfully complete Legal and Ethical Implications I prior to enrolling in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 522 [Min Grade: C]

CFTP 524 Research I: Family Evaluation 3.0 Credits

This course focuses on issues in the clinical assessment of individuals, couples, and families. Assessment will be considered through a multi-method approach that includes: qualitative interview, observational, clinician-rated or global rating scales, and self report inventories.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

CFTP 525 Research in Couple and Family Therapy 4.0 Credits

This course focuses on research methods for couple and family therapy, and is designed to review contemporary family research methods through a multi-method approach. Issues in the clinical assessment of individuals, couples, and families will be explored from diverse contextual variables.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

CFTP 526 Person of the Therapist Experience I 2.0 Credits

Students will use the Person of the Therapist Training Model to actively explore self of the therapist development. This course is designed to help students develop an awareness of the self within one's own family of origin.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 530 [Min Grade: C] (Can be taken Concurrently)

CFTP 527 Person of the Therapist Experience II 2.0 Credits

This course is a continuation of Therapist Experience I: Person of the Therapist Training. Students will use the Person of the Therapist Training Model to actively explore self of the therapist development.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 531 [Min Grade: C] (Can be taken Concurrently)CFTP 526 [Min Grade: C]

CFTP 528 Person of the Therapist Experience III 2.0 Credits

This course is a continuation of Therapist Experience I & II: Person of the Therapist Training. Students will use the Person of the Therapist Training Model to actively explore self of the therapist development.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 532 [Min Grade: C] (Can be taken Concurrently)CFTP 526 [Min Grade: C] and CFTP 527 [Min Grade: C]

CFTP 529 Family Policy 4.0 Credits

The purpose of this course is to enhance student's awareness of policies that affect families in society. It will focus on policy development and process, and the role of policy in addressing family problems. Critical issues in family policy, particularly as it relates to diverse family structures and culture will also be explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 530 Clinical Practicum/Supervision I 1.0-2.0 Credit

The purpose of the first-year practicum is for the students to develop foundational skills necessary for the practice of couple and family therapy. Students are expected to spend one hour weekly in on-site supervision (which may be a non-AAMFT-approved supervisor); in addition, students spend one hour weekly in off-site supervision, and/or 2 hours weekly in group supervision (with an AAMFT-approved supervisor). An average of 8-10 client contact hours is expected each week for MFT students, with 10-12 client contact hours each week for PMC students. Students must successfully complete practicum orientation in order to enroll in this course and subsequently complete each practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Corequisite: CFTP 539

CFTP 531 Clinical Practicum/Supervision II 1.0-2.0 Credit

The purpose of the first-year practicum is for the students to develop foundational skills necessary for the practice of couple and family therapy. Students are expected to spend one hour weekly in on-site supervision (which may be a non-AAMFT-approved supervisor); in addition, students spend one hour weekly in off-site supervision, and/or 2 hours weekly in group supervision (with an AAMFT-approved supervisor). An average of 8-10 client contact hours is expected each week for MFT students, with 10-12 client contact hours each week for PMC students. Students must successfully complete practicum orientation in order to enroll in this course and subsequently complete each practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 530 [Min Grade: CR]

CFTP 532 Clinical Practicum/Supervision III 1.0-2.0 Credit

The purpose of the first-year practicum is for the students to develop foundational skills necessary for the practice of couple and family therapy. Students are expected to spend one hour weekly in on-site supervision (which may be a non-AAMFT-approved supervisor); in addition, students spend one hour weekly in off-site supervision, and/or 2 hours weekly in group supervision (with an AAMFT-approved supervisor). An average of 8-10 client contact hours is expected each week for MFT students, with 10-12 client contact hours each week for PMC students. Students must successfully complete practicum orientation in order to enroll in this course and subsequently complete each practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 531 [Min Grade: CR]

CFTP 533 Clinical Practicum/Supervision IV 1.0-2.0 Credit

The purpose of the first-year practicum is for the students to develop foundational skills necessary for the practice of couple and family therapy. Students are expected to spend one hour weekly in on-site supervision (which may be a non-AAMFT-approved supervisor); in addition, students spend one hour weekly in off-site supervision, and/or 2 hours weekly in group supervision (with an AAMFT-approved supervisor). An average of 8-10 client contact hours is expected each week for MFT students, with 10-12 client contact hours each week for PMC students. Students must successfully complete practicum orientation in order to enroll in this course and subsequently complete each practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX or major is FATX.

Prerequisites: CFTP 532 [Min Grade: CR]

CFTP 534 Clinical Practicum/Supervision V 1.0-2.0 Credit

The purpose of the second-year practicum is for the students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to spend one hour weekly in on-site supervision (which may be a non-AAMFT-approved supervisor); in addition, students spend one hour weekly in off-site supervision, and/or 2 hours weekly in group supervision (with an AAMFT-approved supervisor). An average of 8-10 client contact hours is expected each week for MFT students and 10-12 client contact hours each week for PMC students. Students must successfully complete CFTP 530-533 to enroll in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 533 [Min Grade: CR]

CFTP 535 Clinical Practicum/Supervision VI 1.0-2.0 Credit

The purpose of the second-year Practicum is for the students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to spend one hour weekly in on-site supervision (which may be a non-AAMFT-approved supervisor); in addition, students spend one hour weekly in off-site supervision, and/or 2 hours weekly in group supervision (with an AAMFT-approved supervisor). An average of 8-10 client contact hours is expected each week for MFT students and 10-12 client contact hours each week for PMC students. Students must successfully complete CFTP 530-534 to enroll in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 534 [Min Grade: CR]

CFTP 536 Clinical Practicum/Supervision VII 1.0-2.0 Credit

The purpose of the second-year practicum is for the students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to spend one hour weekly in on-site supervision (which may be a non-AAMFT-approved supervisor); in addition, students spend one hour weekly in off-site supervision, and/or 2 hours weekly in group supervision (with an AAMFT-approved supervisor). An average of 8-10 client contact hours is expected each week for MFT students and 10-12 client contact hours each week for PMC students. Students must successfully complete CFTP 530-535 to enroll in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CCFT or major is CFTX or major is FATX.

Prerequisites: CFTP 535 [Min Grade: CR]

CFTP 537 Nosology & Couple and Family Therapy Practice 4.0 Credits

This course focuses on the principles of individual diagnosis of mental illness as defined in DSM IV and the implications for relational theory.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 539 Clinical Readiness Seminar 3.0 Credits

The purpose of this first-year course is to develop foundational clinical skills in couple and family therapy necessary to prepare a student for their clinical readiness evaluation, as part of the Simulation Lab learning experience, and to support their initial clinical placement. Students must successfully complete their Simulation Lab learning experience, in addition to the course assignments, in order to pass the course.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 6 credits

CFTP 540 Child Therapy in Couple and Family Therapy 3.0 Credits

This course provides students with an expanded exposure to working with children, individually and in the context of family or social group. It examines a variety of conceptual bases for working with children and adolescents, considers the expression of different diagnostic categories, and examines therapist strategies for the different diagnoses, based on the therapist conceptual base. Issues of client development, family situation, and cultural context will be examined in relation to possible therapeutic strategies.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 6 credits

CFTP 541 Live Supervision Group 2.0 Credits

This course serves as an integrative link between theory and practice for the graduate student who is engaged in meeting the practicum requirements of the program. CFT interns will carry a case load in the CFT clinical practices. It allows students immediate feedback from a program supervisor concerning the many situations encountered in the process of training to be couple and family therapists. In addition, issues of therapist self-care and ethical practice remain on the forefront throughout the clinical experience.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 4 credits

CFTP 542 Professional Development Seminar 1.0 Credit

This course addresses professional expectations and resources students can expect to find as they graduate from the program.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 543 Capstone Project 1.0 Credit

This course provides a forum for students to present the capstone projects that they have been developing throughout the program, integrating the principles of self-of-therapist, respect for diversity, and commitment to social justice in a personal reflective statement.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 2 credits

CFTP 544 Clinical Practicum/Supervision VIII 1.0-9.0 Credit

The purpose of the second year Practicum is for the student to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 18 credits

Prerequisites: CFTP 536 [Min Grade: CR]

CFTP 545 Clinical Practicum/Supervision IX 1.0-9.0 Credit

The purpose of the second year Practicum is for the student to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 544 [Min Grade: CR]

CFTP 546 Clinical Practicum/Supervision X 1.0-9.0 Credit

The purpose of the second year Practicum is for the student to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 545 [Min Grade: CR]

CFTP 547 Clinical Practicum/Supervision XI 1.0-9.0 Credit

The purpose of the second year Practicum is for the student to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 18 credits

Prerequisites: CFTP 546 [Min Grade: CR]

CFTP 548 Clinical Practicum/Supervision XII 1.0-9.0 Credit

This directed course may be offered when a student wishes to pursue a particular personal goal, or when remedial action needs to be taken, based on a student's past clinical performance. The directed study will be designed by the Director of Clinical Training, with input from the student, and in consultation with the Director of the Program and the student's clinical supervisors.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 536 [Min Grade: CR]

CFTP 549 Clinical Practicum/Supervision XIII 1.0-9.0 Credit

This directed course may be offered when a student wishes to pursue a particular personal goal, or when remedial action needs to be taken, based on a student's past clinical performance. The directed study will be designed by the Director of Clinical Training, with input from the student, and in consultation with the Director of the Program and the student's clinical supervisors.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 539 [Min Grade: CR]

CFTP 550 Clinical Practicum/Supervision XIV 1.0-9.0 Credit

This clinical directed study course may be offered when a student wishes to pursue a particular personal goal, or when remedial action needs to be taken, based on a student's past clinical performance. The directed study will be designed by the Director of Clinical Training, with input from the student, and in consultation with the Director of the Program and the student's clinical supervisors.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 539 [Min Grade: CR]

CFTP 561 Group Supervision / Practicum I 2.0 Credits

The purpose of the second-year practicum is for the students to develop foundational skills necessary for the practice of couple and family therapy. Students are expected to spend two hours weekly in group supervision (with an AAMFT-Approved Supervisor or Candidate). An average of 8-12 client contact hours is expected each week for MFT students, with 10-12 client contact hours each week for PMC students.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 562 Group Supervision / Practicum II 2.0 Credits

The purpose of the second-year practicum is for the students to develop foundational skills necessary for the practice of couple and family therapy. Students are expected to spend two hours weekly in group supervision (with an AAMFT-Approved Supervisor or Candidate). An average of 8-12 client contact hours is expected each week for MFT students, with 10-12 client contact hours each week for PMC students.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 563 Group Supervision / Practicum III 2.0 Credits

The purpose of the second-year practicum is for the students to develop foundational skills necessary for the practice of couple and family therapy. Students are expected to spend two hours weekly in group supervision (with an AAMFT-Approved Supervisor or Candidate). An average of 8-12 client contact hours is expected each week for MFT students, with 10-12 client contact hours each week for PMC students.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 564 Group Supervision / Practicum IV 2.0 Credits

The purpose of the second-year practicum is for the students to develop foundational skills necessary for the practice of couple and family therapy. Students are expected to spend two hours weekly in group supervision (with an AAMFT-Approved Supervisor or Candidate). An average of 8-12 client contact hours is expected each week for MFT students, with 10-12 client contact hours each week for PMC students.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 606 Contextual Family Therapy 3.0 Credits

This course introduces students to the basic tenets and clinical implications of Contextual Therapy including but not limited to assessment, intervention, and treatment implications.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 610 Sex Therapy 3.0 Credits

This course introduces students to the theory and practice of sex therapy. Sexual disorders and sexuality will be addressed from the perspective of the individual, couple, and family of origin.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 509 [Min Grade: C] (Can be taken Concurrently)

CFTP 711 Research I: Conceptual Basis 3.0 Credits

Identification of the theoretical basis for family systems research. Ethical and social context issues in family system research. Conceptual structure of the research process and description.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 712 Family Theory 3.0 Credits

Comparative analysis of major theories of family life and development, including social context issues involved in the assessment and understanding of family interaction.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 713 Introduction to CFT Clinical Research 3.0 Credits

This course provides an overview of seminal and current couple and family therapy clinical research. This course will review debates around the value, training and dissemination of empirically supported treatments and philosophical underpinnings of the scientific enterprise. We will also examine research from the perspective of culture, race and gender and how these sociopolitical issues impact the interpretation of science. The significance of the research process and empirical evidence to couple and family therapy practice will be explored, with reference to "common factors" and evidence-based research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 714 Professional Development Seminar I 2.0 Credits

Self of the therapist and issues in the development of PhD-level professionals. Identification of program, college, and university academic resources. Identification of professional organizations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 715 Quantitative Methods 4.0 Credits

Identification of various strategies for utilizing quantitative research methodology in family studies, including difference in research design, sampling, instruments, and data collection.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 716 Advanced Family Therapy Theory and Practice 3.0 Credits

Advanced comparative analysis of historical and contemporary approaches to family therapy theory and their practical application, with particular reference to social context implications.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 712 [Min Grade: C]

CFTP 717 Couple and Family Therapy Assessment and Diagnosis 3.0 Credits

Introduction to the theory and development of instruments designed to assess relational functioning of couples and families, including research evidence and social context implications.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 718 Professional Development Seminar II 2.0 Credits

Self of the therapist and issues in the development of PhD-level professionals. Preparation of presentations and publications for submission to professional conferences and journals.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 714 [Min Grade: C]

CFTP 719 Qualitative Methods 4.0 Credits

Identification of various strategies for utilizing qualitative research methodology in family studies, including differences in research design, sampling, and data collection.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 720 Couple Therapy Theory & Practice 3.0 Credits

Advanced comparative analysis of historical and contemporary approaches to couple therapy theory and their practical application, with particular reference to social context implications.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 712 [Min Grade: C]

CFTP 721 Critical Theory in Couple and Family Therapy 3.0 Credits

Comparative analysis of postmodern critical theories (e.g., critical race theory, feminist theory, queer theory) of family interaction and development.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 712 [Min Grade: C]

CFTP 722 Professional Development Seminar III 2.0 Credits

Self of the therapist and issues in the development of PhD-level professionals. Teaching couple and family therapy.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 714 [Min Grade: C] and CFTP 718 [Min Grade: C]

CFTP 724 Multicultural Approach to Couple and Family Therapy 4.0 Credits

Develops cultural awareness and competency in working with families around issues of race and class.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 725 Trauma and Families 4.0 Credits

Assessment of the impact of both acute and chronic trauma on family members and the response of the family system. Both internal trauma (domestic violence) and external trauma investigated.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 726 Professional Development Seminar IV 2.0 Credits

Self of the therapist and issues in the development of PhD-level professionals. Understanding academia, and the tenure process.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 714 [Min Grade: C] and CFTP 718 [Min Grade: C] and CFTP 722 [Min Grade: C]

CFTP 728 Research V: Advanced Qualitative Data Analysis 3.0 Credits

Understanding and using software for qualitative data analysis in family studies. Subjects covered related to current or proposed student projects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 711 [Min Grade: C] and CFTP 715 [Min Grade: C] and CFTP 719 [Min Grade: C] and RHAB 759 [Min Grade: C]

CFTP 729 Diverse Families and Communities: Intervention Strategies 3.0 Credits

This course will increase student's knowledge about social context impact clinical interventions and clinical research. Students will examine the importance of research with culturally diverse populations and consider how contextual issues influence CFT clinical practice and research. Specifically, students will examine how contextual variables such as gender, class, sexual orientation, immigration, religion, race, ethnicity, and are considered in the context of clinical practice and research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 730 Gender and Sexual Orientation 4.0 Credits

This course covers gender and sexual orientation with special attention given to the intersection of race, class, culture, ethnicity, religion, age, and ability.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 731 Professional Development Seminar V 2.0 Credits

Self of the Therapist issues in the development of PhD-level professionals. Understanding the grant writing process.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 714 [Min Grade: C] and CFTP 718 [Min Grade: C] and CFTP 722 [Min Grade: C] and CFTP 726 [Min Grade: C]

CFTP 732 Advanced Quantitative Research Design 4.0 Credits

The development of a research proposal, utilizing principally a quantitative methodology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 716 [Min Grade: C]

CFTP 733 Advanced Qualitative Research Design 4.0 Credits

The development of a research proposal, utilizing principally a qualitative methodology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 719 [Min Grade: C]

CFTP 734 Supervision in Couple and Family Therapy 4.0 Credits

Preparation for supervising trainees in couple and family therapy, from a systemic perspective. Exploration of supervision models and modalities; development of a personal model of supervision.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 735 Family Healthcare Policy 3.0 Credits

This course examines historical and contemporary trends in family healthcare policy, emphasizing healthcare disparities and the socio-political implications for families in different social positions while examining the intervene role of family therapy in larger eco-systemic issues. Furthermore, this course will explore individual and family health, specifically across the contexts of gender, race, and class. Factors influencing health policy (e.g., politics, media, interests groups, religion, think tanks) will additionally be explored, along with health disparities and health equality in the American health care system.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 736 Professional Development Seminar VI 2.0 Credits

Self of the therapist issues in the development in PhD-level professionals. Ethics in CFT supervision and teaching.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

Prerequisites: CFTP 714 [Min Grade: C] and CFTP 718 [Min Grade: C] and CFTP 722 [Min Grade: C] and CFTP 726 [Min Grade: C] and CFTP 731 [Min Grade: C]

CFTP 741 Religion, Spirituality and Couple and Family Therapy 4.0 Credits

Examines the organizing influence of personal belief system for both the therapist and family. The role of religious practices and differences between therapist and family investigated.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 742 Couples Sexual Therapy 3.0 Credits

Explores the definition of "normal" sexual functioning, and the assessment and treatment of sexual dysfunction in couples therapy.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CFTX.

CFTP 753 Introduction to Emotionally Focused Therapy 4.0 Credits

Students will examine, apply, and critically analyze the theoretical underpinnings of Emotionally Focused Couple Therapy (EFT). This course is designed to help students conceptualize couples distress from an attachment perspective, assist them identifying ways to help partners reprocess emotional responses that maintain couple distress, shape key new interactions and bonding events, and overcome therapeutic impasses. The organization of the course includes observation of live therapy sessions, presentations of theoretical and clinical techniques, skills training exercises, and case consultation. This course follows the guideline of Externship in Emotionally Focused Couple Therapy as part of training requirements for EFT certification.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 754 Core Skills in Emotionally Focused Therapy 4.0 Credits

Students will expand the breadth of knowledge and clinical skills developed in the EFT introductory course through didactic learning, theoretic presentation, and clinical supervision of live or videotaped therapy sessions. This course consists of small groups (approx. 12-16 people) learning the skills essential to the practice of EFT. Students are required to have completed Intro to EFT or an EFT externship and be willing to present their own work through audio/videotape presentation. The organization of the course includes observation of live therapy sessions, presentations of theoretical and clinical techniques, skills training exercises, and case consultation. This course follows the guideline of Externship in Emotionally Focused Couple Therapy as part of training requirements for EFT certification.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 753 [Min Grade: B]

CFTP 755 Introduction to Attachment-based Family Therapy 3.0 Credits

Students will examine and critically analyze the theoretical underpinnings and clinical structure of Attachment Based Family Therapy (ABFT). We will use readings, lecture, recordings of therapy, and role play to understand how this empirically supported therapy model unfolds over the course of treatment. How to use attachment theory, emotion regulation, trauma resolution and behavioral change as key therapeutic mechanism of change will be examined and applied. This course should provide the basic foundation for applying this model to work with trouble adolescents.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 6 credits

CFTP 756 ABFT Core Skills Advanced Course 3.0 Credits

Students will expand the breadth of knowledge and clinical skills developed in the ABFT introductory course through didactic learning, theoretic presentation, and clinical supervision of live or videotaped therapy sessions. Building on the introductory ABFT course (755) students will learn more advanced ABFT theory and technique. Students will simultaneously see ABFT appropriate patients in the student outpatient clinic at 3020 Market Street. Course activities include observation of live therapy sessions, presentations of theory and clinical techniques, skills training exercises, and case consultation. This course follows the guidelines of Advanced Core Skills Training in Attachment-Based Family Therapy as part of training requirements for ABFT certification.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 755 [Min Grade: C]

CFTP 757 Attachment, Emotions and Psychotherapy 3.0 Credits

This course examines attachment theory and theories of emotional development and their implications for therapeutic work with individuals, couples, and families. This course provides an in-depth understanding of the importance of parent child attachment and the role it plays in the development of emotion regulation skills across the lifespan. Students will learn how attachment theory and emotion regulation can inform therapeutic work with individuals, couples, and families. Students will study issues related to contextual variables, diverse culture, and attachment theory.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 758 Dyadic Analysis and Longitudinal Causal Modeling in CFT 3.0 Credits

The purpose of this course is to introduce students to causal/structural equation modeling (SEM) in the field of family therapy for dyadic analysis issues. This course will illustrate the uses of structural equation models for dyadic, cross-sectional, longitudinal, and experimental data analysis. Major activities include a combination of lectures, group discussions, and software applications and interpretations. The course will cover an introduction to SEM with an emphasis on dyadic analysis, building, specifying, estimating, and testing models, confirmatory factor analysis, invariance testing, full SEM models and related techniques. The course is organized to take students through each of the cumulative steps in the analysis: 1) deciding which type of model is appropriate; 2) setting up the data file and cod.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 759 Psychotherapy Outcome and Process Research 3.0 Credits

This course examines the methodological foundations of psychotherapy outcome and process research, specifically related to family based interventions. The course will define and demonstrate methods pertaining to efficacy, effectiveness, and dissemination/implementation science. The course will focus sample selection, sample size and statistical power, assessment, random assignment, study design, comparison groups, and treatment fidelity. The first five weeks focus will focus on randomized clinical trials; the second five weeks will focus on processes research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 760 Teaching Practicum 2.0 Credits

The teaching practica involves observation, mentoring, participation in classroom teaching, and planning/teaching one course section. Students and their advisors/mentors will develop contracts that identify individualized learning outcomes of the practica. The student will participate in teaching a course within the College of Nursing and Health Profession with a graduate faculty member advising and mentor. The teaching practica will include the student teaching a course, developing learning activities and assignments, evaluating student performance, and evaluating their own teaching performance.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 761 Advanced Clinical Practicum/Supervision 2.0 Credits

This course prepares doctoral students to develop advanced skills necessary for the practice of couple and family therapy. Students engage in one hour of on-site supervision, and 8-10 client contact hours each week for three terms. Students must successfully complete all compliance requirements in order to enroll in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

CFTP 770 Capstone Project I 2.0 Credits

The Capstone Project facilitates the student's ability to articulate and demonstrate how the knowledge and skills of an advanced Couple and Family Therapist can be applied to a problem that affects a couple, family, or community. In this first of three capstone courses, the student works with a faculty mentor to conceptualize a problem and proposes an action plan.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Corequisite: CFTP 801

CFTP 771 Capstone Project II 2.0 Credits

Capstone Project II facilitates the student's ability to implement an action plan as proposed in Capstone I and devise a mechanism for evaluating the outcome.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 770 [Min Grade: B]

CFTP 772 Capstone Project III 2.0 Credits

Capstone Project III facilitates the student's ability to evaluate the outcomes of the project as implemented in Capstone II and write a complete manuscript about the project.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 771 [Min Grade: B]

Corequisite: CFTP 801

CFTP 801 Couple and Family Therapy Internship 1.0-20.0 Credit

Provides an advanced one-year full time supervised placement in a clinical, research, administrative or academic setting, as determined by the program director and student.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 5 times for 20 credits

Restrictions: Can enroll if major is CFTX.

CFTP 802 Couple and Family Therapy Dissertation 1.0-20.0 Credit

Supervised research, including establishing a topic directly related to family functioning or family therapy; developing a research question and methodology for investigating it, collecting, processing, and analyzing the data; and writing a scholarly description of the research project.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 5 times for 20 credits

Restrictions: Can enroll if major is CFTX.

CFTP 803 Couple and Family Therapy Dissertation Defense 1.0 Credit

The student should enroll for this only in the anticipated final quarter of enrollment, after all other credits for the PhD have been satisfied. This course may be repeated for a maximum of six (6) credits.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 3 credits

Restrictions: Can enroll if major is CFTX.

CFTP 804 Registered for Degree Only 1.0 Credit

The student should enroll for this only in the anticipated final quarter of enrollment, after all other credits for the PhD have been satisfied. This course may be repeated for a maximum of two credits.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 2 credits

Restrictions: Can enroll if major is CFTX.

CFTP 1799 Independent Study in Couple and Family Therapy 1.0-8.0 Credit

An Independent Study may be offered when a student needs a unique plan of study, either to pursue a particular personal goal, or when remedial action needs to be taken, based on student performance, or extenuating circumstances beyond the student's control. The Independent Study will be designed by the instructor, with input from the student, in consultation with the Director of the program.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 16 credits

Restrictions: Can enroll if major is CCFT or major is CFTX.

CFTP T780 Special Topics in Couple and Family Therapy 1.0-6.0 Credit

Special topics may be offered when several students share an interest in a particular subject matter related to couple and family therapy. This course may be repeated for a maximum of eight (8) credits.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 8 credits

Restrictions: Can enroll if major is CCFT or major is CFTX.

Creative Arts in Therapy

Courses

ARTS 501 Introduction to Creative Arts Therapy I 2.0 Credits

Foundational theories for the creative arts therapies are discussed. Readings cover psychodynamic and object-relations concepts, symbolism and metaphor, the nature and development of creativity and response to the arts.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 502 Introduction to Creative Arts Therapy II 2.0 Credits

This course uses experiential and didactic formats to facilitate understanding and integration of processes and principles central to the three creative arts therapy modalities of art, dance/movement and music therapy. Students compare features of the different creative arts therapy approaches and explore common themes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 504 Human Psychological Development I 2.0 Credits

An introduction to human development across the lifespan with an emphasis on psychosocial and emotional development. Major theories and models of normal development, from infancy to old age, are discussed. Development of ego functions and personality, as well as deviations from normal development, are also covered in a lifespan framework.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 505 Clinical Diagnosis of Psychopathology I 2.0 Credits

An overview of the Diagnostic and Statistical Manual-V, including etiological factors and levels of functioning. Designed to enable the beginning clinician to assess various mental and behavioral disorders in adults and children, with consideration of social, cultural and physiologic aspects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 506 Professional Orientation and Ethics I 1.0 Credit

Prepares the beginning student for Clinical Observation in the field and supports the formation of a professional identity as a creative arts therapist. Provides a foundation in ethics and basic clinical mental health skills of observation and interaction, and a theoretical framework for clinical practice that is sensitive to sociocultural differences/diversity.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 507 Group Dynamics in Counseling and Psychotherapy I 2.0 Credits

Students study basic aspects of group dynamics through experiential and instructional formats, supported by assigned readings. Major emphasis is on the dynamics of groups, i.e. the group process and ways that basic group psychology plays out in counseling groups. Issues include the impact of personal, socioeconomic and cultural factors in response to group membership and the counseling process.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 508 Introduction to Behavioral Research I 2.0 Credits

This course introduces basic qualitative, quantitative and mixed method approaches to human and behavioral research. The course emphasizes application to the creative art therapies, preparation for the master's thesis, and competencies as a consumer of research literature and as a beginning clinical researcher.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 509 Human Psychological Development II 2.0 Credits

Continuation of ARTS 504, Human Psychological Development I.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ARTS 504 [Min Grade: C]

ARTS 510 Clinical Practicum I: Observation 1.0 Credit

A 9-week supervised clinical experience focused on the development of fundamental observation skills. The student is assigned, by Director of Field Education, to a child or adult clinical field experience under the guidance of an on-site therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is DMTC or major is MTC.

Corequisite: ARTS 506

ARTS 511 Clinical Practicum II 1.0 Credit

A 10-week supervised clinical experience in which the student begins to function as a student therapist, co-leading and leading group and individual sessions. The student is assigned, by Director of Field Education, to a child or adult clinical field experience under the guidance of an on-site therapist. Includes Mental Health Science Supervision with a psychiatrist, psychologist or other qualified mental health clinician.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is DMTC or major is MTC.

ARTS 512 Clinical Practicum III 1.0 Credit

A 10-week supervised clinical experience in which the student continues to function as a student therapist, co-leading and leading group and individual sessions. The student is assigned, by Director of Field Education, to a child or adult clinical field experience under the guidance of an on-site therapist. Includes Mental Health Science Supervision with a psychiatrist, psychologist or other qualified mental health clinician.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is DMTC or major is MTC.

ARTS 513 Clinical Diagnosis of Psychopathology II 2.0 Credits

An overview of the Diagnostic and Statistical Manual-V, including etiological factors and levels of functioning. Designed to enable the beginning clinician to assess various mental and behavioral disorders in adults and children, with consideration of social, cultural and physiologic aspects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 515 Introduction to Behavioral Research II 2.0 Credits

Continuation of ARTS 508, Introduction to Behavioral Research I.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 519 Neuroscience: Concepts and Applications for Creative Arts Therapy 3.0 Credits

This course describes structure and functions of the human central nervous system; neurons; basic topography of the spinal cord and brain; major sensory and motor pathways; higher cortical functions. Neurological deficits resulting from stroke, brain trauma and other neuropathological processes as well as implications for rehabilitation and psychotherapy are presented.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is DMTC or major is MTC.

ARTS 520 Studio Art for Art Therapists 1.5 Credit

This course emphasizes the importance of the art therapist's arts-based practice for informing clinical work. Studio work is focused on exploring the art therapist's use of her or his own creative capacities in the service of individuals who would benefit from engagement in artistic processes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC.

ARTS 531 Art Therapy Assessment and Treatment for Adults I 2.0 Credits

This course examines the interactions between theory and ethical practice in art therapy with adult clinical populations. The theoretical principles of psychological development and psychodynamics are applied to clinical art therapy assessments, art media analysis and applications, art therapy treatment approaches, and the therapeutic relationship which are studied in general and as specifically applied to adults suffering from psychiatric illness.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 532 Art Therapy Assessment and Treatment for Adults II 2.0 Credits

This course examines the interaction between theory and ethical practice in art therapy with adult clinical populations. The theoretical principles of psychological development and psychodynamics are applied to clinical art therapy assessments, art media analysis and applications, art therapy treatment approaches, and the therapeutic relationship which are studied in general and as specifically applied to adults suffering from psychiatric illness.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 531 [Min Grade: C]

ARTS 533 Art Therapy Assessment and Treatment for Children I 2.0 Credits

This course examines the interactions between theory and ethical practice in art therapy with children. The principles and application of artistic and psychological development, art therapy assessments, art media analysis and application, art therapy treatment approaches, and the therapeutic relationship are studied in general and as specifically applied with children suffering from developmental delays, psychiatric and medical illness.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 534 Art Therapy Assessment and Treatment for Children II 2.0 Credits

This course examines the interaction between theory and ethical practice in art therapy with children. The principles and application of artistic and psychological development, art therapy assessments, art media analysis and application, art therapy treatment approaches, and the therapeutic relationship are studied in general and as specifically applied with children suffering from development delays, psychiatric and medical illness.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 533 [Min Grade: C]

ARTS 535 Art Therapy Theory and Symbolism I 2.0 Credits

This course includes the study of the history and development of art therapy. The pioneers in art therapy and the origins of art therapy theory are discussed as they relate to historical and present day practices in art therapy. The concepts of psycho-dynamics, developmental levels, and symbolism as they appear in the artwork are studied in the context of human development and behavior.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MUTX.

ARTS 536 Art Therapy Theory and Symbolism II 2.0 Credits

This course includes the continued study of the history and development of art therapy. The origins of art therapy theory are discussed as they relate to historical and present day practices in art therapy. The concepts of psychodynamics, developmental levels, and symbolism as they appear in the artwork are studied in the context of human development and behavior.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 535 [Min Grade: C]

ARTS 537 Art Therapy Group Supervision I 1.5 Credit

In this course students participate in presenting, discussing, and evaluating patient case material that they bring from their clinical experiences. The cases are discussed in a small group interactive format where students can begin to connect theory and practice with children, adolescent and adult populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT.

ARTS 538 Art Therapy Group Supervision II 1.5 Credit

Students participate in group supervision through presenting, discussing, and evaluating clinical case material that they have observed or co-facilitated during their field experiences. Small groups of up to 8 students are guided by a credentialed art therapist to engage in interactive dialogue about how they are connecting theory to practice in their practicum experience with children, adolescents, and adults. The course is a continuation of Art Therapy and Counseling Group Supervision I and taken in conjunction with Practicum II.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT.

ARTS 539 Art Therapy Group Supervision III 1.5 Credit

Students participate in group supervision through presenting, discussing, and evaluating clinical case material that they have observed or co-facilitated during their field experiences. Small groups of up to 8 students are guided by a credentialed art therapist to engage in interactive dialogue about how they are connecting theory to practice in their practicum experience with children, adolescents, and adults. The course is a continuation of Art Therapy and Counseling Group Supervision II and taken in conjunction with Practicum III.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC.

ARTS 540 Art Therapy Literature and Research 1.0 Credit

This course provides instruction in academic research and writing to prepare students for their thesis project. Students will explore the literature and research in art therapy and counseling with emphasis on identifying both areas in need of study and topics of interest to the student.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 541 Jungian Psychology for Art Therapists 2.0 Credits

This course is a survey of the history and principles of Jungian Psychology as applied to the Creative Arts in Therapies. The principles and application of the arts art experienced, applied, to case histories, to oneself and related to Jung's theory and the Post-Jungians.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 542 Group Dynamics: Art Therapy 2.0 Credits

This course is part II of the Group Dynamics track. In the first course, basic group and group psychotherapy theory and practice are learned experientially and didactically. In this course, the principles and practice of group psychotherapy are applied to group art therapy. Group art therapy theory and techniques are studied in the context of the group dynamic, therapeutic factors, behaviors and art processes of members and leaders and applications to different treatment venues.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 507 [Min Grade: C]

ARTS 551 Introduction to Anatomy and Kinesiology for Dance/Movement Therapy 2.0 Credits

This course introduces anatomy and kinesiology through lecture, discussion, and experiential learning formats. The course provides an overview of the musculoskeletal system and how it functions to support the mechanics of human motion. An introduction to the principles of body connectivity provides a foundation for later dance/movement therapy clinical applications. The course also supports development of body/self awareness.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 552 Therapy Relationship Skills I 2.0 Credits

This course introduces and provides practice in skills for establishing, understanding, and developing the therapy relationship and the therapeutic process through movement and verbal counseling processes. Students participate in and lead segments of sessions in the laboratory setting of the classroom.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 553 Therapy Relationship Skills II 2.0 Credits

This course continues Therapy Relationship Skills I with the experience and practice of therapy relationship skills in the laboratory setting of the classroom. Particular attention is given to identifying patterns and shaping themes through which the therapy relationship and therapeutic process develops.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ARTS 552 [Min Grade: C]

ARTS 554 Movement Observation I 2.0 Credits

This course introduces students to movement observation and analysis within the framework of Laban Movement Analysis. In experiential and didactic frameworks, students will examine personal, relational, cultural, and societal dynamics as manifested in movement behavior. Therapeutic implications for both individuals and groups will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 555 Laban Movement Analysis Lab 1.0 Credit

This course provides experience in improvisational movement and various cultural dance forms. Movement will be reviewed with reference to movement parameters of Laban Movement Analysis to reinforce students' developing movement analysis skills.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 556 Movement Observation II 2.0 Credits

This course further develops student skills in movement observation and analysis within the framework of Laban Movement Analysis. In experiential and didactic formats, students will examine personal, relational, cultural, and societal dynamics as manifested in movement behavior. Therapeutic implications for both individuals and adults will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 554 [Min Grade: C]

ARTS 557 Theory and Practice I- Children 2.0 Credits

This course addresses the theory and practice of dance/movement therapy and counseling with children. The course reviews child and adolescent development, emotional, behavioral, and neurodevelopmental disorders, and concomitant patterns of movement behavior. Students investigate evidence and theory based therapy methods through lecture, readings, films, experiential structures, and discussion. The content this term focuses on neurodevelopmental disorders.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CDMT or major is DMTC.

ARTS 558 Theory and Practice II: Children 2.0 Credits

This course addresses the theory and practice of dance/movement therapy and counseling with children. The course reviews child and adolescent development, emotional, behavioral, and developmental disorders, and concomitant patterns of movement behavior. Students investigate evidence and theory-based therapy methods through lecture, readings, films, experiential structures, and discussion. The content this term focuses on Prevention and Early Intervention, ADHD, the Physically Challenged, and Trauma.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CDMT or major is DMTC.

Prerequisites: ARTS 557 [Min Grade: B]

ARTS 559 Introduction to Dance/Movement Therapy History and Literature 1.0 Credit

This survey seminar introduces students to the historical development of dance/movement therapy theoretical orientation, and supporting literature. Experiential activities and films will illustrate particular approaches.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 563 Movement Perspectives in Human Development 2.0 Credits

This course provides the student with an understanding of normal movement development from infancy to adulthood. The course addresses the relationship between movement, emotional, and cognitive development and provides examples of development disturbance. Implications for assessment and clinical application with adult and child populations are examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 564 Group Dynamics II: Counseling and Dance/Movement Therapy 2.0 Credits

This course continues Group Dynamics in Counseling and Psychotherapy I. Group development and group process theory is applied to understanding group movement behavior and how this understanding informs dance/movement therapy and counseling interventions. The class is taught in an experiential classroom lab format and provides the opportunity to practice group leadership skills.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DMTC.

Prerequisites: ARTS 552 [Min Grade: B] and ARTS 553 [Min Grade: B]

ARTS 570 Clinical Musicianship I 2.0 Credits

Provides methods for learning to accompany self and ensembles within music therapy applications. Additional emphasis is placed on clinical improvisation methods for keyboards.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 571 Clinical Musicianship II 2.0 Credits

This course, designed for Music Therapy students, will assist students in the development of functional guitar methods within a variety of musical styles for the purpose of facilitating music therapy processes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 572 Clinical Musicianship III 2.0 Credits

Provides methods for developing the clinical musical skills needed for internship in piano, guitar, vocal, percussion and major instrument areas. The course also helps to refine skills developed in Clinical Musicianship I and II, and Clinical Musical Improvisation I and II.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 573 Clinical Musical Improvisation I 2.0 Credits

Highly experiential course designed to introduce the student to: a) musical improvisation in general, and b) techniques used within a music therapy environment to develop therapeutic relationships with groups and individuals through the creative musical process. Readings will be used to increase understanding of improvisation as a clinical application.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 574 Clinical Musical Improvisation II 2.0 Credits

Designed to further the student's understanding of music therapy improvisation as used in clinical environments with various populations. Established models of clinical musical improvisation will be included in readings and discussed in class, with exploration of the use of verbal processing in conjunction with the musical experience.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 573 [Min Grade: C]

ARTS 575 Theories in Music Therapy and Counseling I: Musical Development in Children 2.0 Credits

This course provides an overview of clinical and research literature pertaining to musical development and psychological theories and their implications for music therapy practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CARX or major is CDMT or major is MTC or major is MUTX.

ARTS 577 Music Therapy and Counseling Approaches for Adult Populations 2.0 Credits

This course will include music therapy and counseling methods as applied with adult populations, from early adulthood to advancing age, with a range of abilities and clinical needs. Students will examine multicultural considerations within the music therapy experiences.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CARX or major is CDMT or major is MTC or major is MUTX.

ARTS 578 Music Therapy Skills and Counseling Approaches for Child and Adolescent Populations 2.0 Credits

This course will include methods and techniques as applied in music therapy and counseling with children and adolescents.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MTC or major is MUTX.

ARTS 579 Music Therapy Skills III: Technological Applications 2.0 Credits

This course will teach the basic music technology approaches and techniques for application with adult and child clinical populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 580 Psychology of Music 2.0 Credits

This course includes the study of acoustics, psychoacoustics, physiological and emotional responses, music cognition, meaning, and the psychosocial processes involved in musical perception.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 581 Music Therapy Group Supervision I 1.0 Credit

Materials and techniques for dealing with mental, neurological and other disorders in children, adolescents and adults in various settings are related to advanced music clinical practice and research in small group presentations and discussions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Corequisite: ARTS 510

ARTS 582 Music Therapy Group Supervision II 1.0 Credit

This is a continuation of ARTS 581. The objectives and course requirements are continuous in a developmental progression toward increasing sophistication and mastery of music therapy skills and conceptual understandings.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 511 [Min Grade: C] (Can be taken Concurrently)

ARTS 583 Music Therapy Group Supervision III 1.0 Credit

This is a continuation of ARTS 581 and ARTS 582. The objectives and course requirements are continuous in a developmental progression toward increasing sophistication and mastery of music therapy skills and conceptual understandings.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 512 [Min Grade: C] (Can be taken Concurrently)

ARTS 601 Theories of Counseling and Psychotherapy I 2.0 Credits

Through readings, lecture, discussions, and small group learning, this course provides an overview of major approaches and systems of psychotherapy, with emphasis on understanding assumptions, curative factors and counseling processes in each. Students learn to recognize and integrate various theoretical perspectives in the counseling process. Comparisons with the creative arts therapies are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is FATX or major is MTC or major is MUTX or major is PSY.

ARTS 602 Social and Cultural Foundations in Counseling and Psychotherapy I 2.0 Credits

The class explores implications of culture, race, ethnicity, sexual orientation, gender, social class, physical ability and religion within the context of mental health treatment. Through readings, experiential exercises, discussions, guest speakers, reflective writing, personal projects, and lecture, multicultural issues are examined and a framework presented for the practitioner to develop flexibility, openness, knowledge and competence with diverse populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 603 Clinical Appraisal and Assessment I 2.0 Credits

An introduction to major established instruments and scales in intellectual, behavioral, social, emotional, developmental, and neurological testing. Students learn theories of clinical appraisal and testing, interviewing for mental health functioning, and skills of professional case presentation, with an emphasis on case conceptualization and holistic assessment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is FATX or major is MTC or major is MUTX or major is PSY.

ARTS 604 Career Counseling 4.0 Credits

This introductory course in career counseling covers theory and practice of assessment and counseling of work and career from a lifespan perspective with attention to issues of gender, race, ethics and individuals with special needs. Includes didactic, experiential and computer-lab based learning methods.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is FATX or major is MTC or major is MUTX or major is PSY.

ARTS 605 Theories of Counseling and Psychotherapy II 2.0 Credits

Through readings, lecture, discussions, and small group learning, this course provides an overview of major approaches and systems of psychotherapy, with emphasis on understanding assumptions, curative factors and counseling processes in each. Students learn to recognize and integrate various theoretical perspectives in the counseling process. Comparisons with the creative arts therapies are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ARTS 601 [Min Grade: B]

ARTS 606 Professional Orientation and Ethics II 3.0 Credits

Covers ethical principles, concerns and legal issues as related to the practice of arts, music, dance/movement therapy and professional counseling. Classes use readings, videos, lecture and case discussion for mastery of concepts and problem-solving. Course also addresses the professional identity and professionalism of the psychotherapist.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 506 [Min Grade: C]

ARTS 607 Clinical Appraisal and Assessment II 2.0 Credits

Continuation of ARTS 603: Clinical Appraisal and Assessment I.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ARTS 603 [Min Grade: C]

ARTS 610 Clinical Internship I 3.0 Credits

Advanced supervised clinical experience with a population of the student's preference, arranged by the student in collaboration with Director of Field Education and Specialty Program Director. Individual clinical supervision provided by a qualified professional in student's specialty as approved by the Director of Field Education.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is DMTC or major is MTC.

ARTS 611 Clinical Internship II 3.0 Credits

A continuation of Clinical Internship I: advanced supervised clinical experience with a population of the student's preference, arranged by the student in collaboration with Director of Field Education and Specialty Program Director. Ongoing individual clinical supervision provided by a qualified professional in student's specialty as approved by the Director of Field Education.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is DMTC or major is MTC.

Prerequisites: ARTS 610 [Min Grade: CR]

ARTS 612 Clinical Internship III 3.0 Credits

A continuation of Clinical Internship II: advanced supervised clinical experience with a population of the student's preference, arranged by the student in collaboration with Director of Field Education and Specialty Program Director. Ongoing individual clinical supervision provided by a qualified professional in student's specialty as approved by the Director of Field Education.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is DMTC or major is MTC.

Prerequisites: ARTS 611 [Min Grade: CR]

ARTS 621 Thesis I 1.0 Credit

Under individual advisement, the student constructs research focus and questions, conducts literature review and prepares the proposal for the masters' thesis project on an art therapy, music therapy or dance/movement therapy topic.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 508 [Min Grade: C]

ARTS 622 Thesis II 1.0 Credit

Under individual advisement, the student completes the proposal for the masters' thesis project on an art therapy, music therapy or dance/movement therapy topic.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 623 Thesis III 1.0 Credit

Under individual advisement, the student completes data collection and data analysis portions of the masters' thesis project on an art therapy, music therapy or dance/movement therapy topic.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 624 Thesis IV 1.0 Credit

Under faculty committee advisement, the student completes the discussion section of the thesis, submits the full document, defends the thesis in a formal oral defense and completes revisions with committee guidance.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 625 For Thesis Only 0.0 Credits

This no-credit course is available to creative arts therapy students who have submitted the MA thesis to the advisory committee. Students in ARTS 625 are expected to defend the thesis, complete revisions and submit the final copy of the thesis for binding during the quarter covered by this course registration.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for NaN credits

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 621 [Min Grade: C] and ARTS 622 [Min Grade: C] and ARTS 623 [Min Grade: C]

ARTS 626 Gerontology and the Creative Arts Therapies 1.0 Credit

This elective course covers selected topics in normal aging from approximately age 65 until death, including developmental challenges, growth, maintenance of functioning, and creativity. Greater emphasis is placed upon elders with health challenges associated with aging and the uses of the creative arts therapies for both elders in various settings and their caregivers.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

ARTS 631 Processes and Materials in Art Therapy & Counseling 2.0 Credits

Techniques of practice in art therapy are explored through the direct experience of art making with a range of art materials and processes in a studio based format. An emphasis on treatment approaches through artistic communication is established through experiential and discussion formats.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 634 Art Therapy Family Assessment 1.0 Credit

This course will provide an introduction to family art therapy assessment through the study of family therapy theory and a systems perspective. Student role plays are used to demonstrate and practice engaging with families and constructing appropriate assessments that contribute to the treatment planning process.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT.

ARTS 635 Social and Cultural Foundations in Art Therapy and Counseling 2.0 Credits

This course builds upon Multicultural Perspective in Therapy I and further investigates cultural diversity theory and competency models in art therapy and counseling. Critical exploration of the role of the art therapist and counselor within the clinical setting as well as in social justice, advocacy, and community models to expand sensitivity and awareness of various cultural perspectives of clients, peers, and the self is conducted through discussion, presentations, experientials, and critical reflection papers (prerequisite course: Multicultural Perspectives in Therapy I).

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 636 Studio Art for Art Therapists 1.5 Credit

This course emphasizes the importance of the art therapist's arts-based practice for informing clinical work. Studio work is focused on exploring the art therapist's use of her or his own creative capacities in the service of individuals who would benefit from engagement in artistic processes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX.

ARTS 637 Advanced Art Therapy Group Supervision I 1.5 Credit

Small group format is used to discuss advanced clinical art therapy treatment cases. Emphasis is upon diagnosis, treatment planning, individual and group dynamics, and transference/countertransference issues. In addition, more advanced issues of art therapy program development, professional identity, and ethical issues are address. The method used is small group experiential supervision format with an emphasis upon peer supervision under the guidance of a credentialed art therapy faculty member.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 537 [Min Grade: C] and ARTS 538 [Min Grade: C] and ARTS 539 [Min Grade: C]

Corequisite: ARTS 610

ARTS 638 Advanced Art Therapy Group Supervision II 1.5 Credit

Small group format is used to discuss advanced clinical art therapy treatment cases. Emphasis is upon diagnosis, treatment planning, individual and group dynamics, and transference/countertransference issues. In addition more advanced issues of art therapy program development, professional identity, and ethical issues are addressed. The methods used is small group experiential supervision format with an emphasis upon peer supervision under the guidance of a credentialed art therapy faculty member.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 637 [Min Grade: C] and ARTS 610 [Min Grade: C]

Corequisite: ARTS 611

ARTS 639 Advanced Art Therapy Group Supervision III 1.5 Credit

Small group format is used to discuss advanced clinical art therapy treatment cases. Emphasis is upon diagnosis, treatment planning, individual and group dynamics, and transference/countertransference issues. In addition more advanced issues of art therapy program development, professional identity, and ethical issues are addressed. The methods used is small group experiential supervision format with an emphasis upon peer supervision under the guidance of a credentialed art therapy faculty member.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 637 [Min Grade: C] and ARTS 638 [Min Grade: C] and ARTS 610 [Min Grade: C] and ARTS 611 [Min Grade: C]

Corequisite: ARTS 612

ARTS 640 Medical Art Therapy 1.0 Credit

This elective course includes the history of medical art therapy for pediatrics and adults, psychosocial implications of illness and hospitalization on children and adults, differentiation between acute and sub-acute hospitalization, understanding family response to illness, hospitalization and bereavement. In addition the role of the art therapist is explored including treatment planning and interventions, transference and countertransference.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 641 Forensic Art Therapy 1.0 Credit

This elective course is an overview of forensic issues and forensic art therapy. Legal proceedings, reporting mandates, testimonial capability and evidentiary material is explored along with specific material relevant to forensic populations and practices identified as child abuse, both physical and sexual, custodial disputes and domestic violence.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 642 Art Therapy in an Education Setting 1.0 Credit

This elective course is designed to increase understanding of art therapy in schools with attention to the institution's characteristics and culture, impact of regular and special education, role of the Child Study Team, and the function of the individualized Education Plan. Child social, emotional and cognitive development will be reviewed along with relevant assessment measures.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 644 Art Therapy Approaches to Trauma Treatment 2.0 Credits

This course provides an overview of art therapy approaches to treating children, adolescents, adults, families, and communities who have survived trauma. Art therapy approaches will be introduced with emphasis on the mechanisms in art therapy that promote trauma recovery, and their interface with trauma theory.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 645 Professional Identity in Art Therapy and Counseling 1.0 Credit

The focus of this course is the professional identity of the art therapist and learning the core components of professional performance and functioning. The requirements for professional credentialing are reviewed and practices surrounding career development and entering the job market are provided.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 647 Art Therapy and Counseling Adv Group Supervision I 2.0 Credits

Students participate in group supervision through presenting, discussing, and evaluating clinical case material that they have co-facilitated and/or facilitated from their field experiences. Small groups of up to 8 students are guided by a credentialed art therapist to engage in interactive dialogue about art therapy and counseling cases with an emphasis on diagnosis, treatment planning, individual/group dynamics, and transference/countertransference. Art therapy program development, professional identity, and ethical issues are also addressed. Students are expected to connect art therapy and counseling theory with their internship experiences with children, adolescent and adult clinical populations. This course is taken in conjunction with Internship I.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC.

Prerequisites: ARTS 539 [Min Grade: C]

ARTS 648 Art Therapy and Counseling Adv Group Supervision II 2.0 Credits

Students participate in group supervision through presenting, discussing, and evaluating clinical case material that they have co-facilitated and/or facilitated from their field experiences. Small groups of up to 8 students are guided by a credentialed art therapist to engage in interactive dialogue about art therapy and counseling cases with an emphasis on diagnosis, treatment planning, individual/group dynamics, and transference/countertransference. Art therapy and counseling program development, professional identity, and ethical issues are also addressed. Students are expected to connect art therapy and counseling theory with their internship experiences with children, adolescent and adult clinical populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC.

Prerequisites: ARTS 539 [Min Grade: C]

ARTS 649 Art Therapy and Counseling Adv Group Supervision III 2.0 Credits

Students participate in group supervision through presenting, discussing, and evaluating clinical case material that they have co-facilitated and/or facilitated from their field experiences. Small groups of up to 8 students are guided by a credentialed art therapist to engage in interactive dialogue about art therapy and counseling cases with an emphasis on diagnosis, treatment planning, individual/group dynamics, and transference/countertransference. Art therapy and counseling program development, professional identity, and ethical issues are also addressed. Students are expected to connect art therapy and counseling theory with their internship experiences with children, adolescent and adult clinical populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC.

Prerequisites: ARTS 647 [Min Grade: C]

ARTS 651 Medical Dance/Movement Therapy 1.0 Credit

Dance/Movement Therapy is emerging as a useful complementary approach for people with primary medical conditions. Using readings, experiential exercises, lectures, discussion, and video formats, this course examines clinical work reported to date, relevant theory from health psychology, psychoneuroimmunology, and body/mind perspectives to motivate programming and research in this area.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 652 The Kestenberg Movement Profile 3.0 Credits

This course provides an introduction to the fundamentals of the Kestenberg Movement Profile (KMP). The KMP is a theoretically based tool for the assessment of psychological development through body movement. The course will address clinical applications of the KMP and cross-cultural issues. Teaching formats include discussion, experiential activities, and observational practice sessions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS 654 Theory and Practice III: Adults 2.0 Credits

This course addresses the theory and practice of dance/movement therapy and counseling with adults. The course reviews adult clinical disorders with reference to common psychological issues, movement features, and therapy approaches. Students investigate evidence and theory based therapy methods through lecture, readings, interviews, experiential structures, and discussion.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CDMT or major is DMTC.

Prerequisites: ARTS 552 [Min Grade: B] and ARTS 553 [Min Grade: B]

ARTS 655 Social and Cultural Foundations II: Counseling and Dance/Movement Therapy 2.0 Credits

This course continues the Social and Cultural Foundations in Counseling and Psychotherapy course. The course addresses diversity and further develops student cultural self-awareness. Students investigate the embodiment of culture in individual experience, expression, identity, and relationship. The course addresses the nature of multiculturally sensitive dance/movement therapy and counseling practice and the role of advocacy for social justice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CDMT or major is DMTC.

ARTS 656 Mental Health Applications of Movement Analysis I 2.0 Credits

Refine's students' skills in observing and evaluating movement and nonverbal communication. Reviews the major instruments and approaches for clinical assessment in dance/movement therapy. Addresses the application of Laban Movement Analysis based movement assessment in treatment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 554 [Min Grade: C] and ARTS 555 [Min Grade: C]

ARTS 657 Mental Health Applications of Movement Analysis II 2.0 Credits

Continuation of ARTS 656: Mental Health Applications of Movement Analysis I.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 656 [Min Grade: C]

ARTS 658 Advanced Group Supervision I 1.0 Credit

This course supports student clinical problem solving in a small group context with attention to therapist self-awareness within the therapy relationship. The course considers professional identity, multi-disciplinary teamwork, and health care system dynamics. Students discuss methods for addressing specific clinical needs in children, adolescents, and adults in various settings. Instructors serve as role models and facilitators for constructive evaluation of work.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CDMT or major is DMTC.

ARTS 659 Advanced Group Supervision II 1.0 Credit

This course continues the work begun in ARTS 658 in supporting student clinical problem solving in a small group context with attention to therapist self-awareness within the therapy relationship. The course considers professional identity, multi-disciplinary teamwork, and health care system dynamics. Students discuss methods for addressing specific clinical needs in children, adolescents, and adults in various settings. Instructors serve as role models and facilitators for constructive evaluation of work.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CDMT or major is DMTC.

ARTS 660 Advanced Group Supervision III 1.0 Credit

This course continues ARTS 658 and ARTS 659 in supporting student clinical problem solving in a small group context with attention to therapist self-awareness within the therapy relationship. The course considers professional identity, multi-disciplinary teamwork, and health care system dynamics. Students discuss methods for addressing specific clinical needs in children, adolescents, and adults in various settings. Instructors serve as role models and facilitators for constructive evaluation of work.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DMTC.

ARTS 661 Family Dance/Movement Therapy: A Systems Approach 2.0 Credits

This course views the family through developmental and family systems perspectives. The course reviews nonverbal communication research and introduces students to the assessment of family interaction patterns using Dulcaï's Nonverbal Assessment of Families instrument. The course will also address applications of dance/movement in family systems work.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS 662 Advanced Group Dance/Movement Therapy Skills I 2.0 Credits

This course provides support for students to advance understanding and practice of group dance/movement therapy through participation in, leadership, and review of classroom lab sessions. Course continues through two quarters.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 507 [Min Grade: C] and ARTS 564 [Min Grade: C]

ARTS 663 Advanced Group Dance/Movement Therapy Skills II 2.0 Credits

Continuation of ARTS 662: Advanced Group Dance/Movement Therapy Skills I.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 507 [Min Grade: C] and ARTS 564 [Min Grade: C]

ARTS 670 Advanced Music Therapy and Counseling Skills I: Music and Imagery Approaches 2.0 Credits

Music and imagery approaches in counseling and therapy with individuals and groups are examined through experiential learning.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MTC or major is MUTX.

Prerequisites: ARTS 577 [Min Grade: B] and ARTS 578 [Min Grade: B]

ARTS 671 Advanced Music Therapy and Counseling Skills II: Group Processes 2.0 Credits

During this experiential course, students will have the opportunity to participate as leader and member of an ongoing group, simulating a variety of populations. Concepts from assigned music therapy readings will be employed during group processing and in discussions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MTC or major is MUTX.

Prerequisites: ARTS 670 [Min Grade: B]

ARTS 672 Multicultural Perspectives in Music Therapy and Counseling 2.0 Credits

This course will include culturally-specific and universal musical phenomena. Cultural understandings of musical behavior, beliefs about music, musical restrictions and referential influences will be explored through readings and in-class musical experience.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MTC or major is MUTX.

Prerequisites: ARTS 602 [Min Grade: B]

ARTS 673 Advanced Music Therapy Group Supervision I 1.0 Credit

Materials and techniques for dealing with mental, neurological and other disorders in children, adolescents and adults in various settings are related to advanced music therapy clinical practice and research in small group presentations and discussions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 610 [Min Grade: C] (Can be taken Concurrently)

ARTS 674 Advanced Music Therapy Group Supervision II 1.0 Credit

Materials and techniques for dealing with mental, neurological and other disorders in children, adolescents and adults in various settings are related to advanced music therapy clinical practice and research in small group presentation and discussions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 611 [Min Grade: C] (Can be taken Concurrently)

ARTS 675 Advanced Music Therapy Group Supervision III 1.0 Credit

Materials and techniques for dealing with mental, neurological and other disorders in children, adolescents and adults in various settings are related to advanced music therapy clinical practice and research in small group presentations and discussions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

Prerequisites: ARTS 612 [Min Grade: C] (Can be taken Concurrently)

ARTS 676 Theories in Music Therapy and Counseling II: Theoretical Models 2.0 Credits

Designed to provide an introductory overview of two major theoretical models of psychotherapy as they apply to music, creativity and to music therapy. The first half of the course will focus on perspectives from the psychodynamic orientation while the second half will focus on perspectives of the humanistic, also known as Existential/Humanistic (E/H) orientation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MTC or major is MUTX.

ARTS 677 Advanced Music Therapy Skills III: Wellness and Mind/Body Approaches 2.0 Credits

Students will study music therapy within group and individual formats incorporating wellness and mind/body approaches. Students will participate as leaders and members of individual and group experiences to simulate a variety of clinical, caregiver and other non-clinical populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MTC or major is MUTX.

Prerequisites: ARTS 671 [Min Grade: B]

ARTS 678 Clinical Internship Laboratory: Musical Analysis 2.0 Credits

This seminar/lab will introduce methods of analysis of client musical expressions using developmental and interaction models. Approaches to post-analysis therapist response will be explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CARX or major is CDMT or major is MTC or major is MUTX.

Prerequisites: ARTS 612 [Min Grade: C] (Can be taken Concurrently)

ARTS 703 Interdisciplinary Seminar I 3.0 Credits

This course is one in a series of four seminars in which students study the inter-relatedness between collective interdisciplinary bodies of knowledge and the CAT's. The seminar is also to be viewed as a venue for identifying knowledge gaps in the CAT's and generating original research topics.

This seminar addresses the study of the interface between aesthetics, creativity and literature and the implications for the CAT's.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Corequisites: ARTS 712, ARTS 716

ARTS 704 Interdisciplinary Seminar II 3.0 Credits

This course is one in a series of four seminars in which students study the inter-relatedness between collective interdisciplinary bodies of knowledge and the CAT's. This seminar addresses the intersection between psychology, biology and neuroscience and the CAT's within the context of mind-body theories. The implications of study in these bodies of knowledge are considered for the development of epistemologies, theory and practice in the CAT's.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Prerequisites: ARTS 703 [Min Grade: C]

ARTS 705 Interdisciplinary Seminar III 3.0 Credits

This course is one in a series of four seminars in which students study the interrelatedness between collective interdisciplinary bodies of knowledge and the CAT's. This seminar addresses the study of how psychoanalysis, philosophy, ethics and interface with the theory, practice and research in the arts therapies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Prerequisites: ARTS 703 [Min Grade: C] and ARTS 704 [Min Grade: C]

Corequisites: ARTS 714, ARTS 718

ARTS 706 Interdisciplinary Seminar IV 3.0 Credits

This course is one in a series of four seminars in which students study the inter-relatedness between collective interdisciplinary bodies of knowledge and the CAT's. This seminar addresses the study of the interface between the tenets of anthropology, sociology, cultural diversity and the arts therapies. The study of how embedded cultural thought, semiotics, and healing practices, relate to theory, practice and research in the arts therapies will be the focus of this seminar.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Prerequisites: ARTS 703 [Min Grade: B] and ARTS 704 [Min Grade: B] and ARTS 705 [Min Grade: B]

Corequisites: ARTS 715, ARTS 719

ARTS 712 Research I: Philosophy & Theory 3.0 Credits

This course is the first in the doctoral research sequence. It introduces the student to the epistemological, philosophical, socio-cultural, and theoretical context for social science research and methods. The exploration of conceptual and philosophical underpinnings of nine perspectives of research guide the development of congruent methods. The significance of the research process and empirical evidence to creative arts therapies and mental health practice will be addressed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX or major is CFTX.

Corequisites: ARTS 703, ARTS 716

ARTS 715 Innovative and Emergent Research Methods 3.0 Credits

This course introduces students to the newest research paradigms in the Creative Arts Therapies and related fields. The philosophy and methods for mixed methods research, arts-based research, and transformative/emancipator paradigms, among others, will be presented. Experiential assignments that are geared to simulate the data collection and analyses processes within these research methods will be integral to this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Prerequisites: ARTS 712 [Min Grade: C]

ARTS 716 Studio Based Artistic Inquiry I 3.0 Credits

The first of this three course study module introduces the method of self-directed intrinsic learning through the art process. The class consists of two parts: creative art making; and 2) personal reflection, notation and discussion of the emotional, cognitive, artistic, and inter-subjective creative arts experience. Appropriate readings will be introduced to parallel the emergent experiences of the students. Note: Combined with the interdisciplinary seminars the objective is to research and articulate the epistemology of the arts therapies and its application to theory and practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Corequisites: ARTS 703, ARTS 712

ARTS 717 Studio Based Artistic Inquiry II 3.0 Credits

The second of the three course study module continues the method of self-directed intrinsic learning through the art process. The class consists of two parts: 1) creative art making; and 2) personal reflection, notation and discussion of the emotional, cognitive, artistic, and inter-subjective creative arts experience. The focus in this course is upon the emergence of metaphor, symbolism, and the process of making meaning within the inter-subjective/artistic matrix. Note: Research topics and clinical arts therapy applications will be discussed as a result of the emergent knowledge.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Prerequisites: ARTS 716 [Min Grade: B]

Corequisite: ARTS 704

ARTS 718 Studio Based Artistic Inquiry III 3.0 Credits

The third of the three course study module continues the method of self-directed intrinsic learning through the art process. The class consists of two parts: 1) creative art making; and 2) personal reflection, notation and discussion of the emotional, cognitive, artistic, and inter-subjective creative arts experience. The concepts of transference and counter-transference are explored within the context of the symbolism, meaning, and the inter-subjective/artistic matrix. Note: Research topics and clinical arts therapy applications will be discussed as a result of the emergent knowledge.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Prerequisites: ARTS 716 [Min Grade: B] and ARTS 717 [Min Grade: B]

Corequisites: ARTS 705, ARTS 714

ARTS 719 Studio Based Artistic Inquiry IV 3.0 Credits

The final of the four course study module continues the method of self-directed intrinsic learning through the arts process. The class consists of two parts: 1) creation of art in the student's art form; and 2) personal reflection, notation, and discussion of the emotional, cognitive, artistic, and inter-subjective arts experience. The formulation of epistemologies, theories, and hypotheses based upon the integration of knowledge from the four courses contributes to the generation of CAT research topics and clinical practice issues.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Prerequisites: ARTS 716 [Min Grade: C] and ARTS 717 [Min Grade: C] and ARTS 718 [Min Grade: C]

Corequisites: ARTS 706, ARTS 715

ARTS 732 Advanced Quantitative Research Seminar 3.0 Credits

This course is an advanced research course in quantitative methods. It builds on information from the previous course in biostatistics, focusing on advanced strategies for quantitative data analysis. Particular focus is on multivariate analysis, examination of power in determining sample size, assessment of instrument reliability and validity, and understanding effect size. Students will have an opportunity to explore specific data analytic strategies necessary for their proposed projects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Prerequisites: ARTS 712 [Min Grade: B] and RSCH 770 [Min Grade: B]

ARTS 734 Innovative and Emergent Research Methods II 3.0 Credits

This course includes the advanced study of the practical approaches to and applications of mixed methods and arts based research paradigms. As the second of two courses, this course focuses on an in depth study of mixed methods and arts based research designs including data collection, data analysis, approaches to validity and reliability, and application of these philosophies, paradigms, and methods to evidence based practice and legitimacy in the creative arts therapies and related fields.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Prerequisites: ARTS 715 [Min Grade: B]

ARTS 804 Dissertation Research I 1.0-9.0 Credit

This course focuses upon choosing a research topic for the dissertation. The topic will be chosen with the assistance of seminars and ongoing faculty advisement. Once the topic is chosen, the student prepares a dissertation proposal outline that includes the identification of the problem to be studied, the purpose of the study, the rationale, the methodology and the research question. The proposal outline must be approved by the program faculty. Following approval the student begins writing the dissertation proposal.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 18 credits

Restrictions: Can enroll if major is CATX.

ARTS 805 Dissertation Research II 1.0-9.0 Credit

In this course, with faculty advisement, the student writes the dissertation proposal. In addition the student finalizes their dissertation committee during this term. The proposal is submitted to the dissertation proposal committee and the oral defense of the proposal takes place. The student must pass the oral proposal defense in order to register for ARTS 806.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CATX.

ARTS 806 Dissertation Research III 1.0-9.0 Credit

In this course the student revises the dissertation proposal based upon the results of the Dissertation Proposal Defense and the dissertation format selected. The student prepares materials for IRB submission and approval. Once the dissertation is approved by the IRB, and with the advisement of the Supervising Professor, the student establishes a data management system and begins data collection.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CATX.

ARTS 807 Dissertation Research IV 1.0-9.0 Credit

This course includes the final stages of the dissertation during which the data collection is completed, the data is analyzed, the manuscripts, results and discussion chapters are written and the final dissertation is defended in an oral examination.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CATX.

ARTS 808 Practicum I 3.0 Credits

The practicum provides the practical application component of the doctoral program. With faculty advisement, students choose one of the following practical areas of study: 1) academia/teaching; 2) research; 3) clinical supervision; or 4) advanced clinical practice. The goal of the practicum is to transform knowledge learned in the doctoral program into practical application and research in the creative arts therapies fields.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

ARTS 809 Practicum II 2.0-9.0 Credits

The Practicum Module provides the practical application component of the doctoral program. The Practicum Module includes one quarter of the ARTS 812 Teaching Practicum and two quarters of Practicum II and III of the student's choice in one of the following practical areas of study: 1) academia/teaching; 2) research; 3) clinical supervision, or, 4) advanced clinical practice. The goal of the practicum is to transform the knowledge learned to this point in the doctoral program into practical application and research in the creative arts therapies fields.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

ARTS 810 Practicum III 2.0-9.0 Credits

The Practicum Module provides the practical application component of the doctoral program. The Practicum Module includes one quarter of the ARTS 812 Teaching Practicum and two quarters of Practicum II and III of the student's choice in one of the following practical areas of study: 1) academia/teaching; 2) research; 3) clinical supervision; or, 4) advanced clinical practice. The goal of the practicum is to transform the knowledge learned to this point in the doctoral program into practical application and research in the creative arts therapies fields.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 18 credits

Restrictions: Can enroll if major is CATX.

ARTS 812 Teaching Practicum 1.0 Credit

The teaching practicum provides the opportunity for students to develop aptitudes and skills related to teaching in higher education including teaching philosophy, curriculum development, course construction and prep, in-class teaching experiences, pedagogical approaches, advisement, mentoring, supervision, and evaluation. The goal of the practicum is to prepare students for positions of leadership in academia in the Creative Arts Therapies fields.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS I699 Independent Study in Creative Arts in Therapy 0.5-4.5 Credits

Independent opportunities for study may be offered to individual students who have an interest and an academic rationale to pursue greater depth than is provided in other CAT courses. This course is structured with a contract and under close advisement.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ATC or major is CARX or major is CDMT or major is DMTC or major is MTC or major is MUTX.

ARTS I899 Independent Study in Creative Arts Therapies 1.0-6.0 Credit

This is a course in which a student can pursue additional work as suggested or recommended by the faculty for completion of program or course requirements and/or a course in which a student may choose to pursue in-depth and specialized study in an area relevant to their educational goals and research directions. This course must include close faculty advisement as agreed upon by the student and faculty member.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

ARTS T880 Special Topics in Creative Arts in Therapy 3.0 Credits

This is a special topics course that is being created for the Ph.D students in Creative Arts Therapies. This course is to be used for the students who wish to create an elective course to fulfill their elective and specialization requirements in the Ph.D Program. The elective course is an option only if no existing course in this area of specialization is offered in the Drexel University curricula. To register for this course students must obtain approval from their academic advisor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

Creativity Studies

Courses

CRTV 501 Foundations in Creativity 3.0 Credits

Provides a foundation in creativity including leading theorists and their ideas. Questions investigated include who is creative and why? What does it mean to be creative? Is creativity a general attribute or is it discipline specific? Students will complete and score a creativity assessment.

College/Department: School of Education

Repeat Status: Not repeatable for credit

CRTV 502 Tools and Techniques in Creativity 3.0 Credits

Provides opportunities to enhance creative capacities and strengths. Through study and experiential learning, students work toward self-mastery of creative techniques, tools and strategies. Moreover, through a fieldwork experience, students learn to teach and motivate other individuals or groups to use these techniques in real life circumstances for their benefit.

College/Department: School of Education

Repeat Status: Not repeatable for credit

CRTV 503 Creativity in the Workplace 3.0 Credits

This course focuses on applied creativity, how creative ideas happen, how they become innovations, and how creativity can be infused into every aspect of an organization. Examples from a wide range of industries and organizations demonstrate how to build systemic creativity in individuals, in teams, and at the leadership level.

College/Department: School of Education

Repeat Status: Not repeatable for credit

CRTV 610 Creativity and Change Leadership 3.0 Credits

This course explores the relationship between change, leadership, and creativity, and how these three concepts mutually support one another. Distinction is made between a leader who is effective at introducing change, but who is not creative.

College/Department: School of Education

Repeat Status: Not repeatable for credit

CRTV 620 Research Methods and Assessment of Creative and Innovative Thinking 3.0 Credits

This course acquaints students with creativity research and applications. The goal is to help students employ creative problem solving to successfully complete their course of study in the context of other responsibilities and the program's standards and requirements. Using creativity as a vehicle, students will study various research paradigms.

College/Department: School of Education

Repeat Status: Not repeatable for credit

CRTV 630 Global Perspectives on Creativity 3.0 Credits

The goal of this course is to explore theories, research, assessment, and programs for the development of creativity in a wide variety of countries around the world. Motives for the lack of global creativity research are suggested.

College/Department: School of Education

Repeat Status: Not repeatable for credit

CRTV 640 Creativity & Innovation: 1500-Present 3.0 Credits

Trends and interactions of creativity and innovation are examined from pre-1500 to present. Emphasis placed on understanding how the notion of creativity has evolved overtime and its influence on modern workplace and educational environments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

CRTV 650 Current Trends in Creativity & Innovation 3.0 Credits

Focus on five major trends: the study of creativity and social influence, innovation and planning, creativity and cognitive processes, sub-system configuration, and new venture emergence. Though unique in orientation, these trends have a common bond in raising and addressing multi-level issues and possible solutions that involve multiple levels of analysis.

College/Department: School of Education

Repeat Status: Not repeatable for credit

CRTV 660 Diagnostic Creative Intervention 3.0 Credits

Integrates diagnostic teaching, creativity, and mediation skills. Diagnostic teaching is a creative problem solving instructional model framed upon core influences on learning, in depth content knowledge, and pedagogy knowledge. Creativity theories, applications and mediation concepts complement diagnostic teaching as individuals integrate intervention strategies in identifying real problems and creative resolutions.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is MS.

CRTV 695 Applied Project in Creativity Studies I 3.0 Credits

First of a two-course capstone experience providing creativity studies students with an opportunity to demonstrate achievement in their concentration and to engage in self-reflection. Components include a statement of awareness of personal creative strengths, evidence of emergence as a creative thinker and doer, and synthesis of creative expansion to date.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: CRTV 501 [Min Grade: C] and CRTV 502 [Min Grade: C] and CRTV 503 [Min Grade: C] and CRTV 610 [Min Grade: C] and CRTV 620 [Min Grade: C] and CRTV 630 [Min Grade: C]

CRTV 696 Applied Project in Creativity Studies II 3.0 Credits

Students will complete the creative portfolio begun in CRTV 695. Components include creative expression, future directions, and reflection on the major, concentration, and experience of creating a portfolio.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: CRTV 695 [Min Grade: C]

CRTV I599 Independent Study in CRTV 0.0-12.0 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

CRTV I699 Independent Study in CRTV 0.0-12.0 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

CRTV I799 Independent Study in CRTV 0.0-12.0 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

CRTV I899 Independent Study in CRTV 0.0-12.0 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

CRTV I999 Independent Study in CRTV 0.0-12.0 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

CRTV T580 Special topics in CRTV 0.0-12.0 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 T680 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 T780 Special topics in CRTV 0.0-12.0 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 T880 Special topics in CRTV 0.0-12.0 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 T980 Special topics in CRTV 0.0-12.0 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

Design and Merchandising

Courses

Design Research

Courses

DSRE 620 Design Problem Solving 3.0 Credits

A seminar course that examines different methods of design problem solving and its role across disciplines. The intention is to give the student a basis to approach interdisciplinary projects in an innovative way.

In addition, the practice of design problem solving is examined from multiple viewpoints including human centered and technology centered approaches.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DSRE 625 Technologies of Making 3.0 Credits

A Seminar and Lab course that examines and builds on the students' core skills in design and making. The Technologies of Making Course aims to continue the development of skills in various computational modeling and fabrication techniques and at varying scales. This course also includes an interdisciplinary exploration in digital fabrication.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DSRE 630 Data Visualization for Design Professionals 3.0 Credits

A seminar course that examines and builds visual fluency in the understanding and re-communication of data including both quantitative and qualitative constructs. Skill building in the communication of research as a way of facilitating design research and the communication of intensive data including technology, environment and human based modes.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DSRE 635 Translational Design Research 3.0 Credits

A seminar course that examines and builds on the students' core skills in design research. Students will understand the ways that research can drive innovation and iteration in the design process. Students will understand the ethics of research and how to engage with different types of research including engagement with different cultures and communities and a variety of stakeholders.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DSRE 640 Design Media and Communications 3.0 Credits

New forms of communication in the many design disciplines will be examined. This course will also examine the ways in which this truly interdisciplinary media practice influences and creates the current and future culture of design via a hybridization of media. The goal is to produce interdisciplinary researchers from a group of multi disciplinary students. For the purpose of this course, media refers to a broad set of digital and analogue modes of operation, contemporary works, theories, history and practice. This course will engage students in historical, current and future theories and speculative strategies in relationship to these evolving forms of design and information transfer.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DSRE 641 Contemporary Design Theory 3.0 Credits

In this core course, we will work on the development and positioning of current research within a broader theoretical, philosophical and contextual framework. We will be examining how a larger body of research can spawn multiple threads of inquiry each with differing aspects which are relevant to specific audiences related to funding, academic conferences and publications. Within an academic research context, this entails the extraction of specific aspects of students' work which are then investigated further through the specific lens of conference or journal themes and topics.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

DSRE 645 Design Research Thesis Proposal 3.0 Credits

In this course students will integrate their thoughts, research and progress into a proposal for their Masters of Science in Design Research (DSRE) thesis capstone project. The DSRE thesis proposal will include elements of speculation related to their chosen research path. Proposal possible outcomes for the project and research methods will be examined and implemented. Students will use the proposal as a plan to organize the four term thesis research project they will undertake in the second year of the program.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSRE 625 [Min Grade: C] and DSRE 635 [Min Grade: C]

DSRE 650 Thesis Research and Practicum 1.0 Credit

In this course students will spend the summer documenting and reflecting on a practicum experience related to their path of study; or an initial research endeavor related to the path of study. Students will meet with relevant faculty at intervals during the summer to assess progress and integrate their experience into the ongoing research.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSRE 645 [Min Grade: C]

DSRE 677 Health and Design Research 3.0 Credits

In this inter-professional course, students will explore concepts and methodologies of design, health research, and design thinking. The course is cross-listed between the disciplines of public health and design research, and students will be drawn from both disciplines to examine the reciprocal relationship between health research and human-centered innovation and creative thinking.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DSRE 750 Thesis in Design Research I 3.0 Credits

In this, the first of the three thesis project courses, students will expand their research, and progress, into their Masters of Science in Design Research (DSRE) thesis capstone project. The DSRE thesis project will include elements of speculation related to their chosen research path. The initial work of the proposal written in DSRE 645 and outcomes from the practicum/research course DSRE 650 will be examined and synthesized in this first of the three-course thesis project sequence—additional research methods will be implemented and examined. The outcome from this term is a research report that will be integrated into the final binder in the third thesis term.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSRE 650 [Min Grade: C]

DSRE 760 Thesis in Design Research II 3.0 Credits

In this, the second course of the thesis sequence, students will continue to develop their Masters of Science in design Research (DSRE) thesis capstone project. The DSRE thesis project will include elements of speculation related to their chosen research path. Student will build on initial research outcomes to develop a draft of their final thesis—this may include a physical artifact, prototype or a database-or a combination of outcomes. All students will produce a final binder that documents the proposal, base research, and outcomes. This term students will produce, document and speculate on initial outcomes—a draft of the final document will be due at the end of this term.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSRE 750 [Min Grade: C]

DSRE 770 Thesis in Design Research III 3.0 Credits

In this course, the culmination of the Masters of Science in Design Research (DSRE) Thesis sequence, students will finalize their DSRE thesis capstone project. The DSRE thesis project will include elements of speculation related to their chosen research path. Students will build on initial research outcomes to complete their final thesis—this may include a physical artifact, prototype, database-or a combination of outcomes. All students will produce a final, publication quality paper that documents the proposal, base research, and outcomes. In this final term, students will finalize both the outcome and the document. The final format will be determined by the student and advisor—final outcome to be evaluated with professional input.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DSRE 760 [Min Grade: C]

DSRE I599 Independent Study 1.0-3.0 Credit

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

DSRE I699 Independent Study 1.0-3.0 Credit

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

DSRE T580 Special Topics 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

DSRE T680 Special Topics 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

Digital Media

Courses

DIGM 501 New Media: History, Theory and Methods 3.0 Credits

New Media: History, Theory and Methods. This advanced seminar class examines parallel developments in modern art and computer technology beginning in World War II to the present. It will survey writings and works of major contributors to the field.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DIGM 502 Advanced New Media Topics 3.0 Credits

Advanced Seminar in New Media Topics. This Seminar is dedicated to topical readings and in-depth discussions in Digital Media ranging from virtual reality to digital art and the socio-cultural impact of the Internet.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 501 [Min Grade: C]

DIGM 505 Design and Interactivity Bootcamp 3.0 Credits

This course focuses on the understanding and comprehension of the basic tools and strategies for design within a two-dimensional environment. In addition to design, web development and interactivity will be covered, including a discussion of various display platforms, including mobile development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM and program is MS.

DIGM 506 Animation and Game Design Bootcamp 3.0 Credits

This course focuses on the understanding and comprehension of the basic tools and strategies for animation and game production. This course will focus on the production of digital assets using standard modeling and animation software, along with their integration into a game engine.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM and program is MS.

DIGM 508 Digital Cultural Heritage 3.0 Credits

Digital Cultural Heritage is a growing transdisciplinary pursuit having components in academic research and applied situations, commercial applications, as well as new media technology development. This class will investigate Digital Cultural Heritage's position within the tradition of digital media discourse, potential research issues, interdisciplinary collaborations, emerging best practices and project development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

DIGM 510 Designing for Interactivity 3.0 Credits

This course will provide the hands-on experience to designing and developing visual interactive media projects including, but not limited to, games, web art, interactive animation, and immersive media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 501 [Min Grade: B]

DIGM 511 Research Methods for Digital Media 3.0 Credits

This course will survey the fundamental methods to evaluate digital media projects. It will cover the basics of human-centered design paradigm, iterative design and refinement progress, and qualitative and quantitative methods to evaluate a project within the area of digital media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 501 [Min Grade: B]

DIGM 512 Shader Writing and Programming 3.0 Credits

Shader Writing and Programming. Development of custom output shaders allows for the use and manipulation of materials for use in production render engines. This course focuses on the basic components of shaders including reflective, translucency, and illumination models.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 501 [Min Grade: C] (Can be taken Concurrently)

DIGM 515 Digital Matte Painting 3.0 Credits

Digital Matte Painting. Digital matte painting and set extension are methods of integrating live action footage into lush and believable CG environments. By using physical construction as a basis for a digital environment, greater integration between live and CG plates can be achieved.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 512 [Min Grade: C]

DIGM 518 Particle Systems and Artificial Intelligence for Visual Effects 3.0 Credits

Particle Systems/Artificial Intelligence for Visual Effects. Particle systems can be used to stimulate natural phenomena as well as create ethereal effects through the use of scripting and mathematical expressions.

In the same way, digital crowds can be created to populate a scene with autonomous characters. This hybrid course addresses software applications and trigonometric functions for advanced animation by digital media designers.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 515 [Min Grade: C]

DIGM 520 Interactivity I 3.0 Credits

This course focuses on the development of interactive media across a variety of platforms. Human-Computer interaction and layout are discussed along with implementations on mobile and PC based platforms. Dynamically created web content and integration with databases, as a server-side component, will also be covered.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 505 [Min Grade: B]

DIGM 521 Interactivity II 3.0 Credits

This course covers advanced topics in the development of interactive digital media, in particular with respect to the use of new and experimental interaction technologies (for example gesture control, virtual reality and heads up displays, augmented reality, location aware media, etc.) and the implementation of novel user experience design methods.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 520 [Min Grade: B]

DIGM 525 Animation I 3.0 Credits

This course delves into advanced topics in animation, including procedural modeling and dynamics. Emphasis will be placed on the development of natural phenomena in a simulated environment and physically accurate movement of characters.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 506 [Min Grade: B]

DIGM 526 Animation II 3.0 Credits

This course delves into advanced topics in animation, including light transport and crowd simulation. Also discussed will be integration of acquired data, specifically from motion capture sources. Multi-layer rendering output and shaders for production will be discussed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 525 [Min Grade: B]

DIGM 530 Game Design I 3.0 Credits

This course sequence covers advanced gaming topics, including mobile games, motion capture, artificial intelligence, real-time effects and shaders, and advanced user interfaces.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 506 [Min Grade: B]

DIGM 531 Game Design II 3.0 Credits

This course sequence covers advanced gaming topics, including mobile games, motion capture, artificial intelligence, real-time effects and shaders, and advanced user interfaces. The group project will follow an Agile software development methodology with weekly Scrum sprints for iterative project development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 530 [Min Grade: B]

DIGM 540 New Media Project 3.0 Credits

New Media Project. Students work on funded and unfunded research and industrial projects. With faculty approval, students may work on personally designed projects relevant to problem solving in a student's area of interest. Each student is required to complete it two times. This course may be repeated up to three times for credit.

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 DIGM.

DIGM 547 Organic Modeling 3.0 Credits

This course will be an intensive exploration of organic modeling. Through lectures, demonstrations, class critiques and individual feedback from the instructor, the best approaches to modeling organic forms will be explored.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 526 [Min Grade: C]

DIGM 560 Advanced Concepts and Applications in Interactive 3D Environments 3.0 Credits

Advanced Concepts/Applications in Interactive 3D Environments.

Advanced concepts/applications on adding interactivity to 3D environments via an assortment of software packages including 3D Max, Director and Flash. This course focuses on the optimized integration of 3D objects in environments with interactive authoring tools.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 501 [Min Grade: C]

DIGM 580 Thesis Preparation 3.0 Credits

This course instructs on Thesis proposal writing within a Digital Media context, covering style, performing research, assigning credit and reference, and topic exploration and expansion.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 501 [Min Grade: B]

DIGM 591 Digital Media Skills Intensive 3.0 Credits

This course provides students with an in-depth understanding of a specialized skills topic within digital media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is DIGM.

DIGM 605 Advanced Techniques in Computer Generated Imagery 3.0 Credits

Advanced Techniques in Computer Generated Imagery. Students create electronic media assets that effect the stimuli, bearings, and responses of human cognition to phenomena of light and sound. Student works explore integrations of visual and aural illusions to affect alterations in audience-perceived realities.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 518 [Min Grade: C] (Can be taken Concurrently)

DIGM 616 Immersive World Building 3.0 Credits

Immersive World Building. Students investigate various emerging technologies for immersive content creation. Focus is on the production of 3D animated environments. Special production issues and concerns to dome planetaria and theatrical (IMAX) venues are considered. Interdisciplinary activities are strongly encouraged.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 605 [Min Grade: C]

DIGM 620 Digital Media Workshop 3.0 Credits

This course addresses issues in the field of Digital Media, with emphasis on a single, comprehensive project. Examples of topics include stereoscopic production, mobile game development or training through game development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 531 [Min Grade: C]

DIGM 630 Digital Media Group Workshop 3.0 Credits

The course addresses topical issues in the field of Digital Media, with emphasis placed on a single, comprehensive group project. Examples of topics include stereoscopic production, mobile game development or training through game development.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 531 [Min Grade: C]

DIGM 650 Public Venue Seminar 3.0 Credits

This group project course is focused on creating public venue works, either performance-based, interactive or web-distributed. The distinguishing mark of graduate research is an original contribution to knowledge and this course is intended to design and implement a media piece to be viewed by a large group of people.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 531 [Min Grade: C]

DIGM 651 Publication and Presentation 3.0 Credits

This course instructs on the submission of portfolio and thesis work including journal publication, conference presentations, contests and competition and public performance venues.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

DIGM 670 Gaming I 3.0 Credits

Gaming I. Students learn to solve 3D game design problems working with game programming techniques and leading cross platform software.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 518 [Min Grade: C] and DIGM 560 [Min Grade: C]

DIGM 671 Gaming II 3.0 Credits

Gaming II. Building upon skills developed in Gaming I, students form small teams and work to develop and implement original 3D game designs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 670 [Min Grade: C]

DIGM 680 Thesis Development 1.0-3.0 Credit

Thesis development results in a project including the production of original media assets, a written thesis paper, as well as an oral presentation and demonstration delivered to the Department of Digital Media.

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 DIGM.

Prerequisites: DIGM 511 [Min Grade: B]

DIGM 681 Thesis Completion 0.5-9.0 Credits

This course assists students who have completed all course requirements in completing their master thesis.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Prerequisites: DIGM 680 [Min Grade: B]

DIGM 690 Advanced Special Topics in Digital Media 3.0 Credits

Advanced Special Topics in Digital Media. This class is reserved for occasional special topics in Graduate Digital Media Studies. It may include seminars, studio and classes taught by visiting faculty.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: DIGM 502 [Min Grade: C]

DIGM 701 Advanced New Media Topics 3.0 Credits

This seminar covers advanced topics in new media theory. It is dedicated to topical readings and in-depth discussions in digital media ranging from virtual reality to digital art and the socio-cultural impact of the Internet.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

DIGM 710 Digital Media Research Methods I 3.0 Credits

This course focuses on quantitative research methodologies and statistical analysis tools and methods relevant for digital media research. The course also introduces students to basic epistemological positions and concepts, such as Popper's falsificationism or Kuhn's research paradigms.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

DIGM 711 Digital Media Research Methods II 3.0 Credits

This course focuses on qualitative and mixed research methodologies relevant for digital media research. It introduces students to the concepts of design research and deals with the challenges of interdisciplinary or translational research methods.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 710 [Min Grade: B]

DIGM 810 Advanced Topics in Digital Media Research 3.0 Credits

This course focuses on advanced topics in digital media research with an emphasis on current technological developments. Examples include augmented reality research, user experience design research or interaction design research.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

Prerequisites: DIGM 701 [Min Grade: B] and DIGM 711 [Min Grade: B]

DIGM 850 Public Venue Seminar 3.0 Credits

This group project course is focused on creating digital media research driven public venue works that are performance-driven, interactive or web-distributed. The course is intended to design and implement a media piece that communicates scientific knowledge to a large group of people within a public environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

DIGM 851 Publication and Presentation 3.0 Credits

This course instructs on the submission of portfolio and thesis work including journal publication, conference presentations, contests and competition and public performance venues. It supports Digital Media Ph.D. students in publishing their graduate work through various scientific media channels.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DIGM.

DIGM 998 Digital Media Ph.D. Seminar 1.0 Credit

This seminar guides students in their Digital Media Ph.D. dissertation progress.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is DIGM.

DIGM 999 Digital Media Research 0.5-9.0 Credits

Students in this course participate in a faculty led research project.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is DIGM.

DIGM I599 Independent Study in Digital Media 0.0-12.0 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 I699 Independent Study in Digital Media 0.5-6.0 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 3 times for 6 credits

DIGM I799 Independent Study in Digital Media 0.0-12.0 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 I899 Independent Study in Digital Media 0.0-12.0 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 I999 Independent Study in Digital Media 0.0-12.0 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 T580 Special Topics in Digital Media 0.0-12.0 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

DIGM T680 Special Topics in Digital Media 0.0-12.0 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

DIGM T780 Special Topics in Digital Media 0.0-12.0 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

DIGM T880 Special Topics in Digital Media 0.0-12.0 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

DIGM T980 Special Topics in Digital Media 0.0-12.0 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

E-Learning

Courses

ELL 501 The Purpose and Business of E-Learning 3.0 Credits

Examines the business side of e-learning. Explores historical, organizational and strategic issues associated with developing and delivering e-learning through a wide range of topics. Non-profit and profit models used for marketing and delivering e-learning products are examined and business practices, as they affect the success of e-learning enterprises, are examined.

College/Department: School of Education

Repeat Status: Not repeatable for credit

ELL 502 E-Learning Technologies 3.0 Credits

This course provides a comprehensive introduction to the wide range of emerging e-learning technologies, a description of what is in store for the near future, and foundational elements for sound decision making regarding technological responses to well-defined learning problems.

College/Department: School of Education

Repeat Status: Not repeatable for credit

ELL 503 Teaching and Learning Issues in E-Learning 3.0 Credits

This course prepares trainers, teachers, and administrators at all educational levels with the knowledge they will need to provide effective experiences in distance education. Provides a conceptual and theoretical foundation as well as practical skills and knowledge, along with numerous opportunities for hands-on experience.

College/Department: School of Education

Repeat Status: Not repeatable for credit

ELL 504 Learning Technologies & Disabilities 3.0 Credits

The course is designed to develop the knowledge and skills required to utilize adaptive and assistive technology (AT) and accommodation in the facilitation of learning design and delivery.

College/Department: School of Education

Repeat Status: Not repeatable for credit

ELL 604 Design & Delivery of E-Learning I 3.0 Credits

Extends and assimilates knowledge of several facets of e-learning (planning, technology, pedagogy, usability, and more) to develop a proposal to an RFP or a proposal for a grant related to e-learning. The course emphasizes theory and practice.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: ELL 501 [Min Grade: C] and (ELL 502 [Min Grade: C] or ELL 503 [Min Grade: C])

ELL 605 Design & Delivery of E-Learning II 3.0 Credits

Using the proposal written in ELL 604, students create an implementation plan for and limited development of an e-learning solution. Specific topics such as project management, budgeting, assessment, staffing, and technology will be addressed. The course emphasizes theory and practice.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: ELL 604 [Min Grade: B]

ELL 695 Applied Project in E-Learning Leadership I 3.0 Credits

The first of a two-course sequence in which students create a full-scale project in e-learning that demonstrates the knowledge and skills that they have acquired from the ELL concentration. Students complete five deliverables that form the foundation for ELL 696, which will result in a professional-level E-Learning project.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: ELL 501 [Min Grade: C] and ELL 502 [Min Grade: C] and ELL 503 [Min Grade: C] and ELL 504 [Min Grade: C] and ELL 605 [Min Grade: C]

ELL 696 Applied Project in E-Learning Leadership II 3.0 Credits

The second of a two-course sequence in which students create a full-scale project in E-Learning that demonstrates the knowledge and skills that they have acquired from the ELL concentration. Students complete three deliverables that, added to the work from ELL 695, result in professional-level E-Learning project.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: ELL 695 [Min Grade: C]

ELL I599 Independent Study in ELL 0.0-12.0 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

ELL I699 Independent Study in ELL 0.0-12.0 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

ELL I799 Independent Study in ELL 0.0-12.0 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

ELL I899 Independent Study in ELL 0.0-12.0 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

ELL I999 Independent Study in ELL 0.0-12.0 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

ELL T580 Special topics in ELL 0.0-12.0 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

ELL T680 Special topics in ELL 0.0-12.0 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

ELL T780 Special topics in ELL 0.0-12.0 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

ELL T880 Special topics in ELL 0.0-12.0 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

ELL T980 Special topics in ELL 0.0-12.0 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

Economics

Courses

ECON 540 Intro to Econometrics and Data Analysis 3.0 Credits

This course will provide students with a hands-on introduction to econometrics, emphasizing both theory and applications. The applied side of the course will focus on developing students' data manipulation and programming skills in econometric software. The theory side of the course will cover basic probability theory, hypothesis testing, simple linear regression and multiple regression models.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ECON 548 Mathematical Economics 3.0 Credits

Discusses the application of mathematics in economic models, with extensive discussion of economic applications of calculus and other mathematical tools. Considers implications of the assumptions of maximization of profits and utility. Stresses mathematical models and techniques useful in theoretical and applied applications of economics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ECON 550 Econometrics 3.0 Credits

This course is an applied course in econometrics for Masters students and covers some statistical tools to understand economic relationships. Economic applications will be discussed and real economic data will be analyzed.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C] or STAT 510 [Min Grade: C]

ECON 560 Time Series Econometrics 3.0 Credits

The objectives of this course are to introduce the students to time series econometric models and to provide them with 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: (STAT 610 [Min Grade: C] or ECON 550 [Min Grade: C] or ECON 540 [Min Grade: C]) and (BUSN 502 [Min Grade: C] or ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C])

ECON 601 Managerial Economics 3.0 Credits

Covers demand and cost analysis, pricing policies, and selected topics of economic analysis as they relate to business policies.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ECON 610 Microeconomics 3.0 Credits

This course develops microeconomic theory with advanced mathematical tools. It covers models of consumer behavior and individual decision making including responses to price and income changes, choice over time, and choice under uncertainty. Students will also learn how technology and cost affect firm decisions, and how consumer and producer behavior interact to determine prices in competitive markets. The course includes applications of microeconomic theory to policy making.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ECON 614 Macroeconomics 3.0 Credits

Provides an in-depth analysis of 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. Emphasizes the use of theory to understand past and current macroeconomic events.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 548 [Min Grade: C] or ECON 610 [Min Grade: C]

ECON 616 Public Finance and Cost Benefit Analysis 3.0 Credits

Introduces market failure as a justification for government provision of public goods and regulation. Covers public choice theory and cost-benefit analysis for public expenditure, impact of taxation on efficiency, incidence of taxes, personal and corporate income taxes, and fiscal federalism.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 502 [Min Grade: C] or ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

ECON 621 Business, Government, and Global Macroeconomics 3.0 Credits

The emergence of a globalized and interconnected economy means that adverse macroeconomic events can greatly impact a firm's performance. Witness for example the 2007-08 financial crisis and ensuing recession in the US, or the fiscal crises in Europe. To effectively respond to these risks and opportunities, business leaders need to have a sound understanding of the key economic and institutional factors that affect their firm's environment. Relying primarily on a case-based learning approach, we will study key macroeconomic events and policies that have had widespread implications for society and firms doing business in a country. The experience gained from analyzing these phenomena with a coherent framework will provide managers with a competitive advantage.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C] or BUSN 502 [Min Grade: C]

ECON 625 Urban and Real Estate Economics 3.0 Credits

The course applies economic concepts to the study of real estate markets, including the determinants of urban development, residential and commercial construction and investment, real estate prices, and rents. We will examine how national and local economic policies impact the supply and demand for housing and housing prices, and how government policies can correct for or exacerbate market imperfections.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 601 [Min Grade: C] or BUSN 502 [Min Grade: C]

ECON 630 International Economics 3.0 Credits

Examines the theoretical principles guiding international trade. Emphasizes the gains from trade, exchange rates, and balance-of-payments adjustments.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

ECON 631 International Macroeconomics 3.0 Credits

This is a course in open economy macroeconomics. Key topics include: The Real Business Cycle (RBC) model in an open economy, the effects of interest rate shocks in small open economies, the determination of equilibrium terms of trade, non-tradable goods and the real exchange rate, the role of price rigidity in the determination of nominal exchange rates, exchange rate regimes, capital controls and labor markets, balance of payments crises and sovereign default.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 614 [Min Grade: C]

ECON 634 History of Economic Analysis 3.0 Credits

Traces the development of economic principles and ideas to the present time. Emphasizes the historical changes that have taken place in the frameworks of economics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ECON 639 Applied Industrial Analysis 3.0 Credits

This course will provide students with the theoretical and empirical tools to determine how markets work and to answer a variety of policy-relevant questions. For each topic, students will use real data and court documents to justify their conclusions, so econometrics is a prerequisite for taking the course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 610 [Min Grade: C] and ECON 550 [Min Grade: C]

ECON 644 Trade Policy: Theory and Evidence 3.0 Credits

This course reviews the major theories of international trade. It then introduces a series of trade policy instruments, and analyzes their effects on various economic outcomes. It develops a practical guide to benchmark partial and general equilibrium analysis of the effects of trade policy. Students will also address policy issues of current and ongoing concern.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 610 [Min Grade: C] and STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C]

ECON 650 Business & Economic Strategy: Game Theory & Applications 3.0 Credits

This course discusses business strategy in the context of the "game theory" approach to strategic interaction, with additional tools drawn from industrial organization and economic theory. Alternative approaches to pricing strategy, strategic investment, strategies of technological innovation, market entry, and information release; strategy for design of and participation in auctions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C] or STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C]

ECON 661 Health Economics 3.0 Credits

Use analytical techniques from microeconomics to analyze the inter-relationship between health care resources, providers, consumers, and markets.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

ECON 662 Economic Analysis of Health Systems 3.0 Credits

Using applies microeconomic models developed in ECON 661, this course analyzes the government's role in health care. Methodology for economic evaluation of health care intervention and analysis of the pharmaceutical industry.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 661 [Min Grade: C]

ECON 700 Economics Seminar 3.0 Credits

The Economics Seminar is a course designed to give students who have completed the first four quarters of the MS program in economics an opportunity to put what they have learned to work, and gain wider and deeper knowledge of the field, through discussions and writing.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is MSECN.

ECON 902 Mathematical Economics 3.0 Credits

The purpose of this course is to provide Ph.D. students with a survey of the basic math tools applied in the study of Microeconomics, Macroeconomics, Econometrics and related areas such as Finance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ECON 910 Advanced Microeconomics I 3.0 Credits

This course is intended to introduce the student to a rigorous treatment of Microeconomic Theory. Topics include an introduction to choice theory; the representative consumer's utility maximization problem; and the firm's profit maximization problem and choice under certainty.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 902 [Min Grade: C]

ECON 911 Advanced Microeconomics II 3.0 Credits

This course is a continuation of Advanced Microeconomics I. Topics to be covered include competitive markets, oligopoly model, adverse selection, signaling, screening, moral hazard, the principle-agent problem and auctions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 910 [Min Grade: C]

ECON 920 Advanced Macroeconomics I 3.0 Credits

This course introduces student to the basic tools and structures used in modern macroeconomic research. The course covers basic general equilibrium models of business cycles and growth including two period models: finite horizon models and infinite horizon models in both discrete and continuous time.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 902 [Min Grade: C]

ECON 921 Advanced Macroeconomics II 3.0 Credits

This course introduces students to models and techniques used extensively in macroeconomics. While focusing on tools, the course presents and discusses competing theories of monetary aspects of macroeconomic and short-run fluctuations in a closed economy, with several extensions to the open-economy setting.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 920 [Min Grade: C]

ECON 925 Macroeconomic Dynamics 3.0 Credits

This course introduces students to advanced methods and current research in Macroeconomics. The course will focus on dynamic macroeconomic models including theory, policy implications and numerical solution methods. Topics will be selected from Growth Theory, DSGE models, Calibration, Labor, Monetary Economics, Search Theory, and Banking and Business Cycles.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

Prerequisites: ECON 920 [Min Grade: C] and ECON 921 [Min Grade: C]

ECON 930 Monetary Economics 3.0 Credits

This course is designed to give students in-depth knowledge of the models used to investigate the interactions between real and monetary factors. Topics covered include short-run real effects of monetary policy, the credit channel of money, and types and effectiveness of monetary policy rules.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 920 [Min Grade: C]

ECON 940 Econometrics I 3.0 Credits

This course is an introduction to applied econometric techniques beyond Ordinary Least Squares (OLS). Many of the questions that arise in economics cannot be studied using linear estimation methods. Nonlinear estimation techniques will be presented with emphasis on interesting economic questions that can be analyzed using these methods.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 931 [Min Grade: C]

ECON 941 Econometrics II 3.0 Credits

This course examines advanced topics in time-series econometrics and its application to economic/finance research, unit-root tests, bivariate and multivariate co-integration relationships, causality and error correction models, vector autoregression models, and the time-varying heteroskedastic behavior of economic and financial data.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 940 [Min Grade: C]

ECON 942 Applied Microeconometrics 3.0 Credits

This course provides an advanced, in-depth study of many of the popular techniques used in the analysis of microeconomic data. Topics will include panel data, identification of causal effects, and Generalized Method of Moments estimation. The course will present theoretical models but will stress the implementation of the models to applied settings and the interpretation of the empirical results.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

Prerequisites: ECON 940 [Min Grade: C]

ECON 950 Industrial Organization I 3.0 Credits

This course is an introduction to theoretical industrial organization. We will examine how firms interact in markets characterized by imperfect competition.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 911 [Min Grade: C]

ECON 951 Industrial Organization II 3.0 Credits

This course introduces the student to research methods in industrial organization. The primary focus is on the use of empirical analysis, although relevant theoretical papers are discussed.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 950 [Min Grade: C]

ECON 952 Health Economics 3.0 Credits

This course discusses the economics of the health care system including government programs and policies that influence health.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 910 [Min Grade: C] and ECON 940 [Min Grade: C]

ECON 955 Public Economics 3.0 Credits

This course discusses the welfare effects of government expenditure programs, taxes, and other policies including their incentive effects on firms and households.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 910 [Min Grade: C] and ECON 940 [Min Grade: C]

ECON 959 Industrial Organization Seminar 3.0 Credits

This course will be team-taught by Economics faculty members whose research interest lie in the areas of Industrial Organization (theoretical and applied). It will be a continuation of IO-I (theory) and IO-II (applied).

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 951 [Min Grade: C]

ECON 960 International Trade 3.0 Credits

This course provides the student with an understanding of the theory of International Economics and some empirical issues. Topics include: determinants of trade patterns, gains from trade, international factor mobility, factor market distortions, strategic trade policy, and issues related to the theory of commercial policy and international finance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 910 [Min Grade: C]

ECON 961 Empirical International Trade 3.0 Credits

The purpose of this course is for students to be familiar with a number of important topics and papers in the empirical trade literature.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 960 [Min Grade: C]

ECON 962 Open Economy Macroeconomics 3.0 Credits

This course emphasizes macroeconomic issues and policies in an open-economy setting. Topics covered include: monetary and exchange rate regimes, international capital flows, and current issues in international macroeconomic policy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 920 [Min Grade: C] and ECON 940 [Min Grade: C]

ECON 964 Economic Development 3.0 Credits

This course examines a number of theoretical and empirical issues in economic development of underdeveloped economies, including topics dealing with growth, inequality, human capital, the relationship between international trade and economic development, and credit and labor market imperfections.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 910 [Min Grade: C]

ECON 969 International Trade Seminar 3.0 Credits

This course is the last of a three-course sequence of international trade at the graduate level. The course will be jointly taught by faculty with expertise in theoretical and/or empirical aspects of international trade and public policy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 960 [Min Grade: C] and ECON 961 [Min Grade: C]

ECON 979 Open Economy Macro Seminar 3.0 Credits

The objective of the course is to introduce students to current/relevant topics in open economy macroeconomics (OEM) and international finance (IF) and get them started on their own individual research. The course emphasizes international macroeconomic and financial topics in an open-economy setting and relevant international policy issues. The course is organized as a broad-based reading on main issues in OEM/IF and producing and presenting a research paper.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ECON 962 [Min Grade: C]

ECON 980 Game Theory 3.0 Credits

This course introduces concepts and tools of game theory as they enter into business and economics research. Topics to be covered include Nash equilibrium, games in extensive form and repeated games, together with critical and scholarly controversies about game theory.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ECON 998 Dissertation Research in Economics 1.0-12.0 Credit

Dissertation Research in Economics.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

ECON I599 Independent Study in ECON 0.0-12.0 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 I699 Independent Study in ECON 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

ECON I799 Independent Study in ECON 0.0-12.0 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 I899 Independent Study in ECON 0.0-12.0 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 I999 Independent Study in ECON 3.0 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 9 credits

ECON T580 Special Topics in ECON 0.0-12.0 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 T680 Special Topics in ECON 0.5-9.0 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 T780 Special Topics in ECON 0.0-12.0 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 T880 Special Topics in ECON 0.0-12.0 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 T980 Special Topics in ECON 0.5-9.0 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 500 Foundations of Human Resources Development 3.0 Credits

Introduces HRD as a professional field of practice, places HRD within the context of the contemporary workplace, presents theories, paradigms, and issues in the field; introduces the concept of a learning organization and the HRD practitioner as a change agent.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 600 Organizational Consulting 3.0 Credits

Prepares students to be effective internal or external consultants for management. Covers partnering and contracting skills, organizational diagnosis and feedback, intervention strategies, interpersonal communications, influencing skills, and ethics.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 601 Leading and Evaluating Change 3.0 Credits

This course serves as introduction to the study and practice of organization development and change. Students will gain a broad understanding of the field including its philosophy, history, models, and techniques used in facilitating system-wide as well as incremental organizational change and improvement. Issues related to values, ethics, and organizational assessment and diagnosis are explored.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 602 Coaching and Mentoring for Sustainable Learning 3.0 Credits

The purpose of this course is to develop leaders at executive levels into organizational mentors who help to sustain a learning culture in organizations. Using readings, written assignments, self-assessments, case studies, and group activities, students will learn specific skills & concepts of effective mentoring/coaching for building learning communities in organizations. The course will address how coaching and mentoring can be used as effective development initiatives for nurturing learners at all levels within organizations.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 603 Performance Competencies 3.0 Credits

Using their own organization as a learning laboratory and a company sponsor/mentor, students will demonstrate 4 core competencies: 1) Technical Competencies (related to the technical aspects of training); 2) Business Competencies (related to the understanding of staffing principles and budgeting); 3) Intellectual Competencies (related to thinking and processing of information) and 4) Interpersonal Competencies (related to how we interact and communicate with others. Students will present a case study critiqued by instructor and company mentor.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 604 Development of Human Resources 3.0 Credits

The purpose of this Advanced Seminar Course is to develop human resources in the organization. Students will learn ways to invest in the talents and expertise of people within a culture conducive to information and knowledge sharing of professional practices. Career development and succession planning will be studied and applied for future leadership practices.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 605 Organizational Learning & Strategy 3.0 Credits

This course assists leaders at executive levels understand the need to align learning functions with strategic, organization goals; develop awareness and understanding of how organizations are designed and structured; and the implications of leading and managing learning organizations. Using a research-based model of organization theory, students will learn to build organizational cultures that support strategic alignment of learning by making learning relevant to businesses' daily workflow.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 606 Human and Organizational Performance 3.0 Credits

Systemic strategies for attaining continuous improvement in the private and public sector marketplace are examined. This includes the concept of human performance improvement in research and practice and the role of the performance improvement professional in facilitating individual, team, and organizational performance to support and sustain these strategies.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 607 Global Human Resource Development 3.0 Credits

This course explores the scope of human resource development programs in multinational and global settings. Using readings, written assignments, case studies, and group activities, students will learn about the national and international trends and initiatives regarding human resource development with a focus on the influence and impact of a diverse and global workforce.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 609 Training and Development 3.0 Credits

This introductory course provides an overview of the training and development component of human resource development. While delivering the traditional components of training assessment, design, delivery, implementation, and evaluation, this course also explores alternative 'training' modalities. The course is designed to provide participants a working knowledge of the basic skills required to be successful trainers in a current organizational environment. The course is also designed for participants to challenge the dominant assumptions under which trainers are asked to work.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 650 Learning Leadership in Organizations 3.0 Credits

Examinations of cyclical continuum beginning with individual learning, extending through work unit and corporate learning activities, and resulting in organizational success indicators. Students will explore structures for promoting and sharing learning, such as the corporate "university," systems theory, career development and other techniques employed by learning leaders. The course will illumine leadership attributes of the chief learning officer and methodologies for inspiring an organizational culture of leadership.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD 660 Principles of Adult Learning 3.0 Credits

This course explores in-depth analysis of relevant theories relating to contemporary application of adult learner materials and methods. Many adult education theories and practices are explored to provide the participants with a broad understanding of andragogy (the art and science of teaching adults) and how it relates to the field.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EHRD I599 Independent Study in EHRD 0.0-12.0 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

EHRD I699 Independent Study in EHRD 0.0-12.0 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

EHRD I799 Independent Study in EHRD 0.0-12.0 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

EHRD I899 Independent Study in EHRD 0.0-12.0 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

EHRD I999 Independent Study in EHRD 0.0-12.0 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

EHRD T580 Special topics in EHRD 0.0-12.0 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

EHRD T680 Special topics in EHRD 0.0-12.0 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

EHRD T780 Special topics in EHRD 0.0-12.0 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

EHRD T880 Special topics in EHRD 0.0-12.0 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

EHRD T980 Special topics in EHRD 0.0-12.0 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

Education Improvement & Transformation

Education Improvement Transformation Courses

EIT 715 EIT Evaluation, Assessment and Capstone Preparation 4.5 Credits

Students will review evaluation and assessment practices and propose an action research capstone project in the area of Educational Improvement and Transformation that demonstrates the skills and tools they have garnered in obtaining their Drexel Professional Development certifications and/or concentrations. The project is to provide the student with real-life, hands on experience in being a change agent.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EIT.

EIT I599 Independent Study in EIT 0.0-12.0 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

EIT I699 Independent Study in EIT 0.0-12.0 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

EIT I799 Independent Study in EIT 0.0-12.0 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

EIT I899 Independent Study in EIT 0.0-12.0 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

EIT I999 Independent Study in EIT 0.0-12.0 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

EIT T580 Special topics in EHRD 0.0-12.0 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

EIT T680 Special topics in EIT 0.0-12.0 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

EIT T780 Special topics in EIT 0.0-12.0 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

EIT T880 Special topics in EIT 0.0-12.0 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

EIT T980 Special topics in EIT 0.0-12.0 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

Education Learning Technologies

Courses

EDLT 503 The Learning Sciences 3.0 Credits

This course draws from research in the cognitive sciences, education, and computer sciences. It covers three broad themes around sociocultural, design, and cognition domains. Learners are expected to become competent in understanding cognitive and sociocultural perspectives on learning, as well as perspectives on the design of learning environments for teaching and learning in both school and non-school settings. In addition, the relevance and impact of the learning sciences on specific learning technologies is explored and demonstrated.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 511 Computer Skills for Teachers 3.0 Credits

Presents major instructional design concepts students will use in developing their own curricular materials. Describes and discusses 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

EDLT 512 Using and Integrating Learning Technologies 3.0 Credits

This course covers learning theories and recent research relevant to emerging trends in technology and their possible effects on learning. Students will demonstrate strategies for using and integrating technologies in the design, implementation, integration, and assessment of technology based applications in formal and informal learning settings. Students will also investigate the role of leadership and innovation in technology related change in education and learning.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 525 Design for Learning with Digital Media 3.0 Credits

Investigates the relationship among learning sciences, theory, technology, and design in the creation of learning goals and experiences. Special emphasis is placed on the integration of technology in order to enhance effective learning. Learners will design learning activities, create them, implement them, and assess their effectiveness with digital tools. Issues in digital citizenship, collaboration, affordability, and continuous learning will also be examined.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 532 Designing Virtual Communities for Staff Development - Non-Field Experience 3.0 Credits

Examines the impact of distance learning and multimedia technologies on the educational systems of teachers, administrators, librarians, and other professionals in schools responsible for technology and professional development. Online discussion groups, video conferencing, and web-based instruction will be used to form a virtual learning community. There is no field experience component in this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 533 Designing Virtual Communities 3.0 Credits

Examines the impact of distance learning and multimedia technologies on the educational systems of teachers and other professionals responsible for technology and professional development. Online discussion groups, video conferencing, and Web-based instruction will be used to form a virtual learning community. This course includes a 20-hour internship for ITS certification.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 534 Developing Educational Leaders Using Technology 3.0 Credits

Addresses leadership and team building competencies that instructional technologists need to work collaboratively with teachers, administrations, parent groups, and the community. Will use technologies that facilitate communication and team building.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 535 Researching & Evaluating Instructional Technology 3.0 Credits

Course will focus on teaching and learning technology standards, general applications of technology and basic technology and skills. Will examine and critique educational software and learning technologies, and through research, develop criteria for technology. This course includes a 1-2 day field-based research assignment.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 536 Learning Sciences and Instructional Design 3.0 Credits

The learning sciences and learning by doing bring about a new instructional design emphasis on how the learning technologies provide scaffolding for collaborative learning and reasoning. Students will learn innovative learning techniques and develop an experiential learning design such as, problem-based learning, goal-based scenarios, role-plays, mini-games and simulations.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EDLT.

EDLT 537 Technologies for Performance Support 3.0 Credits

This course focuses on online performance support systems, job aids, and assessment tools for e-portfolios, authentic assessments, and data collection to meet performance requirements in education and business. Students will have experience in designing embedded interventions for information help, procedural support, feedback and tracking goals, and develop their own e-portfolio.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EDLT.

EDLT 538 New Media Literacies 3.0 Credits

Students will learn how new media are changing the dimensions of school literacies and challenge traditional ways of learning and communicating. Students will use action research to study current literacies, collaboratively explore and analyze a range of media texts, and design meaningful media-related literacy learning experiences across the curriculum.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EDLT.

EDLT 539 EDLT Co-op Seminar Course I 1.5 Credit

The first of a two course sequence in which the student proposes and arranges for a part-time co-op experience/project in the field of learning technologies. In the weekly seminar, students share journal entries, do assigned readings and participate in discussions.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EDLT.

Prerequisites: EDLT 536 [Min Grade: C] and EDLT 537 [Min Grade: C] and EDLT 538 [Min Grade: C]

Corequisite: EDAM 538

EDLT 540 EDLT Co-op Seminar Course II 4.5 Credits

Students implement co-op/capstone project proposed in EDLT 539 to apply knowledge, skills, principles and experiences from the learning technologies coursework and field experiences through action research. Students gain practical skills through culminating, comprehensive ePortfolio based on explicit criteria including samples of work in the co-op experience/project and formally present it and the experience to a panel of professionals.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is EDLT.

Prerequisites: EDLT 539 [Min Grade: C]

EDLT 541 Foundations of Game-Based Learning 3.0 Credits

Students explore the rationale of game studies, the history of games and learning, the role of digital media, and the social nature of games as an affinity space for social learning. Students demonstrate their understanding of why games are powerful environments for learning, identity formation, and motivation.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 542 Research in Motivation & Game-based Learning 3.0 Credits

This course introduces students to research in game-based learning and the role of motivational theories associated with games and player styles. Students conduct research on existing games to identify the motivational and learning factors. The course provides a foundation for incorporating the role of motivation for engaging learning.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 543 Play & Learning in a Participatory Culture 3.0 Credits

Students examine games, emerging media, and learning in the context of participatory culture. 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.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 544 Integrating Games & Pedagogical Content Knowledge 3.0 Credits

Students use the technological, pedagogical and content knowledge (TPACK) educational technology framework. Students explore game design systematically by framing game genres as forms of pedagogy as they consider educational content. Students demonstrate their understanding of the interplay of technology, pedagogy, and content in the game environment.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 545 Design & Development of Learning Games I 3.0 Credits

This course introduces students to the design process of creating learning games. Students will engage in the game design research process of understanding how to apply content and pedagogical elements to a game storyline along with understanding other key elements such as mechanics, technology, and aesthetics.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLT 544 [Min Grade: C]

EDLT 546 Design & Development of Learning Games II 3.0 Credits

This course engages students in the design of a framework for their capstone project using techniques learned in EDLT 545: Design/Dev Learning Games I. Students work in teams to develop a detailed learning games framework.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLT 545 [Min Grade: C]

EDLT 547 Capstone Project I 1.5 Credit

This capstone course is the first part of an independent study where students engage in designing a framework and conducting research. Each student researches a game concept and develops a design framework. Research includes user research and technological, pedagogical and content theories to create the foundation for their learning game.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLT 546 [Min Grade: C]

EDLT 548 Capstone Project II 4.5 Credits

This capstone course is the 2nd part of an independent study where students engage in a design and development project based on their design framework. Students submit documents, conduct play testing, report on the testing results, write a descriptive analysis of their worked example, and present their game prototypes.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLT 547 [Min Grade: C]

EDLT 550 Introduction to Instructional Design 3.0 Credits

Students examine the research and theory of instructional design models and formats in educational, corporate, and workplace settings. Students identify the interrelationships of context, technology and media resources, learner needs and goals, and learning and assessment strategies through case study analysis. Students design an action plan for a learning need.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 551 Instructional Design Methods 3.0 Credits

In this course, students will be introduced to the practice of instructional design and develop fluency with the models that support instructional design activities. Beginning with an overview of the history and development of instructional design, students will explore how instructional design differs in the domains of higher education, K-12, corporate, and non-profit environments. The impact of educational research such as learning theories and student engagement on instructional design will be investigated. Students will also consider the impact of technology on instructional strategies and delivery and gain proficiency with several tools. The course will culminate with a project that draws on the knowledge and skills that students have developed throughout the term.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 552 Instructional Design: Project Management 3.0 Credits

This course will lead students through the full lifecycle of an instructional design project. Students will learn to develop a project's scope, work with stakeholders, develop schedules, identify accountability, and consider the pedagogical factors in their project. They will then move through the development, design and implementation phases; using formative feedback and multiple iterations to complete their project.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 553 Instructional Design: Special Topics 3.0 Credits

In this course students will be exposed to an array of special topics related to the research and practice of instructional design, including learning science, assessment of learning, emerging technologies and technology integration, universal design for learning, learning theories, and more. Students will select two of these topics to explore more deeply, one through a research paper and one through a practical project. They will also reflect on the use of instructional design in multiple contexts and their own agency in influencing the practice of instructional design in their own organizations.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 554 Learning with Social Media and Mobiles 3.0 Credits

Students learn to use social media tools based on a more relevant pedagogy of 21st century learning and change. Students examine the culture of connectivity and networking, use mobile learning strategies and role play, and design an action plan that incorporates social media for learning outcomes.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 561 Design-Based Research Methods 3.0 Credits

This course introduces students to multi-disciplinary design-based research methods in educational research, while providing an intensive experience in implementing a design-based research study. Focused on the conceptualization of a design-based research study and the associated design of learning environments, the course features a research case study approach. Students will explore how the specific research goals a scholar brings to design-based research (e.g. the refinement of an existing learning environment or the creation of a novel one) determine the appropriate form of inquiry.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT 811 Designing and Developing Multimedia Applications For Learning 3.0 Credits

Allows students to design and develop a multimedia application for learning using an object-oriented authoring application and the process of design, development, and testing. Demonstrates and applies principles of learning that affect interface design, instructional design, storyboarding, navigation, interactivity, and feedback design.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLT I599 Independent Study in EDLT 0.0-12.0 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

EDLT I699 Independent Study in EDLT 0.0-12.0 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

EDLT I799 Independent Study in EDLT 0.0-12.0 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

EDLT I899 Independent Study in EDLT 0.0-12.0 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

EDLT 1999 Independent Study in EDLT 0.0-12.0 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

EDLT T580 Special topics in EDLT 0.0-12.0 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

EDLT T680 Special topics in EDLT 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

EDLT T780 Special topics in EDLT 0.0-12.0 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

EDLT T880 Special topics in EDLT 0.0-12.0 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

EDLT T980 Special topics in EDLT 0.0-12.0 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

Educational Administration

Courses

EDAM 700 Leading in Urban, Rural and Suburban Settings 3.0 Credits

Provide school leadership experiences from three settings: urban, rural and suburban. The study of the similarities and differences within and across these types of schools to learn effective leadership skills and strategies will be examined. They will identify significant educational issues pertaining to these locales and use problem-solving skills, visitations, recent research and scenarios.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 701 Resource Management, Allocation and Entrepreneurship 3.0 Credits

Students learn to find, use and allocate needed resources for their schools, communities, and organizations from experienced business and school leaders. Management and monitoring technology tools for optimum effective use of resources and how to gain entrepreneurship skills for expanding opportunities to gain new resources will be explored.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 702 School Leadership & Decision Making 3.0 Credits

This course will focus on decision-making in the schools. Emphasis will be placed on major challenges and opportunities in the work world of the principal and the interpersonal skills of school leadership.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 705 School Law and Politics 3.0 Credits

This course is designed to assist students with their understanding of how law, politics, and power structures interact to influence the goals and operations of the schools. Students will study the roles of school boards and community organizations, state boards of education, state government agencies, special interest groups, professional organizations, and unions.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 708 Integration of Technology with School Instruction and Management 3.0 Credits

In this course students will investigate learning theory and its implication for interactive multimedia learning formats including the relationship of instructional design principles to selection of multimedia elements.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 710 School Finance and Facilities 3.0 Credits

In this course, students will study the school budgeting process and school facilities management. Students will receive an overview of the basic financial and facility issues, unique to education that affect individual school buildings.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 712 School and Community Partnerships and Relations 3.0 Credits

In this course, students will study the skills, techniques and attitudes school leaders need to work effectively with school constituents.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 714 Instructional and Curriculum Leadership 3.0 Credits

In this course, students will examine the relationship between school culture and classroom instruction. Students will study the five fundamental tasks of instructional leadership (direct assistance, group development, professional development, curriculum development, and action research). Students will also investigate effective classroom observation methods.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 715 School Principal Internship: Technology 1.5 Credit

This yearlong intensive internship is the activity for the students in the Drexel Education Leadership Program. During this course, the students will put school leadership theory and knowledge to practical application.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 716 School Principal Internship: Finance 1.5 Credit

The yearlong intensive internship is the culminating activity for the students in the Drexel Education Leadership Program. During this course, the students will put school leadership theory and knowledge to practical application.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 717 School Principal Internship: Leadership 1.5 Credit

The yearlong intensive internship is the culminating activity for the students in the Drexel Education Leadership Program. During this course, the students will put school leadership theory and knowledge to practical application.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 718 School Principal Internship: Relations 1.5 Credit

The yearlong intensive internship is the culminating activity for the students in the Drexel Education Leadership Program. During this course, the students will put school leadership theory and knowledge to practical application.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 722 Evaluation & Assessment Competencies 3.0 Credits

Procedures and tools of research will be used to evaluate school programs. Program of evaluation in a school setting will be implemented. Essential assessment principles about the importance of implementing an assessment system, distinguish between assessments of learning versus assessment for learning, and about the types of student work samples needed for monitoring and reporting will be examined. Data on norm-referenced and other standardized tests in reporting achievement will be explored.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 724 Mentoring and Collaborative Leadership 3.0 Credits

Research and experience on mentoring as a critical need in sustaining new teachers, creating renewal for experienced teachers, and building leadership capacity across the staff will be the focus of this course. Specific skills and concepts for effective mentoring/coaching of others and collaborative leadership will be examined. The importance of establishing learning communities in schools will be emphasized with a student's plan for induction within context of supportive school practices.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 726 Interpreting & Evaluating Research & Achievement Data 3.0 Credits

Substantive opportunities for interpreting and evaluating different kinds of research with established criteria will be provided. Ways to lead school teams in analyzing, interpreting and evaluating student achievement data (from several sources, both formative and summative) to monitor student learning, to improve curriculum and instruction, to meet NCLB requirements and for reporting to the community. A balanced perspective in reviewing data from group achievement data to the collaborative analysis of an individual student's work over time will be explored.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDAM 722 [Min Grade: B] or EDAM 522 [Min Grade: B]

EDAM 728 Research Methodology for Action Research 3.0 Credits

Provides rationale, theoretical constructs and methodology for conducting Action Research within a school and/or classroom setting. Significant practical applications for other school practitioners.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 740 Action Research Project 3.0 Credits

Students will complete the written research project according to established criteria building from the four stages of Action Research completed in previous course work. The research will be shared in an article or summary form on the School of Education website.

College/Department: School of Education

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: EDAM 728 [Min Grade: B] or EDAM 528 [Min Grade: B]

EDAM 750 Leadership in K-12 Virtual Schools I 3.0 Credits

Students will examine K-12 virtual school leadership issues including policy, accountability, finance, and infrastructure in virtual schools. Case study and critical analysis of existing virtual school policy and procedure are addressed.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 752 Leadership in K-12 Virtual Schools II 3.0 Credits

Students examine K-12 virtual leadership issues including professional development, teacher evaluation student, counseling and communication. Differentiation strategies among early childhood, adolescent and secondary students is explored.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 817 Curriculum Models 3.0 Credits

Allows candidates to develop models of curricula aligned with local, state, and national standards. Presents strategies for interdisciplinary teaching, creating constructivist learning environments, and developing integrative curriculum modules. Considers learning styles in effective methods that will be modeled and implemented in the course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 820 School Superintendency 3.0 Credits

This course is designed to provide both theoretical and practical insights into the evolving responsibilities associated with being the chief executive office of a school system.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 801 [Min Grade: C] and EDUC 802 [Min Grade: C]

EDAM 824 Parents and Schools 3.0 Credits

This course provides the candidate with the skills required by system-level administrators to work with a broad spectrum of constituencies. Students will focus on the major issues facing families, especially those that mitigate against strong home-school relations, such as poverty, domestic violence, and drug abuse.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 827 School Superintendent's Internship: Curriculum Models 1.0 Credit

This is a yearlong internship in various central office positions depending on the candidate's career preferences. The experience will focus on school issues of a system-wide impact, such as policy development, long-range planning, school board function and personnel management.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 828 School Superintendent's Internship: Parents and Schools 1.0 Credit

This is a yearlong internship in various central office positions depending on the candidate's career preferences. The experience will focus on school issues of a system-wide impact, such as policy development, long-range planning, school board function and personnel management.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 829 School Superintendent's Internship: Budget and Finance 1.0 Credit

This is a yearlong internship in various central office positions depending on the candidate's career preferences. The experience will focus on school issues of a system-wide impact, such as policy development, long-range planning, school board function and personnel management.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM 830 School Superintendent's Internship: Human Resource Development 1.0 Credit

This is a yearlong internship in various central office positions depending on the candidate's career preferences. The experience will focus on school issues of a system-wide impact, such as policy development, long-range planning, school board function and personnel management.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDAM I599 Independent Study in EDAM 0.0-12.0 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

EDAM I699 Independent Study in EDAM 0.0-12.0 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

EDAM I799 Independent Study in EDAM 0.0-12.0 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

EDAM I899 Independent Study in EDAM 0.0-12.0 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

EDAM I999 Independent Study in EDAM 0.0-12.0 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

EDAM T580 Special topics in EDAM 0.0-12.0 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

EDAM T680 Special topics in EDAM 0.0-12.0 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

EDAM T780 Special topics in EDAM 0.0-12.0 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

EDAM T880 Special topics in EDAM 0.0-12.0 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

EDAM T980 Special topics in EDAM 0.0-12.0 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

Educational Lifelong Literacy

Courses

EDLS 501 Current Practices in Literacy 4.5 Credits

This course provides students with an opportunity to examine the current practices and contemporary issues in PreK-12 reading, writing, and literacy across the subject areas. Theoretical models will be scrutinized for their implications in current curriculum and instruction. Assessment and accountability will be reviewed. Additional field experience hours are required for this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLS 503 Models of Reading 4.5 Credits

This course presents an introduction to the psychological processes of reading. Topics include psycholinguistics, sociolinguistics, literacy development, cultural influences of home and school, and attitude and motivation in the classroom. Students will investigate research topics in reading pedagogy. Additional field experience hours are required for this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 501 [Min Grade: C]

EDLS 505 Instruction in Early Literacy 4.5 Credits

This course emphasizes the development of oral language, early reading skills. Learning theories and recent research looking at early literacy issues of identification of at-risk diagnostic intervention strategies; English Language Learning for dual-language students; appropriate literacy environments; family and intergenerational literacy; and national standards will also be explored.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 501 [Min Grade: C] and EDLS 503 [Min Grade: C]

EDLS 507 Developmental Reading 4.5 Credits

This course bridges Children's Literature with child development and learning theory, helping teachers understand how high-interest books influence children's reading and writing development. Students will learn how children build story knowledge, language knowledge and word knowledge. Field experience hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 501 [Min Grade: C] and EDLS 503 [Min Grade: C]

EDLS 509 Strategic Instruction for Adolescent Readers and Writers 4.5 Credits

This course prepares teachers to teach reading/writing to adolescents in grades 4-12. It provides knowledge of the literacy needs of adolescents, with emphasis on strategies for content information. Fieldwork is required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 501 [Min Grade: C] and EDLS 503 [Min Grade: C]

EDLS 511 Designing a Research-based Literacy Program 4.5 Credits

This course prepares literacy specialists to design balanced reading programs for PK-12 schools. It provides methods for organizing and managing the classroom literacy environment, building reading centers, writing centers, and technology centers for a literacy rich routine. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 501 [Min Grade: C] and EDLS 503 [Min Grade: C]

EDLS 515 Literacy Evaluation & Assessment 4.5 Credits

This course prepares teachers to select, administer and interpret summative, and formative literacy assessments for the purposes of evaluating reading and language arts instruction. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 501 [Min Grade: C] and EDLS 503 [Min Grade: C]

EDLS 519 Secondary Content Reading 4.5 Credits

This course prepares teachers to teach and assess adolescents who are learning to read across the content areas. Students will gain an understanding of the inclusive nature of reading texts -textbooks, electronic texts, Internet resources, and multimedia materials. This course requires additional field experience hours.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 501 [Min Grade: C] and EDLS 503 [Min Grade: C]

EDLS 521 Scaffolding Literacy for English Language Learners 4.5 Credits

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 501 [Min Grade: C] and EDLS 503 [Min Grade: C]

EDLS 529 Literacy Practicum 9.0 Credits

This course is designed to prepare candidates for literacy specialist and literacy coach/mentor responsibilities. Candidates will complete activities to prepare them to the professional journey into and beyond the classroom. This course includes additional field experience.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 501 [Min Grade: C] and EDLS 503 [Min Grade: C] and EDLS 504 [Min Grade: C] and EDLS 505 [Min Grade: C] and EDLS 507 [Min Grade: C] and EDLS 509 [Min Grade: C] and EDLS 511 [Min Grade: C] and EDLS 515 [Min Grade: C] and EDLS 519 [Min Grade: C] and EDLS 521 [Min Grade: C]

EDLS 550 Theories of Reading and Writing 3.0 Credits

Course examines major developmental theories of literacy as they pertain to the development of literacy skills starting from infancy through adulthood. Course will also investigate major theoretical models of reading and writing acquisition and instruction in areas such as constructing literacy rich contexts for K-12 students; integrating literacy skills across the content areas; understanding the relationship between reading, writing, speaking and listening; and understanding the processes of how students develop and use reading and writing practices in meaningful ways. Major theoretical models of reading and writing inform decisions and purposes for using particular instructional practices and strategies in a variety of educational contexts, but with a specific focus on urban settings.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLS 555 Understanding Literacy through Sociocultural Perspectives 3.0 Credits

The central purpose of this course is to use sociocultural theories to investigate the wide range of "literacies" that students possess from diverse backgrounds in urban communities, and ones that literacy teachers can scaffold and build upon while developing their students' reading, writing, speaking, and listening skills. The course also investigates how linguistic differences and styles of language affect literacy acquisition for students from culturally and linguistically diverse backgrounds, and how literacy teachers can create an inclusive learning environment for all students. Students will also learn about the critical need for literacy teachers to create effective partnerships with parents from diverse urban communities in supporting the literacy development of their children at home.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLS 560 Reading and Writing in the Content Areas (7-12) 3.0 Credits

Students will learn how to identify and explain specific reading and writing expectations of the content areas as described in national and state standards. Language and reading development during adolescence will be explained with supporting evidence from theory and research. Major theories of reading and writing processes will be explored to understand needs of all learners in diverse contexts, and develop and implement the curriculum to meet the specific needs of struggling readers. Students will also learn how to support teachers in the design, implementation and evaluation of reading and writing curriculum that is responsive to diverse learners. Course requires some assigned field observation hours in a grade 7-12 school-based classroom.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 550 [Min Grade: B]

EDLS 565 Constructing Meaning through Reading and Writing 3.0 Credits

This course will emphasize literacy as a meaning-making process that is constructed through interaction of the text, the learner and the context. EDLS 565 will include an emphasis on literacy as a meaning making process in urban contexts. The ways in which reading, writing, listening and speaking work together to help learners decode and encode text will be explored. Various models of reading comprehension will be investigated and the power of the writing process to construct and communicate knowledge will be studied. Specific teaching strategies that increase students' ability to comprehend a variety of text types will be mastered. Instructional approaches that help learners to become fluent writers will also be learned.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 550 [Min Grade: B] and EDLS 555 [Min Grade: B]

EDLS 570 Literacy and Evaluation 3.0 Credits

This is a 3 credit course designed to prepare students to develop and use a variety of assessment tools for planning and evaluating effective reading and writing instruction. Students will understand the monitoring of performance at individual, classroom, school, and statewide levels. Understanding the important role of assessment in informing instruction is stressed. Students will learn to analyze data and communicate the findings to the necessary individuals in order to improve instruction.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 550 [Min Grade: B]

EDLS 575 Responding to Children's and Young Adult Literature 3.0 Credits

This course will begin with an overview of the history of children's and young adult literature in the classroom. Participants will learn meaningful ways in which diverse genres of literature can be embedded across all instructional contexts. The course will then explore the ways in which learners can respond to these texts using academic, aesthetic, critical, and personal lenses. The course will emphasize the unique opportunities and challenges of responding to children's and young adult literature in urban settings. The role of eBooks and other reading technologies in the literacy learning process will also be studied.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLS 620 Applied Methods in Multisensory Reading Instruction 1.0 Credit

This course provides students with an introduction to multisensory structured language instruction with the Wilson Reading System® (WRS). This course examines reading research and the five areas of reading in relation to students beyond grade two with persistent phonological coding deficits. Students will specifically study the Wilson Reading System® (WRS), including student identification and placement, program implementation, progress monitoring, scheduling, creating a successful classroom environment, principles of language structure, and how to teach language with direct, multisensory methods.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLS 621 Multisensory Reading Instruction 2.0 Credits

In this course students will be introduced to the use and methodology of research validated strategies that focus on the development of carefully sequenced literacy skills including print knowledge, alphabet awareness, phonological awareness, phonemic awareness, decoding, vocabulary, fluency, spelling and handwriting.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDLS 622 Basic Word Study I 3.0 Credits

This course presents in detail the multisensory structured language instruction that is required for teaching students beyond grade two with word-level deficits who are unresponsive to previous instruction. This course provides practical application of reading research, with particular emphasis on phonological awareness, phonics and spelling at the beginning levels of decoding and encoding as well as expands upon these concepts with specific instruction in the closed syllable pattern. Students will be provided with specific procedures to teach the concepts presented in Wilson Reading (WRS) Steps 1-3.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 620 [Min Grade: B]

EDLS 623 Basic Word Study II 3.0 Credits

This course presents in detail the multisensory structured language instruction that is required for teaching students beyond grade two with word-level deficits who are unresponsive to previous instruction. This course provides practical application of reading research, with particular emphasis on phonological awareness, phonics and spelling at the beginning levels of decoding and encoding as well as expands upon these concepts with specific instruction in the vowel-consonant-e, open, and consonant-le syllable patterns.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 620 [Min Grade: B] and EDLS 622 [Min Grade: B]

EDLS 624 Multisensory Practicum I 1.0 Credit

Supervised practicum requires identifying and securing a practicum student in grade 4-12 with significant word level deficits, selected according to practicum student selection criteria. A second, or back-up, practicum student is highly recommended, but that student does not have to meet all practicum student selection criteria. The practicum entails successful delivery of a minimum of 20 Wilson Reading System (WRS) lessons and teaching mastery through WRS Step 2.3.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 622 [Min Grade: B] (Can be taken Concurrently)

EDLS 625 Multisensory Practicum II 1.0 Credit

Supervised practicum requires identifying and securing a practicum student in grade 4-12 with significant word level deficits, selected according to practicum student selection criteria. A second, or back-up, practicum student is highly recommended, but that student does not have to meet all practicum student selection criteria. The practicum entails successful delivery of a minimum of 20 Wilson Reading System (WRS) lessons and teaching mastery through WRS Step 3.1.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 623 [Min Grade: B] (Can be taken Concurrently) EDLS 622 [Min Grade: B] and EDLS 624 [Min Grade: B]

EDLS 626 Multisensory Practicum III 1.0 Credit

Supervised practicum requires identifying and securing a practicum student in grade 4-12 with significant word level deficits, selected according to practicum student selection criteria. A second, or back-up, practicum student is highly recommended, but that student does not have to meet all practicum student selection criteria. The practicum entails successful delivery of a minimum of 20 Wilson Reading System (WRS) lessons and teaching mastery through WRS Step 4.2.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 623 [Min Grade: B] and EDLS 625 [Min Grade: B]

EDLS 650 Designing a Literacy Program 3.0 Credits

This course is designed for literacy leaders in classrooms, schools and other instructional settings. Participants will learn how to synthesize research-based approaches to instruction with local, state and national standards into a cohesive and effective literacy program. Strategies for evaluating literacy assessments and materials for literacy instruction will be examined. The critical role of professional collaboration in the creation and implementation of effective literacy programs will be highlighted. There will be an emphasis on successfully designing literacy programs for urban environments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDLS 550 [Min Grade: B] and EDLS 555 [Min Grade: B] and EDLS 560 [Min Grade: B] and EDLS 565 [Min Grade: B] and EDLS 570 [Min Grade: B] and EDLS 575 [Min Grade: B] and EDLS 620 [Min Grade: B] and EDLS 622 [Min Grade: B] and EDLS 623 [Min Grade: B]

EDLS I599 Independent Study in EDLS 0.0-12.0 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

EDLS I699 Independent Study in EDLS 0.0-12.0 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

EDLS I799 Independent Study in EDLS 0.0-12.0 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

EDLS I899 Independent Study in EDLS 0.0-12.0 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

EDLS I999 Independent Study in EDLS 0.0-12.0 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

EDLS T580 Special topics in EDLS 0.0-12.0 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

EDLS T680 Special topics in EDLS 0.0-12.0 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

EDLS T780 Special topics in EDLS 0.0-12.0 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

EDLS T880 Special topics in EDLS 0.0-12.0 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

EDLS T980 Special topics in EDLS 0.0-12.0 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

Educational Policy

Courses

EDPO 620 Education Policy: Concepts, Issues, and Applications 3.0 Credits

Examines concept of "policy" as it relates to education and educational institutions and their governance and practices. Related issues and applications that drive current national and global forces are explored with applications to education. Applied learning component of the course requires student to identify, research and apply understandings of both "policy" and current issues.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDPO 624 The Shaping of American Education Policy: Global Forces, Interest Groups, and Politics 3.0 Credits

This course develops and deepens understanding of impact of education policies and how in combination they hold the potential for transforming American education. Learning activities encourage investigation, analysis, and speculation about educational policies and the three forces that shape them: global forces, public interests, and politics.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDPO 628 American Educational Policy and U.S. Competitiveness 3.0 Credits

Through the lens of educational policy, this course will explore the ties between K-12 education, higher education and lifelong learning on the one hand and economic and workforce development on the other hand. Linkages and policies will be examined in the contexts of what "global competitiveness" means at the national, state, and local levels.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDPO 632 Ethics in Educational Policy Making 3.0 Credits

The critical nature of ethics in educational policy-making is closely examined through a series of intersecting elements. A foundation of understanding is created by study of the concept of ethics and by practicing ethical decision-making strategies. Critical literature from the fields of ethics and of policy-making frame an investigation of how educational policy-making is impacted by global, technological, and demographic forces.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDPO 636 Access & Equity in Educational Policy Making 3.0 Credits

Researched and studied is the myriad of phenomenon that can deny individuals full access to education. Critical analysis of past and present educational policies and the attempts to implement them reveal how legislators and educators have attempted to insure access and equity. A chosen issue in access and equity is researched and projections are made about how policy-makers might address it.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDPO 640 Educational Policy-Making Tactics & Influence 3.0 Credits

Methods for analyzing phenomenon that impact policy-making are practiced. From this foundation of critical analysis, an understanding is developed of the tactics needed for creating educational policies. Specific means of exerting influence on policy-makers are practiced in this applied learning course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDPO I599 Independent Study in EDPO 0.0-12.0 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

EDPO I699 Independent Study in EDPO 0.0-12.0 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

EDPO I799 Independent Study in EDPO 0.0-12.0 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

EDPO I899 Independent Study in EDPO 0.0-12.0 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

EDPO I999 Independent Study in EDPO 0.0-12.0 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

EDPO T580 Special topics in EDPO 0.0-12.0 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

EDPO T680 Special topics in EDPO 0.0-12.0 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

EDPO T780 Special topics in EDPO 0.0-12.0 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

EDPO T880 Special topics in EDPO 0.0-12.0 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

EDPO T980 Special topics in EDPO 0.0-12.0 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

Electrical & Computer Engineering

Courses

ECE 501 Topics in Circuits and Systems 3.0 Credits

Circuit laws, transfer functions, convolution, transform techniques, systems engineering. This series of courses may be used to meet the admission prerequisites to ECE graduate program. One credit per term is creditable to the M.S.E.E. degree.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 502 Topics In Communications, Controls and Computers 3.0 Credits

Modulation theory, noise, feedback theory, stability, computer engineering fundamentals, computers in communication and controls. This series of courses may be used to meet the admission prerequisites to the ECE graduate program. One credit per term is creditable to the M.S.E.E. degree.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 503 Topics in Mathematical Techniques In Electrical and Computer Engineering 3.0 Credits

Complex variables in communication and control, matrix methods in circuits and systems, vector calculus in fields, two-dimensional image processing. This series of courses may be used to meet the admission prerequisites to the ECE graduate program. One credit per term is creditable to the M.S.E.E. degree.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 571 Introduction to Electrical and Computer Engineering Research 0.0 Credits

Topics of departmental research. Thesis selection. Required of all full-time graduate students.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 572 Techniques of Electrical and Computer Engineering Research 0.0 Credits

Techniques for making technical presentations: oral and written modes. Meeting organization, audience awareness. Writer-to-reader communication. Required of all full-time graduate students.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 573 Presentation of Electrical and Computer Engineering Research 0.0 Credits

Conference attendance and critique. Student presentation and critique. Topics of concern: professional ethics, liability, etc. Required of all full-time graduate students.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 610 Machine Learning & Artificial Intelligence 3.0 Credits

This course introduces students to topics in modern machine learning, along with applications of machine learning to problems in engineering. Introductory topics will include an overview of classification, overfitting, cross-validation, and dimensionality reduction. Supervised classification approaches will be covered including linear classifiers, generative and discriminative models, non-probabilistic classification approaches, kernel methods, and neural networks. Topics in unsupervised learning will also be covered if time permits.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 521 [Min Grade: C] and ECES 523 [Min Grade: C]

ECE 686 Cell & Tissue Image Analysis 3.0 Credits

Theory and practice of building computational tools for biological image analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 687 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

ECE 695 Research Rotations in Cybersecurity 1.0-12.0 Credit

The research rotation course allows students to gain exposure to cybersecurity-related research that cuts across conventional departmental barriers and traditional research groups, prior to identifying and focusing on a specific interdisciplinary project or thesis topic. Students selecting to participate in research rotations would participate in the research activities of two labs for each three credits of research rotation they undertake.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE 697 Research 1.0-12.0 Credit

Research in electrical and computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE 898 Master's Thesis 1.0-12.0 Credit

Master's thesis in electrical and computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE 997 Dissertation Research 1.0-12.0 Credit

Graded Ph.D. dissertation research in electrical and computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE 998 Ph.D. Dissertation 1.0-12.0 Credit

Ph.D. dissertation research in electrical and computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECE I699 Independent Study in ECE 0.0-12.0 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

Electrical & Computer Engineering - Computers

Courses

ECE 500 Fundamentals Of Computer Hardware 3.0 Credits

Covers computer organization and architecture; elements of computer hardware, processors, control units, and memories; hardware for basic mathematical operations; tradeoffs between speed and complexity; examples of embedded systems; microcontrollers; systems modeling.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 501 Computational Principles of Representation and Reasoning 3.0 Credits

This course presents fundamentals of discrete mathematics as applied within the computer engineering and manufacturing environment. Students are given the theoretical background in representation and reasoning for a broad variety of engineering problems solving situations. Entity-relational techniques of representation are demonstrated to evolve into the object-oriented approach. Various search techniques are applied in the cases of representing engineering systems by using theory of automata techniques.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 502 Principles of Data Analysis 3.0 Credits

This course presents theoretical methods and techniques of model development applicable within the computer engineering design and manufacturing environment. Students are given the theoretical background in data analysis (including "data mining"). Emphasis is on hybrid systems and discrete events systems. Various methods of recognizing regularities in data will be presented. Elements of the theory of clustering and classification will be dealt with for the paradigm of software and hardware problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 503 Principles of Decision Making 3.0 Credits

This course presents theoretical fundamentals and engineering techniques of decision making and problem solving applicable within the computer engineering design and manufacturing environment. Students are given the theoretical background in optimization methods for a broad variety of situation. Elements of the theory of planning and on-line control of systems are presented within the scope of software and hardware computer design and control.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 511 Combinational Circuit Design 3.0 Credits

Representing arithmetic. Logic and syntax data for machine processing. Switching algebra: Boolean and multiple values. Identification and classification of functions. Realizing completely specified and incompletely specified Boolean functions. Issues in designing large communication/control Boolean functions. Fault and testing of Boolean function.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 512 Sequential Circuit Design 3.0 Credits

Finite automata and their realization by sequential machines, capabilities, transformation, and minimization of finite automata, linear finite automata. Clocked pulsed and level mode sequential circuits. Malfunctions in sequential circuits: hazards, races, lockouts, metastability. Issues of state assignment. Evolution of memory elements design: ROM vs. RAM vs. associative memory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECE 511 [Min Grade: C]

ECE 513 Design for Testability 3.0 Credits

Economics vs. Complexity vs. Strategy of Testing; Fault Models; Test Generation; Testability Analysis & Designing Testable Circuits; Testing Microprocessors, Memories and Computer Components; Test Data Compression; Fault Tolerant Hardware; Reliably vs. Availability; Redundancy and Error Correcting Codes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECE 511 [Min Grade: C] and ECE 512 [Min Grade: C]

ECE 520 Dependable Computing 3.0 Credits

Fundamental design issues involved in building reliable, safety-critical, and highly available systems. Topics include testing and fault-tolerant design of VLSI circuits, hardware and software fault tolerance, information redundancy, and fault-tolerant distributed systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 531 Principles of Computer Networking 3.0 Credits

Principles of circuit switching, packet switching and virtual circuits; protocol layering; application layer protocols for e-mail and web applications; naming and addressing; flow control and congestion avoidance with TCP; Internet Protocol (IP); routing algorithms; router architectures; multicast protocols; local area network technologies and protocols; issues in multimedia transmissions; scheduling and policing; Quality-of-Service and emerging Internet service architectures; principles of cryptography.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECE 541 Robotic Computer Interface Controls I 3.0 Credits

Covers sensors, actuators, mechanical components of robots, kinematics, inverse kinematics, dynamics, and equations of motion.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 542 Robotic Computer Interface Controls II 3.0 Credits

Covers the robot control problem, including PD, PID, position, force and hybrid controllers, resolved rate and acceleration control, and multiprocessor architecture.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 641 [Min Grade: C] and ECES 643 [Min Grade: C] and ECEC 541 [Min Grade: C]

ECEC 543 Robotic Computer Interface Controls III 3.0 Credits

Covers non-linear control techniques, FLDT, and advanced topics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 542 [Min Grade: C]

ECEC 571 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

ECEC 572 Custom VLSI Design & Analysis I 3.0 Credits

This is the first of two courses offered on Custom 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. Design and analysis of VLSI integrated circuits will be covered from the circuits and systems design perspectives. First, a thorough analysis of interconnect networks is presented. The second part of the class focuses on synchronization of high performance ICs.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 571 [Min Grade: C]

ECEC 573 Custom VLSI Design & Analysis II 3.0 Credits

This is the second of two courses offered on Custom 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. The primary focus is on-chip power management. Power generation techniques are discussed and different power converters are analyzed. Power distribution networks are presented with a focus on the different distribution architectures and output impedance characteristics. Techniques to reduce power supply noise are also provided. A secondary focus examines substrate noise in mixed-signal systems and techniques to reduce substrate noise.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 571 [Min Grade: C]

ECEC 574 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

ECEC 575 ASIC Design II 3.0 Credits

Design and analysis of VLSI integrated circuits 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 574 [Min Grade: C]

ECEC 576 Hardware Security & Trust 3.0 Credits

The course will cover a broad range of current topics in the areas of security and protection of modern integrated circuits. The covered material includes cryptographic processor and processing overhead, physical and invasive attacks, side-channel attacks, physically unclonable functions, hardware-based true random number generators, watermarking of intellectual property, FPGA security, passive and active metering for prevention of piracy, access control, and emerging threats to current and next-generation technologies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 571 [Min Grade: C]

ECEC 600 Fundamentals of Computer Networks 3.0 Credits

Fundamentals design principles of ATM, Internet and local area networks; protocol layers and the Internet Architecture; medium access protocols; application protocols and TCP/IP utilities; basic principles and virtual circuit switching; naming and addressing; flow and congestion control protocols; routing algorithms; Quality-of-Service in computer networks; security issues in networks.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 621 High Performance Computer Architecture 3.0 Credits

Maximizing single processor performance. Concepts and techniques for design of computer systems. Processor design, instruction set architecture design and implementation, memory hierarchy, pipelines processors, bus bandwidth, processor/memory interconnections, cache memory, virtual memory, advanced I/O systems, performance evaluation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 622 Parallel Programming 3.0 Credits

This course will focus on developing parallel algorithms for multi-core CPUs using: (1) OpenMP, a programming interface for shared-memory parallel computers, (2) streaming SIMD extensions (SSE2), and (2) the pthread multi-threading library. The course will also teach students how to develop parallel algorithms for the graphics processing unit (GPU) and implement them using the CUDA programming interface. Specifically, students will be introduced to the architecture of a modern GPU, to the CUDA programming interface, and to general purpose programming on the GPU.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 623 Advanced Topics in Computer Architecture 3.0 Credits

This course teaches advanced concepts of modern computer architecture and introduces the current challenges faced by computer architects. These challenges include power consumption, transistor variability, and processor heterogeneity. Students develop their research skills through a self directed research project with a final presentation and conference style writeup.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 621 [Min Grade: C]

ECEC 632 Performance Analysis of Computer Networks 3.0 Credits

Covers probability theory and its applications to networks, random variable and random processes; Markov chains, multi-dimensional Markov chains; M/M/1, M/M/m, M/M/m/m, M/G/1 and G/G/1 queueing systems and their applications in computer networks; analysis of networks of queues; Kleinrock Independence Approximation; Time-reversibility and Burke's theorem; Jackson's theorem; the phenomenon of long-range dependence and its implications in network design and traffic engineering.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 631 [Min Grade: C] or ECEC 531 [Min Grade: C]

ECEC 633 Advanced Topics in Computer Networking 3.0 Credits

Perspectives in the areas of switch/router architectures, scheduling for best-effort and guaranteed services, QoS mechanisms and architectures, web protocols and applications, network interface design, optical networking, and network economics. The course also includes a research project in computer networking involving literature survey, critical analysis, and finally, an original and novel research contribution.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 632 [Min Grade: C]

ECEC 641 Web Security I 3.0 Credits

An introduction to web security risks, attack strategies and defenses; a security-conscious introduction to web development languages; security issues in HTTP; symmetric and public key encryption on the web; cryptographic hash functions; digital certificates and authentication; case studies of attacks; encrypted web communications (HTTPS).

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 642 Web Security II 3.0 Credits

Origin-based isolation of web content; attacks on the Domain Name System (DNS) and countermeasures; Secure DNS; anonymous web browsing; onion-routing; Tor browser; attacks on Tor and defenses; illegal hosting and anonymous publishing; fast-flux proxies; Internet censorship, surveillance and their circumvention; security issues in Internet governance.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 643 Web Security III 3.0 Credits

Advanced topics in JavaScript security; Asynchronous JavaScript (AJAX); mobile web security; elliptic-curve cryptography; secure coding principles; web-based malware; secure database management on the web; intrusion detection; principles of security for web users, web developers, and web hosts; trade-offs between performance and security; research perspectives in web security.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 654 Knowledge Engineering I 3.0 Credits

Covers conceptual modeling, including an overview of knowledge representation. Includes semantic networks, reduced semantic networks, logic of incomplete knowledge bases, extensional semantic networks, and applications of conceptual models.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 655 Knowledge Engineering II 3.0 Credits

Covers expert systems, including language and tools of knowledge engineering. Includes reasoning about reasoning, design and evaluation, heuristics in expert systems, expert systems for decision support, and expert systems in conceptual design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 654 [Min Grade: C]

ECEC 656 Knowledge Engineering III 3.0 Credits

Covers information-intensive systems, including information representation in autonomous systems. Includes clauses and their validation; clustering in linguistic structures; linguistic and pictorial knowledge bases; discovery in mathematics, including am; and methods of new knowledge generation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 655 [Min Grade: C]

ECEC 661 Digital Systems Design 3.0 Credits

A project-based course on design concepts, tools and implementation of systems with embedded processors, library IP (Intellectual Property) cores and custom IP cores, synthesis and Field Programmable Gate Array (FPGA) implementation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 662 VLSI Array Processors I 3.0 Credits

Covers VLSI testing, including design for testability and parallel computer architectures; signal and image processing algorithms and mapping algorithms onto array structures; and systolic array processors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 661 [Min Grade: C]

ECEC 663 VLSI Array Processors II 3.0 Credits

Covers wavefront array processors; matching hardware to arrays; hardware design, systems design, and fault-tolerant design; and implementations and VLSI design projects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 662 [Min Grade: C]

ECEC 671 Electronic Design Automation for VLSI Circuits I 3.0 Credits

This course focuses on the electronic design automation problems in the design process of VLSI integrated circuits. In this first quarter of the course, algorithms, techniques and heuristics structuring the foundations of contemporary VLSI CAD tools are presented. Boolean algebra, graph theory, logic minimization and satisfiability topics are presented.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEC 672 Electronic Design Automation for VLSI Circuits II 3.0 Credits

This course focuses on the electronic design automation problems in the design process of VLSI integrated circuits. In this second quarter of the course, physical VLSI design steps of technology mapping, floor planning, placement, routing and timing and presented individual and team-based small-to-medium scale programming projects are assigned.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 671 [Min Grade: C]

ECEC 673 Deep Sub-Micron Integrated Circuit Design 3.0 Credits

This course focuses on the design challenges of digital VLSI integrated circuits in deep sub-micron manufacturing technologies. Automation challenges and high-performance circuit design techniques such as low-power and variation-aware design are presented. The course material is delivered in a lecture format structured on recent presentations, articles, and tutorials.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 671 [Min Grade: C]

ECEC 697 Research in Computer Engineering 1.0-12.0 Credit

Research in computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC 699 Supervised Study in Computer Engineering 0.0-9.0 Credits

Supervised study in computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC 890 Advanced Special Topics in Computer Engineering 1.0-9.0 Credit

Covers advanced special topics of interest to students and faculty.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC 891 Advanced Topics in Computer Engineering 0.5-9.0 Credits

Advanced topics in computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC 898 Master's Thesis in Computer Engineering 1.0-12.0 Credit

Master's thesis in computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC 997 Dissertation Research in Computer Engineering 1.0-12.0 Credit

Graded Ph.D. dissertation in computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC 998 Ph.D. Dissertation in Computer Engineering 1.0-12.0 Credit

Ph.D. dissertation in computer engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEC I599 Independent Study in ECEC 0.0-12.0 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 I699 Independent Study in ECEC 0.0-12.0 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 I799 Independent Study in ECEC 0.0-12.0 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 I899 Independent Study in ECEC 0.0-12.0 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 I999 Independent Study in ECEC 0.0-12.0 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 T580 Special Topics in ECEC 0.0-12.0 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 T680 Special Topics in ECEC 0.0-12.0 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 T780 Special Topics in ECEC 0.0-12.0 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 T880 Special Topics in ECEC 0.0-12.0 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 T980 Special Topics in ECEC 0.0-12.0 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 - Electroph

Courses

ECEE 501 Physical Principles of Electrical Engineering I 3.0 Credits

Core course. Covers classical mechanics, including generalized coordinates, Lagrangian and Hamiltonian formulation, and variational principle. Introduces quantum mechanics, including Schrodinger equation, wave functions, operators, expectation values, and hydrogen atom.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 502 Physical Principles of Electrical Engineering II 3.0 Credits

Core course. Continues ECEE 501. Covers atomic orbitals, angular momentum, oscillators, time-independent and time-dependent perturbation theories, many-particle wave functions, and optical transitions. Also covers statistical mechanics, including distributions, ensembles, and thermal properties of solids.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 501 [Min Grade: C]

ECEE 507 Electromagnetic Field Analysis I 3.0 Credits

Core course. Covers Maxwell's equations; solutions of Laplace's equation, Green's function, and scalar and vector potentials; energy and momentum in electromagnetic fields; and interaction of fields and material media.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 508 Electromagnetic Field Analysis II 3.0 Credits

Core course. Continues ECEE 507. Covers em waves, including reflection, refraction, polarization, and dispersion. Includes metallic and dielectric guiding structures, guides, and waveguide circuits and applications to stripline, microstrip, and optical fiber transmission systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 507 [Min Grade: C]

ECEE 510 Scattering & Diffraction of Electromagnetic Waves 3.0 Credits

Boundary value problems of EM theory. Exact and approximate methods for scattering by spheres, half plane, slit; radar cross-section theory. Quasi-optical theory, scattering, diffraction coefficients. Applications to radio propagation around the earth.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 517 Microwave Networks & Transmission Media 3.0 Credits

Core course. Atmospheric wave propagation, solution of wave equation without sources in isotropic media, plane-waves, polarization, dispersion surfaces, wave admittance and impedance, wave propagation in free-space and various media, waves at interfaces, solution of wave equation with sources, duality principle, arrays analysis, metallic waveguides, modes in cylindrical waveguides, rectangular and circular, resonant cavities and perturbational methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 518 Microwave Passive Components 3.0 Credits

Core course. V-I and E-H analogy, Kirchoff's Law, Telegrapher's EQ, voltage and current waves, reflection coefficient and impedance relationship, Smith Chart, impedance matching techniques, Bode-Fano theoretical limit, Broadband Quarter-wave Transformer, N-port linear networks, Z, Y, and S parameters, ABCD and T matrices, signal flow-graph and transfer functions, synthesis of two-port and unitary properties, even-odd mode analysis and dual directional couplers (design and synthesis), periodic structures and Floquet modes, filter design and synthesis using insertion loss and image methods, prototype LO filter and transformation to LP, BP, HP, and BS filters, Richards transform and Kuroda identities.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 519 Microwave Active Subsystems 3.0 Credits

Core course. Overview of physics of P-N junction and Schottky junctions, pin, varactor, and step recovery diodes and their applications, transistors, MESFET and HEMT, BJT and HBT passive microwave circuits: switches, detectors, attenuators, modulators, and phase shifter, active microwave circuits: LNA, power amplifier, distributed amplifier, oscillators (fixed and VCO) power budget and link performance calculations for telecommunication, radar, and EW systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 520 Solid-State Electronics 3.0 Credits

This course familiarizes the students with the fundamental properties of semiconductor materials leading to the students of electronic and photonic devices. Covered topics include: atomic structure, crystal structure, theories of electron conduction, scattering, pn junctions, heterojunctions, metal-semiconductor contacts, and junction devices.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 521 Bipolar and FETs 3.0 Credits

This is the second course in a sequence of three on electronic and photonic devices. The course covers families of electronic devices. The course covers various families of electronic devices based on silicon and compound semiconductors. Bipolar transistors such as BJTs and HBTs and field-effect devices such as MOSFETs, MESFETs, and MODFETs are studied.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 520 [Min Grade: C]

ECEE 522 Photonic Devices 3.0 Credits

Covers fundamentals of absorption, spontaneous, and stimulated emission, photodetectors, light emitting diodes, laser oscillation, semiconductor laser diodes, RIN and phase noise, quantum well lasers, optical receivers, and quantum effect devices.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 521 [Min Grade: C]

ECEE 523 Integrated Circuits 3.0 Credits

Covers growth of single-crystal silicon, growth of oxide and epitaxial layers, photolithography, diffusion of impurities, fabrication of bipolar and unipolar integrated circuits, and interconnections and packaging.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 521 [Min Grade: C]

ECEE 525 Digital IC and CMOS Technology 3.0 Credits

Covers digital ICs using CMOS technology. Transistor level building blocks, -NOT, NAND, NOR, XOR, OAI, and AOI ? are designed using industry standard CAD tools, e.g. Cadence. Circuit topologies such as CPL, transmission gates are explored. CMOS technology/fabrication and layout are discussed to optimize speed, power, and area.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 526 Custom VLSI Design 3.0 Credits

Course covers advanced design styles such as dynamic CMOS circuits, low power circuit concepts, bi-CMOS circuits and the design of VLSI sub-systems. A major category is memory design, both DRAM. VLSI design styles, system integration aspects are discussed. Project design involves a fair amount of layout.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 525 [Min Grade: C]

ECEE 541 Photonic Systems 3.0 Credits

Introduction to Optical principles through EM theory. Covers the mathematics of wave motion, as well as the idea of light propagating as particles. The course shows how ray (or geometrical) optics and Gaussian optics are derived from the wave theory. The course also introduces the polarization of light, and how this effects optical propagation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 542 Optical Applications of Diffraction and Interference 3.0 Credits

Optical Applications of Diffraction and Interference. This course is an introduction to optical principles through EM theory. Covered topics include wave motion and superposition. Introduction to optical interference, or the interaction of light with itself. Topics include interference and interferometers, diffraction, and Fourier Optics. Diffraction topics include, far (Fraunhofer), near (Fresnel), and the near-field diffraction. The course includes coding of some of the classical diffraction algorithms for the use in a project.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 603 Cooperative Phenomena 3.0 Credits

Covers dielectrics, ferroelectrics, diamagnetism, paramagnetism, ferromagnetism, and antiferromagnetism; superconductivity, London's equations, BCS theory, and Josephson effect; and flux quantization, hard superconductors, GLAG theory, flux dynamics, and high-temperature superconductors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 502 [Min Grade: C] and ECEE 503 [Min Grade: C]

ECEE 607 Nanoscale Fields 3.0 Credits

Course covers essentials of electric and magnetic fields, including thermodynamics of polarizable media. Emphasis is on nano- and micro-scale effects like Van der Waals and double layer interactions, plasmon resonance and others. Examples from colloids and other areas of nanotechnology are used to illustrate main ideas.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 619 Radio Frequency Integrated Circuit Design 3.0 Credits

This course introduces concepts in design of radio frequency (microwave and millimeter wave) integrated circuits. Optimum transistor technologies based on unipolar (MOS, FET, HEMT) and bipolar (BJT, HBT) are discussed for various RFIC applications. Performance of devices and circuits are evaluated in terms of gain, noise, and linearity. Active circuits and systems used in a variety of communications, imaging, and sensing are discussed in terms of standards and applications. IC design projects are integral to this course.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 518 [Min Grade: C]

ECEE 621 Thin Film Technology I 3.0 Credits

Covers vacuum technology, plasma processing, VLSI fabrication, and thin film technologies (e.g., plasma etching, thin film deposition, and thin film characterizations).

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 622 Microfabrication Technology 3.0 Credits

The course provides an overview of basic technological processes typically involved in microfabrication of Micro-Electro-Mechanical Systems (MEMS). The course includes several demonstration laboratories involving basic photolithography, thin film depositions and electroplating.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 623 Thin Film Technology III 3.0 Credits

Presents speakers on state-of-the-art practice and future applications of thin film deposition and processing technology.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 622 [Min Grade: C]

ECEE 641 Fiber Optics & Optical Communications I 3.0 Credits

Covers propagation in guided and unguided media, including step and graded fibers, dispersion, guide deformations, and mode coupling. Involves design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 642 Fiber Optics & Optical Communications II 3.0 Credits

Covers coupling devices, multimode guides, sources, lasers, and radiation patterns. Includes reliability, detectors, circuit models, and noise.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 641 [Min Grade: C]

ECEE 671 Seminar in Electro-Physics I 2.0 Credits

Advanced graduate seminar. Focuses on recent developments in microwaves, electro-optics, and solid-state devices.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 672 Seminar in Electro-Physics II 2.0 Credits

Continues ECEE 671.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 673 Seminar in Electro-Physics III 2.0 Credits

Continues ECEE 672.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 697 Research in Electrophysics 1.0-12.0 Credit

Research in electrophysics.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE 699 Supervised Study in Electrophysics 0.5-9.0 Credits

Supervised study in electrophysics.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE 811 Microwave & THZ Photonics I 3.0 Credits

This course focuses on high speed photonic components for microwave and terahertz fiber-optic links, namely high speed lasers, external modulators and photodetectors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEE 812 Microwave & THZ Photonics II 3.0 Credits

This course focuses on high speed analog and digital fiber-optic links including loss and dynamic range calculations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 811 [Min Grade: C]

ECEE 813 Microwave & THZ Photonics III 3.0 Credits

This course focuses on the applications of fiber-optic links; antenna remoting, optically fed and controlled phased array antennas and fiber radio.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 811 [Min Grade: C] and ECEE 812 [Min Grade: C]

ECEE 820 Carrier Transport Fundamentals 3.0 Credits

This course introduces the fundamentals of carrier transport in semiconductors, beyond the common drift-diffusion description functions and Boltzmann transport equations are covered. Monte Carlo simulations are used for low field and high field transport studies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 520 [Min Grade: C]

ECEE 821 Nanoelectronics 3.0 Credits

Focus is on current transport when the size of electronic medium reaches nanometer scales, that is, deBroglie wavelength. Topics include: characteristic lengths, magneto-electric subbands, conductance from transmission, resistance in a ballistic conductor, quantum Hall effect, electron scattering in quantum structures.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEE 820 [Min Grade: C]

ECEE 890 Advanced Special Topics in Electrophysics 1.0-9.0 Credit

Covers advanced special topics of interest to students and faculty.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE 898 Masters Thesis in Electrophysics 1.0-12.0 Credit

Master's thesis in electrophysics.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE 997 Dissertation Research in Electrophysics 1.0-12.0 Credit

Graded Ph.D. dissertation in electrophysics.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE 998 Ph.D. Dissertation in Electrophysics 1.0-12.0 Credit

Ph.D. dissertation in electrophysics.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEE I599 Independent Study in ECEE 0.0-12.0 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 I699 Independent Study in ECEE 0.0-12.0 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 I799 Independent Study in ECEE 0.0-12.0 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 I899 Independent Study in ECEE 0.0-12.0 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 I999 Independent Study in ECEE 0.0-12.0 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 T580 Special Topics in ECEE 0.0-12.0 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 T680 Special Topics in ECEE 0.0-12.0 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 T780 Special Topics in ECEE 0.0-12.0 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 T880 Special Topics in ECEE 0.0-12.0 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 T980 Special Topics in ECEE 0.0-12.0 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 501 Power System Analysis 3.0 Credits

Core course. Covers modeling of power systems, including: symmetrical components, transmission lines, transformers, per-unit values and one-line diagrams. Introduces power flow. Required of first-year power majors; equivalent undergraduate credits may be substituted.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEP 502 Computer Analysis of Power Systems 3.0 Credits

Core course. Covers digital computation methods, including load flow, fault, and transient stability problems. Required of first-year power engineering majors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 501 [Min Grade: C]

ECEP 503 Synchronous Machine Modeling 3.0 Credits

Core course. Covers two-reaction theory, Park's synchronous machine models, modeling of the synchronous machine excitation and governor systems, and the effects on power system stability. Required of first-year power engineering majors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 502 [Min Grade: C]

ECEP 601 Modeling & Analysis of Power Distribution Systems 3.0 Credits

Modeling and Analysis of Power Distribution Systems. Introduction to power distribution system; balanced and unbalanced systems, component and load modeling, radial and weakly meshed topologies; algorithms for unbalanced power flow studies including radial and general structure solver.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 501 [Min Grade: C] (Can be taken Concurrently)

ECEP 602 Power Distribution Automation and Control 3.0 Credits

Power Distribution Automation and Control. Focuses on distribution management systems and their application: including optimizing network operation -capacitor placement and control, network reconfiguration, service restoration. Modern solution technology will be addresses.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 502 [Min Grade: C] (Can be taken Concurrently)

ECEP 603 Service and Power Quality in Distribution Systems 3.0 Credits

Service and Power Quality in Distribution Systems. Focus 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

ECEP 610 Power System Dynamics 3.0 Credits

Covers system parameters and dynamics, swing equation and solutions for two-machine and multimachine systems, equal area criterion, computer solution techniques, system effects due to dynamic behavior of particular system components, and load characteristics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 503 [Min Grade: C]

ECEP 611 Power System Security 3.0 Credits

Covers contingency analysis, including operating and security constraints and network sensitivities; corrective dispatch using linear programming; and state estimation, including network observability, detection, and identification of bad data.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 610 [Min Grade: C]

ECEP 612 Economic Operation of Power Systems 3.0 Credits

Covers unit characteristics and economic operation, including transmission loss coefficients, general loss formula, and automatic economic load dispatch.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 501 [Min Grade: C]

ECEP 613 Advanced Power System Design 3.0 Credits

Covers components, functions, application, and performance; relative cost and scaling parameters; overall planning problem considering present-worth and cost-benefit principles; system reliability; intersystem pooling; and growth.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEP 614 Power System Dynamic Security 3.0 Credits

Covers power system small signal stability and voltage stability modeling, analysis and simulation and its use in power system dynamic security assessment.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 610 [Min Grade: C]

ECEP 641 Protective Relaying 3.0 Credits

Covers relay principles and types, instrumentation of system parameters, relay characteristics and response, system component protection, solid-state relaying, underfrequency relays, and load shedding.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 503 [Min Grade: C]

ECEP 642 Protective Relay Laboratory 3.0 Credits

Covers electromechanical and static relays. Emphasizes application based on observed performance. Includes testing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 641 [Min Grade: C]

ECEP 643 Solid State Protective Relaying 3.0 Credits

Covers solid-state protective relays as applied to power system stability and protection, including comparisons with electromechanical relays.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 641 [Min Grade: C]

ECEP 661 High Voltage High Power Phenomena 3.0 Credits

Covers corona, corona losses, electromagnetic noise, dielectric strength, lightning, impulse testing and safety practices, elements of high-power circuit interruption, circuit and physical phenomena, and circuit breakers.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEP 671 AC-DC and DC-AC Power Electronic Converters 3.0 Credits

AC-DC and DC-AC Power Electronic Converters. Study of basic power electronic converter circuits: diode and phase controlled rectifiers and inverters; switch-mode converters. Applications to DC and AC power supplies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 501 [Min Grade: C] or ECEP 601 [Min Grade: C]

ECEP 672 Power Electronic Experiments: Hardware and Software 3.0 Credits

Hardware and Software Lab-Intensive course. Additional lectures on: Study of DC-DC switch-mode converters; Study of power electronic circuitry in residential, industrial and electric utility applications; Optimizing utility interfaces with power electronic systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 671 [Min Grade: C]

ECEP 673 Power Electronic Applications 3.0 Credits

Electric Utility Applications with emphasis on DC Transmission, Optimizing the Utility interface. Resonant converters. Fundamentals of motor drives and their controls: induction, DC, synchronous and specialized motors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 671 [Min Grade: C]

ECEP 697 Research in Power Engineering 1.0-12.0 Credit

Research in power engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP 699 Supervised Study in Power Engineering 0.0-9.0 Credits

Supervised study in power engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP 801 Advanced Topics in Power Systems I 0.5-9.0 Credits

Discusses the latest innovations, theories, and methodologies for the design, planning, and operation of power systems. Requires students to read and discuss technical articles published in the IEEE Transactions on pas, the Journal of Electric Energy and Systems, and other publications.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP 802 Advanced Topics in Power Systems II 3.0 Credits

Continues ECEP 801.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEP 803 Advanced Topics in Power Systems III 3.0 Credits

Continues ECEP 802.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECEP 821 Load Forecasting & Probability Methods 3.0 Credits

Reviews probability methods. Covers probabilistic generation and load models; forecasting methodologies; load classification and characterization; energy and peak demand forecasting; weather-and non-weather-sensitive forecast; and annual, monthly, weekly, and daily forecast.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 610 [Min Grade: C]

ECEP 822 Power System Planning 3.0 Credits

Covers deterministic planning, including automated transmission system expansion planning and network sensitivities, and probabilistic planning, including generation and load models, generation cost analysis, production costing, and energy production cost models for budgeting and planning.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 821 [Min Grade: C]

ECEP 823 Power System Reliability 3.0 Credits

Covers basic reliability concepts, including probabilistic generation and load models, loss of load probability (LOLP), static and spinning generating-capacity reliability, transmission system reliability, and composite system and interconnected system reliability.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEP 822 [Min Grade: C]

ECEP 890 Advanced Special Topics in Power Engineering 1.0-9.0 Credit

Covers advanced special topics of interest to students and faculty.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP 898 Master's Thesis Power Engineering 1.0-12.0 Credit

Master's thesis in power engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP 997 Dissertation Research in Power Engineering 1.0-12.0 Credit

Graded Ph.D. dissertation in power engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP 998 Ph.D. Dissertation in Power Engineering 1.0-12.0 Credit

Ph.D. dissertation in power engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECEP I599 Independent Study in ECEP 0.0-12.0 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 I699 Independent Study in ECEP 0.0-12.0 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 I799 Independent Study in ECEP 0.0-12.0 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 I899 Independent Study in ECEP 0.0-12.0 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 I999 Independent Study in ECEP 0.0-12.0 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 T580 Special Topics in ECEP 0.0-12.0 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 T680 Special Topics in ECEP 0.0-12.0 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 T780 Special Topics in ECEP 0.0-12.0 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 T880 Special Topics in ECEP 0.0-12.0 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 T980 Special Topics in ECEP 0.0-12.0 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 - Systems

Courses

ECES 510 Analytical Methods in Systems 3.0 Credits

This course is intended to provide graduate student in the field of signal and image processing with the necessary mathematical foundation, which is prevalent in contemporary signal and image processing research and practice.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 511 Fundamentals of Systems I 3.0 Credits

Core course. Covers linear operators, including forms and properties (differential equations, transfer function, state space, causality, linearity, and time invariance); impulse response, including convolution, transition matrices, fundamental matrix, and linear dynamical system; definition, including properties and classification; representation, including block diagrams, signal flow, and analog and digital; properties, including controllability and observability; and eigenstructure, including eigenvalues and eigenvector and similarity transformations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 512 Fundamentals of Systems II 3.0 Credits

Core course. Covers realization and identification, including minimal realization, reducibility and equivalence of models, and identification of systems; stability, including bounded input-bounded output, polynomial roots, and Lyapunov; and feedback compensation and design, including observers and controllers and multi-input/multi-output systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 511 [Min Grade: C]

ECES 513 Fundamentals of Systems III 3.0 Credits

Core course. Covers multivariable systems, numerical aspects of system analysis and design, design of compensators, elements of robustness, and robust stabilization.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 512 [Min Grade: C]

ECES 521 Probability & Random Variables 3.0 Credits

Probability concepts. Single and multiple random variables. Functions of random variables. Moments and characteristic functions. Random number and hypothesis testing. Maximum likelihood estimation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 522 Random Process & Spectral Analysis 3.0 Credits

Random Process. Poisson Process, Shot Noise. Gaussian Process. Matched Filters. Kalman Filters. Power Spectral Density. Autocorrelation and cross correlation. PSD estimation. Entropy. Markov Processes. Queuing Theory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 521 [Min Grade: C]

ECES 523 Detection & Estimation Theory 3.0 Credits

This course introduces the field of detection and estimation and provides tools for classifying and learning about patterns in the face of total, partial or incomplete prior knowledge. Topics covered include Bayes classifier; Parametric estimation and supervised learning (MLE and Bayes Learning); Hypothesis testing; Decision Fusion; Unsupervised learning; and Non parametric testing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 521 [Min Grade: C]

ECES 558 Digital Signal Processing for Sound & Hearing 3.0 Credits

Introduction to the computational modeling of sound and the human auditory system. Signal processing issues, such as sampling, aliasing, and quantization, are examined from an audio perspective. Covers applications including audio data compression (mp3), sound synthesis, and audio watermarking.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 631 [Min Grade: C]

ECES 559 Processing of the Human Voice 3.0 Credits

Introduction to the computational modeling of the human voice for analysis, synthesis, and recognition. Topics covered include vocal physiology, voice analysis-synthesis, voice data coding (for digital communications, VoIP), speaker identification, speech synthesis, and automatic speech recognition.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 631 [Min Grade: C] and ECES 558 [Min Grade: C]

ECES 561 Medical Robotics I 3.0 Credits

This course will introduce the emerging, multidisciplinary field of medical robotics. Topics include: introduction to robot architecture, kinematics, dynamics and control; automation aspects of medical procedures; safety, performance limitations; regulatory and economics and future developments.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 512 [Min Grade: C]

ECES 562 Medical Robotics II 3.0 Credits

This course will continue the introduction to the emerging, multidisciplinary field of medical robotics. Topics include: medical procedure automation; robot testing and simulation techniques; This is a project based course that will afford students the opportunity to work with existing medical robotic systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 561 [Min Grade: C]

ECES 604 Optimal Estimation & Stochastic Control 3.0 Credits

Introduction to control system problems with stochastic disturbances; linear state space filtering, Kalman Filtering, Non-linear systems; extended Kalman Filtering. Robust and H-infinity methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 512 [Min Grade: C] and ECES 521 [Min Grade: C]

ECES 607 Estimation Theory 3.0 Credits

General characteristics of estimators. Estimators: least squares, mean square, minimum variance, maximum a posteriori, maximum likelihood. Numerical solution. Sequential estimators.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 614 Passive Network Synthesis 3.0 Credits

An introduction to approximation theory; driving point functions; realizability by lumped-parameter circuits; positive real functions; properties of two and three element driving point functions and their synthesis; transfer function synthesis; all-pass networks.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 615 Analysis & Design of Linear Active Networks 3.0 Credits

DC and AC models of bipolar transistors and FETs; design of differential operational amplifiers; optimal design of broad-band IC amplifiers; design of tuned amplifiers; design for optimal power gain, distortion, and efficiency; noise in transistor circuits.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 620 Multimedia Forensics and Security 3.0 Credits

This course introduces students to fundamental concepts in multimedia forensics and security. Topics covered include signal processing and machine learning techniques to detect forgeries, identify editing or manipulation, and determine the source of an image or video through direct signal analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 521 [Min Grade: C]

ECES 621 Communications I 3.0 Credits

Covers modulation techniques: baseband PAM, passband PAM, QAM, and PSK; orthogonal signaling: FSK; symbol/vector detection: matched filter and correlation detector; sequence detection: ISI; equalization: adaptive and blind; carrier synchronization; and timing recovery.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 622 Communications II 3.0 Credits

Covers shot noise, noise in detectors, analog fiberoptic systems, carrier and subcarrier modulation, digital systems bit error rates for NRZ and RZ formats, coherent optical communication systems-heterodyne and homodyne systems, wavelength division multiplexing, system design concepts, power budgets, rise time budgets, and optical switching networks.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 623 Communications III 3.0 Credits

Covers fundamentals of information theory: information measure, entropy, and channel capacity; source encoding and decoding; rate distortion theory; linear codes; block codes; convolutional codes, Viterbi algorithm; encryption and decryption; and spread spectrum communications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 631 Fundamentals of Deterministic Digital Signal Processing 3.0 Credits

Fundamentals of Deterministic Digital Signal Processing. This course introduces the fundamentals of deterministic signal processing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 632 Fundamentals of Statistical Digital Signal Processing 3.0 Credits

Fundamentals of Statistical Deterministic Digital Signal Processing. The course covers topics on statistical signal processing related to data modeling, forecasting and system identification.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 631 [Min Grade: C]

ECES 640 Genomic Signal Processing 3.0 Credits

This course focuses on signal processing applied to analysis and design of biological systems. This is a growing area of interest with many topics ranging from DNA sequence analysis, to gene prediction, sequence alignment, and bio-inspired signal processing for robust system design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 641 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 642 Optimal Control 3.0 Credits

Introduces the concept of optimal control first by static optimization for state space formulated systems. The concept is expanded as the linear quadratic regulator problem for dynamic systems allowing solution of the optimal control and suboptimal control problems for both discrete and continuous time. Additional topics include the Riccati equation, the tracking problem, the minimum time problem, dynamic programming, differential games and reinforcement learning. The course focuses on deriving, understanding, and implementation of the algorithms.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 512 [Min Grade: C]

ECES 643 Digital Control Systems Analysis & Design 3.0 Credits

Covers analysis and design of sampled-data control system using Z-transform and state-variable formulation, sampling, data reconstruction and error analysis, stability of linear and non-linear discrete time systems by classical and Lyapunov's second method, compensator design using classical methods (e.g., rootlocus) and computer-aided techniques for online digital controls, optimal control, discrete-time maximum principle, sensitivity analysis, and multirate sampled-data systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 513 [Min Grade: C]

ECES 644 Computer Control Systems 3.0 Credits

Introduction to the fundamentals of real-time controlling electromechanical dynamic systems, including modeling, analysis, simulation, stabilization and controller design. Control design approaches include: pole placement, quadratic and robust control performances.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 650 Statistical Analysis of Genomics 3.0 Credits

This course focuses on the computational and statistical methods required to analyze metagenomic data. Students learn R and QIIME for conducting analyses. Students learn how to classify DNA sequences, distance and diversity metrics, ordination (ordering) techniques, and comparative statistical methods such as ANOVA and variations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 651 Intelligent Control 3.0 Credits

Concepts of Intelligence in Engineering Systems, Learning Automation, Principles of Knowledge Representation. Levels of Resolution and Nestedness. Organization of Planning: Axioms and Self-Evident Principles.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 660 Machine Listening and Music IR 3.0 Credits

This course introduces methods for the computational analysis, recognition, and understanding of sound and music from the acoustic signal. Covered applications include sound detection and recognition, sound source separation, artist and song identification, music similarity determination, and automatic transcription.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 631 [Min Grade: C]

ECES 670 Seminar in Systems I 2.0 Credits

Involves presentations focused on recent publications and research in systems, including communications, controls, signal processing, robotics, and networks.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 671 Seminar in Systems II 2.0 Credits

Continues ECES 670.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 672 Seminar in Systems III 2.0 Credits

Continues ECES 671.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 681 Fundamentals of Computer Vision 3.0 Credits

Develops the theoretical and algorithmic tool that enables a machine (computer) to analyze, to make inferences about a "scene" from a scene's "manifestations", which are acquired through sensory data (image, or image sequence), and to perform tasks.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 682 Fundamentals of Image Processing 3.0 Credits

The course introduces the foundation of image processing with hands-on settings. Taught in conjunction with an imaging laboratory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 631 [Min Grade: C]

ECES 684 Imaging Modalities 3.0 Credits

This course is intended to produce students and image processing with a background on image formation in modalities for non-invasive 3D imaging. The goal is to develop models that lead to qualitative measures of image quality and the dependence of quality imaging system parameters.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 685 Image Reconstruction Algorithms 3.0 Credits

This course is intended to provide graduate students in signal and image processing with an exposure to the design and evaluation of algorithms for tomographic imaging.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 684 [Min Grade: C] and BMES 621 [Min Grade: C]

ECES 697 Research In Systems Engineering 1.0-12.0 Credit

Research in systems engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES 699 Supervised Study in Systems Engineering 0.0-9.0 Credits

Supervised study in systems engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES 801 Advanced Topics in Systems I 3.0 Credits

Familiarizes students with current research results in their field of interest, specifically in works reported in such journals as The IEEE Transactions.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES 802 Advanced Topics in Systems II 3.0 Credits

Continues ECES 801.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES 803 Advanced Topics in Systems III 3.0 Credits

Continues ECES 802.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES 811 Optimization Methods for Engineering Design 3.0 Credits

Applications of mathematical programming and optimization methods in engineering design problems such as networks, control, communication, and power systems optimization. Optimization problem definition in terms of objective function, design variables, and design constraints.

Single variable and multivariable search methods for unconstrained and constrained minimization using Fibonacci, gradient, conjugate gradient, Fletcher-Powell methods and penalty function approach. Classical optimization--Lagrange multiplier, Kuhn-Tucker conditions. Emphasis is on developing efficient digital computer algorithms for design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 812 Mathematical Program Engineering Design 3.0 Credits

Approximation theory projection theorem. Solution of nonlinear equations by Newton-Raphson method. Resource allocation, linear programming, and network flow problems. Integer programming for digital filter design and power system expansion problems. Gamory's algorithm.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 813 Computer-Aided Network Design 3.0 Credits

Simulation and circuit analysis programs: PCAP, MIMIC, GASP. Data structures. Algorithms. Languages. Interactive I/O. Integration of subroutines for simulation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 817 Non-Linear Control Systems 3.0 Credits

Covers key topics of feedback linearization, sliding mode control, model reference adaptive control, self-tuning controllers and on-line parameter estimation. In addition additional non-linear topics such as Barbalat's Lemma, Kalman-Yakubovich Lemma, passivity, absolute stability, and establishing boundedness of signals are presented. The focus of the course is the understanding each of these algorithms in detail through derivation and their implementation through coding in Matlab and Simulink.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 513 [Min Grade: C]

ECES 818 Machine Learning & Adaptive Control 3.0 Credits

System identification and parameter estimation, gradient search, least squares and Neural Networks methods. Closed loop implementation of system learning and self-organizing controllers. Random searching learning systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 512 [Min Grade: C]

ECES 821 Reliable Communications & Coding I 3.0 Credits

Covers fundamentals of information theory, including measures of communication, channel capacity, coding for discrete sources, converse of coding system, noisy-channel coding, rate distortion theory for memoryless sources and for sources with memory, and universal coding.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 521 [Min Grade: C] and ECES 522 [Min Grade: C]

ECES 822 Reliable Communications & Coding II 3.0 Credits

Introduces algebra of coding, including groups, rings, fields, and vector fields. Covers finite fields, decoding circuitry, techniques for coding and decoding, linear codes, error-correction capabilities of linear codes, dual codes and weight distribution, important linear block codes, perfect codes, and Plotkin's and Varshamov's bounds.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 821 [Min Grade: C]

ECES 823 Reliable Communications & Coding III 3.0 Credits

Continues techniques for coding and decoding. Covers convolutional codes; Viterbi algorithm; BCH, cyclic, burst-error-correcting, Reed-Solomon, and Reed-Muller codes; and elements of cryptography.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 822 [Min Grade: C]

ECES 890 Advanced Special Topics in Systems Engineering 1.0-9.0 Credit

Covers advanced special topics of interest to students and faculty.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES 898 Master's Thesis in Systems Engineering 1.0-12.0 Credit

Master's thesis in systems engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES 921 Reliable Communications & Coding I 3.0 Credits

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECES 997 Dissertation Research in Systems Engineering 1.0-12.0 Credit

Graded Ph.D. dissertation in systems engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES 998 Ph.D. Dissertation in Systems Engineering 1.0-12.0 Credit

Ph.D. dissertation in systems engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECES I599 Independent Study in ECES 0.0-12.0 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 I699 Independent Study in ECES 0.0-12.0 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 I799 Independent Study in ECES 0.0-12.0 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 I899 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 I999 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 T580 Special Topics in ECES 0.0-12.0 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 T680 Special Topics in ECES 0.0-12.0 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 T780 Special Topics in ECES 0.0-12.0 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 T880 Special Topics in ECES 0.0-12.0 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 T980 Special Topics in ECES 0.0-12.0 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 Geology

Courses

EGEO I999 Independent Study in EGEO 0.0-12.0 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

EGEO T580 Special Topics in EGEO 0.0-12.0 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

EGEO T680 Special Topics in EGEO 0.0-12.0 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

EGEO T780 Special Topics in EGEO 0.0-12.0 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

EGEO T880 Special Topics in EGEO 0.0-12.0 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

EGEO T980 Special Topics in EGEO 0.0-12.0 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 Management

Courses

EGMT 501 Leading and Managing Technical Workers 3.0 Credits

The course will cover the history and evolution of management theory as well as planning, organizational design, management styles, motivation/rewards/punishments and problem solving. Emphasis will be on developing a systemic, holistic approach. This course is designed to provide the necessary business knowledge for further study in the Engineering Management advanced courses. Students will have the opportunity to analyze issues dealing with various aspects of management. In addition, the required writing assignments should aid in developing critical thinking and written communication skills.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 502 Analysis and Decision Methods for Technical Managers 3.0 Credits

The course will develop a framework that can be used to effectively manage organizations for sustainable high performance. It will build on the fundamentals that were learned in Engineering Management I and explore concepts related to change, strategy, culture, complexity, systems thinking, learning, creativity, problem solving, and innovation. Upon completing the course the student will have an enhanced ability to bring creativity to management and leadership challenges as well as an appreciation of the processes, skills, and attitude needed for success.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 501 [Min Grade: C]

EGMT 504 Design Thinking for Engineering Communications 3.0 Credits

Teaches effective communication skills, both written and spoken, and strategies essential for success in the workplace. Addresses interpersonal issues, communicating across functional disciplines. Uses the Design Approach. Addresses the communication demands of engineers.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 515 Infrastructure Systems & Performance Evaluation 3.0 Credits

Characterization of transportation, building, urban water resources and power distribution infrastructure. Capacity, functional performance and serviceability metrics. Risk and vulnerability concepts. Physical deterioration mechanisms. Asset management principles. Data management supporting scoping and sequencing of facility maintenance, repair, upgrading, interconnection, expansion or replacement.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 516 Infrastructure Project & Program Planning 3.0 Credits

Coordination of infrastructure systems with multiple integrated projects through concept development, regulatory, environmental and economic screening, and then through design, construction, commissioning, operation and maintenance. Includes definition of program objectives and geographic limits; assessing asset conditions; sustainability and stakeholder analysis, team assembly and governance; defining performance and status reporting metrics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 501 [Min Grade: C]

EGMT 517 Public Value & Participation in Infrastructure Decision 3.0 Credits

Adjusting sponsoring agency plans and program for external statutory and informal inputs, including regulatory approvals, environmental assessment, interested and affected party stakeholder concerns, life cycle sustain ability, and resource allocation. Includes communication of and transparent ratification of tradeoffs in expectations of project performance and reliability.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 516 [Min Grade: C]

EGMT 520 Infrastructure Capstone Project 3.0 Credits

Group project to produce an engineering- intensive submission for approval by a regulatory agency, addressing compliance with regulatory, codes and professional standards and resource requirements. The student team, with diverse backgrounds, will prepare and present the report to the designated entity, following the procedures and protocols that it has published.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 501 [Min Grade: C] and EGMT 515 [Min Grade: C] and EGMT 516 [Min Grade: C]

EGMT 531 Engineering Economic Evaluation & Analysis 3.0 Credits

Provides a review of economic analysis, with emphasis on those phases of major interest to engineering administration. Covers the calculation of economic equivalence, inflation and the purchasing power of money, decision-making among alternatives, evaluation of public activities, and estimation of costs.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 535 Financial Management 3.0 Credits

Studies the features of accounting data essential to the interpretation and evaluation of engineering operations and financial position of the engineering enterprise. Analyzes financial statements and reports from the point of view of management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 531 [Min Grade: C]

EGMT 536 Advanced Financial Management for Engineers 3.0 Credits

Covers advanced problems in planning, controlling, and directing engineering and other operating costs through budgeting and analysis of cost data. Studies judging of profitability, liquidity, and the organizational structure of the engineering functions.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 535 [Min Grade: C] and EGMT 531 [Min Grade: C]

EGMT 545 Introduction to Peacebuilding for Engineers 3.0 Credits

Developed in partnership with professional peacebuilders from the PeaceTech Lab and USIP's Academy for International Conflict Management and Peacebuilding in Washington DC, this course introduces engineering students to the concepts and skills practiced in the field of international peacebuilding and conflict transformation. This course provides students with first-hand accounts of peacebuilders describing the challenges and opportunities in their work, short presentations outlining key theories and concepts that guide that work, and opportunities to think about how this knowledge, skills, and attitudes can be applied to real-life peacebuilding dilemmas.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 550 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 571 Engineering Statistics 3.0 Credits

Covers probability, including random variables and probability distributions, mathematical expectation, discrete probability distributions, continuous probability distributions, sampling and sampling distribution, and estimators and confidence intervals. Includes applications to engineering and industrial problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 572 Statistical Data Analysis 3.0 Credits

Continues EGMT 571. Covers hypothesis testing, linear regression and correlation, multiple regression, and some topics from analysis of variance and non-parametric statistics. Introduces quality control.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 571 [Min Grade: C]

EGMT 573 Operations Research 3.0 Credits

Covers deterministic modeling, including linear programming; the Simplex Method; theory of the Simplex Method; duality and sensitivity analysis; transportation, transshipment, and assignment problems; problem formulation; goal programming; network analysis; dynamic programming; and integer and non-linear programming. Discusses case study applications of engineering and management problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 571 [Min Grade: C] and EGMT 572 [Min Grade: C]

EGMT 581 Human Relations and Organizational Behavior 3.0 Credits

Covers morale and discipline in management situations. Includes case studies stressing the prevention of and solution to employee problems by means of appropriate policies, techniques, practices, and procedures. Examines group dynamics from the point of view of both psychological and sociological factors under varying situations, especially industrial.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 504 [Min Grade: C] and EGMT 501 [Min Grade: C]

EGMT 610 Ethics & Business Practices for Engineers 3.0 Credits

Course will raise level of awareness and sensitivity of and teach how to create a workplace valuing ethical behavior and business conduct. Discusses engineering ethics, how to establish and administer an effective corporate compliance program, case studies and application of the case method, ethical implications of business practice issues in the workplace.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 614 Marketing: Identifying Customer Needs 3.0 Credits

Prepares students for management of research and development by exposing them to the needs of the environment and industries outside of their employers. Teaches students how to find business opportunities based on the wants and needs of customers. Focuses on the marketing of engineering services and engineered products to industrial and governmental customers. Explores the interdependence of engineering marketing, manufacturing, and finance through strategic business planning. Covers industrial and government procurement, sales techniques, costs, pricing, marketing research, proposal preparation, and client relationships.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 501 [Min Grade: C]

EGMT 615 New Product Conceptualization, Justification, and Implementation 3.0 Credits

Covers two broad themes: (1) innovation processes and (2) specific tools to use in the process. The course will acquaint students with the nature and the fundamental concepts of innovation processes, develop an understanding of which innovation processes are best applied to specific competitive environments and basic skill in the use of specific engineering and management tools useful in the development of innovative products, services and business models and the integration of the engineering/management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 616 Value Creation through New Product Development 3.0 Credits

Analyzes the issues and concepts involved in the management of research and development and its functional relationship to other elements of the corporate structure. Pays particular attention to the functional characteristics of the product line, company growth by technological innovation, application of systems engineering concepts to the corporate organization, and changing concepts in management structures to accommodate advances in science and technology.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 620 Engineering Project Management 3.0 Credits

This course addresses the fundamentals of project management, and the techniques to ensure successful project execution. The course will look at qualitative and quantitative project management techniques, the impact of technology on PM, cost and schedule controls, financial considerations, leadership, team development, how other industries approach project management, and planning. We will also examine case studies of project management for international projects, different industries, and outsourcing situations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 625 Project Planning, Scheduling and Control 3.0 Credits

This course provides a basic understanding of project planning and control by examining concepts and theories. Emphasis is placed on planning and control of technology based organizations. Upon successful completion of this course, students should be able to use the tools and concepts of project control and apply them.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 571 [Min Grade: C]

EGMT 630 Global Engineering Project Management 3.0 Credits

This course will focus on strategies and techniques needed for managing a global project in an engineering environment. Develop concepts of leadership for diverse global teams comm. strategies, cultural considerations, organizational structure, collaborative tools & techniques, risk mitigation and contracting strategies, legal and financial issues when executing a global engineering project. Highlight techniques used in design/construction, prod, devpt and technology transfer projects. Essential in today's environment of global competition.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 635 Visual System Mapping 3.0 Credits

Visual System Mapping is an elective course designed to unlock creativity used to solve problems, accelerate learning and improve communications. Application of VSM techniques provides an advantage to solution development, collaboration and consensus in business problems for success in today's highly complex and competitive environment. VSM was inspired by a technique known as "Mind Mapping, and was designed to improve the use of the brain in learning and mastery and has been demonstrated to lead to enhanced creativity and better results. Practitioners can expect to have fun while virtually guaranteeing breakthrough outcomes. This course allows students to learn techniques and methods and apply them to personal, professional and organizational issues on individual and team projects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 645 Managing Engineering Disasters 3.0 Credits

Examines the technical issues with engineering disasters as well as the business, psychological, and social impacts. Reviews case studies in various industries (building, power, chemical, aerospace, materials, etc) to understand the technical issues behind the disasters and how these events changed the industry to improve oversight and safety. Challenges students to think how events today could have major impacts on supply chain, cities and communities. Finally, considers the ethics of designing new projects and technological improvements.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 650 Systems Thinking for Leaders 3.0 Credits

Course will explore concepts related to effective leadership within practice of engineering. Equips practicing engineers to move beyond engineering training to focus on algorithms and analysis and develop a broad understanding of leadership effectiveness in a technically oriented work place. Course will include models related to sustainable, high performance and topics related to living, learning, effectiveness, power, influence, networking, and systems thinking. Emphasis on developing systems thinking.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 652 Engineering Law 3.0 Credits

Examines the influence of contract, tort, and property law on engineering and construction activities. Includes legal principles relating to management of engineering organizations and governmental departments, and legal procedures of interest to engineers. Covers contracts, professional malpractice, expert testimony, intellectual property law, and business organizations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 660 Sustainable Business Practices for Engineers 3.0 Credits

The course will give students a broad and practical understanding of various environmental issues as well as sustainability concepts. The challenges associated with sustainable development are multifaceted involving economic, social and environmental concerns. These concerns are altering business strategies and practices and are leading to new opportunities.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 501 [Min Grade: C]

EGMT 692 Engineering Management Capstone 3.0 Credits

Uses the case method to provide a thorough study of engineering management and administrative procedures in recognizing and solving engineering problems. Emphasizes strategic planning and policy decisions that affect the image and success of the whole organization in its domestic and global environments.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 501 [Min Grade: C] and EGMT 502 [Min Grade: C] and EGMT 531 [Min Grade: C] and EGMT 535 [Min Grade: C]

EGMT 799 Research 0.5-20.0 Credits

Involves the selection and solution of a problem in the field of engineering management. Expects students to conduct independent research and demonstrate the ability to employ one or more of the managerial tools to which they were exposed. Emphasizes the composition and organization of the paper, the logical development of a solution to the problem, and the contribution of the solution to knowledge.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT 898 Master's Thesis 0.5-20.0 Credits

Involves the study and investigation of a research or development problem in the area of the student's major elective. Requires the problem to be reported in a dissertation under the direction of a faculty adviser. No credit will be granted until thesis is completed and approved.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

EGMT I599 Independent Study in EGMT 0.0-12.0 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 I699 Independent Study in EGMT 0.0-12.0 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 I799 Independent Study in EGMT 0.0-12.0 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 I899 Independent Study in EGMT 0.0-12.0 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 I999 Independent Study in EGMT 0.0-12.0 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 T580 Special Topics in EGMT 0.0-12.0 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 T680 Special Topics in EGMT 0.0-12.0 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 T780 Special Topics in EGMT 0.0-12.0 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 T880 Special Topics in EGMT 0.0-12.0 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 T980 Special Topics in EGMT 0.0-12.0 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 Technology

Courses

ET 605 Materials for Emerging Technologies 3.0 Credits

General properties of metals, ceramics and polymers are presented. Focus shifts to technologies - photo and fuel cells in the energy industry.

Topic include: the chemical process that converts fuel to electricity directly, light energy that converts to electrical energy, band model for optical materials, and materials for the optical and electronic industries.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 610 Networks for Industrial Environments 3.0 Credits

An in-depth review of high-performance wired and wireless networks for industrial control, communications, and computing. The emphasis is on understanding current and newly emerging network architectures, protocols and technologies from the point of view of performance, reliability, and cost. Industry standard modeling and simulation tools are also reviewed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 615 Rapid Prototyping and Product Design 3.0 Credits

This course will introduce concepts and methods for rapid prototyping, including their technical basis, and unified principles common to almost all rapid prototyping technologies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 619 Programmable Devices and Systems 3.0 Credits

A review of programmable devices and systems for industrial and embedded applications. Field-Programmable Gate Arrays, microcontrollers, and Programmable Logic Controllers are compared with respect to suitability, performance, and cost in industrial and embedded environments. Industry standard modeling and development tools will be introduced and used to predict performance and reliability.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 620 Microsystems and Microfabrication 3.0 Credits

Microsystems and microfabrication covers the principles of design, structure, and operation, as well as fabrication technologies for microsystems including microelectronics, sensors, MEMS, micro-optics, and microfluidics (lab-on-a-chip).

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 635 Engineering Quality Methods 3.0 Credits

Six Sigma concepts and methods are covered with emphasis on its framework, statistical tools and practical implementations. Students will gain a working knowledge of Six Sigma approaches and techniques for applications to both manufacturing and services.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 675 Reliability Engineering 3.0 Credits

This course will introduce the foundations and applications of reliability engineering including basic probability models for component and system failure, with emphasis on practical applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 681 Nanomaterials and Nanoengineering 3.0 Credits

This course is a graduate level introduction, survey, and case study analysis of nanoscale materials and nanoengineering, including nanodevices, processing, characterization, and applications. The course will feature coordinated and themed focused studies of fundamental developments in novel materials at the nanoscale, and their applications to several fields of engineering. The objectives include familiarizing students with nanoscale perspectives of materials science in the development materials with tailored properties and functions. Applications areas include materials for structures, optics, electronics, processing, and biomedical diagnostics and therapeutics. Topics related to commercialization and intellectual property, as well as environmental, safety, and regulatory issues will also be discussed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 685 Precision Manufacturing 3.0 Credits

Introduction to precision engineering for manufacturing. Emphasis on design and performance of precision machinery for manufacturing. Topics include machine tool elements and structure, sources of error (thermal, static, dynamic, process related), error mapping, precision machining processes and process models, sensors for process monitoring and control, metrology, role of CAD/CAM in precision manufacturing, examples of precision component manufacture.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 725 Sensors and Measurement Systems 3.0 Credits

This course provides a foundation in sensors and measurement systems including data acquisition for quality control. It covers general concepts, measuring devices, and the manipulation, transmission and recording of data. expanded coverage of sensors, and the use of computer tools in measurement & data acquisition for quality control. Measurement techniques related to micro- and nano-technologies are also discussed, reflecting the growing importance of these technologies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 730 Lean Manufacturing Principles 3.0 Credits

Lean is a generic process management philosophy, developed initially for manufacturing and derived mainly from the Toyota Production System (TPS), Just-in-Time (JIT) operations theory, and earlier sources dating from the work of Taylor, Ford, and others or work methods, mass production, and automation. Lean is an integral part of today's modern manufacturing enterprises.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 732 Modern Energy Conversion Technologies 3.0 Credits

This course introduces new energy conversion technologies, with an emphasis on solid-state devices, distributed systems with storage, and alternative energy sources including solar, waste heat, wind, biomass, and hydrogen. Solid-state energy conversion devices including solar cells, thermoelectrics, thermionics, thermophotovoltaics and light-emitting diodes, as well as solid-state refrigerators, will be described and analyzed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 733 Renewable Energy Technology 3.0 Credits

This course covers electric power generation technologies for renewable energy resources. Major topics are electrical machines appropriate for renewable energy systems, power converters for wind turbine and solar photovoltaics, renewable energy power transmission and distribution, and the economics of energy efficiency.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 755 Sustainable and Green Manufacturing 3.0 Credits

This course covers environmental considerations in engineering product and process design, reduction of environmental impact by design, recycling, material selection, demanufacturing and remanufacturing and trade-offs.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ET 775 Master's Project and Thesis in Engineering Technology 3.0 Credits

Involves the study and investigation of a research or development topic in the area of the student's interest. Requires the topic and solution to be reported in a thesis under the direction of a faculty advisor. Can be repeated for credit.

College/Department: College of Engineering

Repeat Status: Can be repeated 3 times for 9 credits

ET I599 Independent Study in ET 0.0-12.0 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

ET I699 Independent Study in ET 0.0-12.0 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

ET I799 Independent Study in ET 0.0-12.0 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

ET I899 Independent Study in ET 0.0-12.0 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

ET I999 Independent Study in ET 0.0-12.0 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

ET T580 Special Topics in ET 0.0-12.0 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

ET T680 Special Topics in ET 0.0-12.0 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

ET T780 Special Topics in ET 0.0-12.0 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

ET T880 Special Topics in ET 0.0-12.0 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

ET T980 Special Topics in ET 0.0-12.0 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 701 Career Integrated Education 3.0 Credits

Industrial and practical training for engineers.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENGR 702 Career Integrated Education II 3.0 Credits

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ENGR T580 Special Topics in ENGR 0.0-12.0 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 T680 Special Topics in ENGR 0.0-12.0 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 T780 Special Topics in ENGR 0.0-12.0 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 T880 Special Topics in ENGR 0.0-12.0 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 T980 Special Topics in ENGR 0.0-12.0 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

Entrepreneurship and Innovation

Courses

ENTP 501 Entrepreneurship Essentials 3.0 Credits

This course is designed for any graduate student who would like to explore entrepreneurship as a career alternative. The course helps prepare the student by introducing a range of tools used by successful entrepreneurs in pursuit of opportunity, beginning with the individual as the cornerstone of enterprise, be it a proprietorship or growing a company. The course begins the path to entrepreneurship with the student gaining insight and facility regarding personal tools and skills that enhance the probability of success as an entrepreneur as well as explore how to frame an opportunity.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 535 Social Entrepreneurship 3.0 Credits

This course is designed to immerse graduate students in social entrepreneurship ventures through experiential learning. While introducing students to frameworks and methodologies that address societal problems through data-driven and market approaches, students will simultaneously work with a social entrepreneur in the development of their existing business or their business model.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 540 Methods of Entrepreneurship 3.0 Credits

This course provides an overview of the entrepreneurial process, while examining entrepreneurship from a range of several scholarly contexts, including the social and behavioral sciences. The course introduces the student to the language of entrepreneurship and covers the initial stages of firm formation and initial development of entrepreneurial opportunities. Emphasis is given in this course to developing theoretical frameworks for enhancing entrepreneurial success.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

Prerequisites: ENTP 501 [Min Grade: C]

ENTP 545 Entrepreneurship in Emerging Markets 3.0 Credits

This course is intended for students interested in launching an innovative venture in an emerging market. It will examine the social and environmental challenges that can impede the entrepreneurial venture in world economies. Students will understand how culture and local customs affect entrepreneurial ventures in five specific regions of the world: Latin America, Eastern Europe, the Middle East, Africa, and Asia. Students will also compare global entrepreneurship to the U.S. model of entrepreneurship.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 555 Dynamics of the Family Firm 3.0 Credits

Family firms make up more than two-thirds of the global economy. This course examines this unique business culture, characteristics, and interpersonal dynamics involved in family enterprise. Emphasis is placed on the opportunities and challenges most commonly found family-operated endeavors. Topics include succession, balancing both family and business roles, family dynamics, managing non-family employees, and advising family enterprises.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 565 Franchising 3.0 Credits

Nearly half of all global retail businesses are managed through franchising networks. Furthermore, franchising continues to grow rapidly worldwide and as a result, there is an increasing need among franchising firms for employees with franchising knowledge and experience. This course deals with the various aspects of starting, developing, and managing both franchise networks and franchises within those networks.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 611 Learning from Failure 3.0 Credits

This course will define failure, analyze the causes of it, and present students with a framework they can use to help them be better prepared for learning from failure in order to drive the entrepreneur's level of entrepreneurial preparedness for further enterprising activities. Through a series of in-depth reflections of personal and professional "failures" and challenges, graduate students will develop a portfolio of resilience mechanisms to better prepare them for an entrepreneurial life.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 621 Innovation & Ideation 3.0 Credits

This course provides students with tools, methods, and self-reflection techniques necessary to bring new ideas to reality while also providing them with ways to learn about how to test the viability of and response to their ideas in the market. Learning through iteration is a key component of this course as it is expected that the first version of any idea is not likely the last. Human-centered design methodologies will be front-and-center in this course from the perspective of how to innovate based not on the ideas of the innovator but based first on the needs of the customer. This course reviews the importance of innovation, not only in new products and services, but also in the underlying business models where unexpected sources of innovation can be found.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 631 Building Internal & External Relationships 3.0 Credits

This course focuses on how early relationships, roles, and reward decisions cause tensions within the founding team. It also covers founders' recurring tension between keeping control of their ventures and attracting the resources needed to build the venture, initially, using founder/CEO succession as a microcosm of that tension and then broadening to key decisions throughout the founding process. This course introduces the next key players in the venture: cofounders and non-founding hires.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 641 Innovation in Established Companies 3.0 Credits

This course develops skills that are important for students who are interested in pursuing careers in an entrepreneurial setting and corporate venture activities. This course should be of interest to anyone who wants to develop their entrepreneurial thinking on various innovation approaches.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 651 Leading New Ventures 3.0 Credits

Starting and leading a new venture creates unique challenges for the entrepreneur as typically, this will be the first time they are in a leadership position. Some of these challenges stem from the context of the new venture itself – a company with scarce resources, little or no history and in many cases an unproven business model. Other challenges are more personal as they involve finding the appropriate leadership style and decision making models to employ in such a context. This course is designed to illustrate the leadership opportunities and challenges that face entrepreneurs and to provide them with the skills and competencies to effectively lead new ventures.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP 660 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. Of particular focus will be the understanding of how angel investors and angel investment groups operate and how they make investment decisions.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 505 [Min Grade: C] and BUSN 506 [Min Grade: C] or BUSN 501 [Min Grade: C]

ENTP 670 Clean Venture Lab 3.0 Credits

This course provides the groundwork to understanding new-venture development in clean-technology markets. A project-based course, students partner with a start-up clean-technology firm or research laboratory in the region and work together on a technology project. In class, students discuss challenges facing the entrepreneurial energy venture, examine technologies shaping the clean-tech industry, and hear from industry experts.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

Prerequisites: ENTP 501 [Min Grade: C] and ENTP 621 [Min Grade: C]

ENTP 690 The Lean Launch 3.0 Credits

In this course students will work on launching their own business. Students will spend the term de-risking their business assumptions through various tasks, such as surveying their customer base, meeting with partners and competitors, building prototypes, and validating a market need. Students will learn the iterative process of how a start-up actually works by using the Lean Start-Up model of new-venture development. Finally, students will see how to rapidly iterate a product or service to build something customers will use and buy.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

Prerequisites: ENTP 501 [Min Grade: C] and (ENTP 640 [Min Grade: C] or ENTP 540 [Min Grade: C])

ENTP I599 Independent Study in Entrepreneurship 1.0-12.0 Credit

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP I699 Independent Study in Entrepreneurship 1.0-12.0 Credit

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP I799 Independent Study in Entrepreneurship 1.0-12.0 Credit

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP I899 Independent Study in Entrepreneurship 1.0-12.0 Credit

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP I999 Independent Study in Entrepreneurship 1.0-12.0 Credit

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

College/Department: Close School of Entrepreneurship-3145

Repeat Status: Not repeatable for credit

ENTP T580 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-3145

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

ENTP T680 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-3145

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

ENTP T780 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-3145

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

ENTP T880 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-3145

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

ENTP T980 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-3145

Repeat Status: Can be repeated multiple times for credit

Restrictions: Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

Environmental Engineering

Courses

ENVE 516 Fundamentals of Environmental Biotechnology 3.0 Credits

This is an introductory course in environmental biotechnology for upper-level undergraduates and graduate students in engineering.

The fundamentals of microbiology and molecular biology important to environmental engineering applications will be emphasized.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 529 Environmental Noise 3.0 Credits

Covers the fundamentals of acoustic propagation, instrumentation, noise descriptors, hearing damage and other health effects, occupational noise, noise abatement techniques, modeling the noise near highways and airports, and EPA strategy for reducing environmental noise exposure.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 534 Industrial Ventilation 3.0 Credits

Covers principles of air movement related to ventilation and air-conditioning facilities for the maintenance of suitable environmental conditions in work areas. Includes principles of industrial processes and air pollution abatement equipment, including air flow, ducts, fans, motors, and hoods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 535 Industrial Safety 3.0 Credits

Examines the impact of accidents, liability considerations, legislation and regulation of safety, osha codes and standards, hazards and their analysis and control, risk assessment, major types of accidents and their impacts, and accident investigation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 546 Solid Waste Systems 3.0 Credits

Analyzes the public health, economic, and political aspects in the operation and design of storage, collection, and disposal of solid waste materials.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 550 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

ENVE 555 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

ENVE 560 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 570 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 571 Environmental Life Cycle Assessment 3.0 Credits

This course provides graduate 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 602 Water Quality Control Lab 3.0 Credits

Introduces analytical procedures in the assessment of water quality as applied to the analysis of natural waters and wastewaters, and to the control of water and waste treatment processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 501 [Min Grade: C]

ENVE 603 Hazardous Waste Analysis Lab 3.0 Credits

Introduces methods of sampling and analysis of hazardous environmental pollutants. Emphasizes inorganic and organic pollutants found at hazardous waste disposal sites. Includes application of leachability and extraction tests.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 501 [Min Grade: C]

ENVE 604 Solid Waste Analysis 3.0 Credits

Uses chemical and physical techniques to analyze the composition of solid waste material. Emphasizes combustible, organic, and toxic fractions of solid wastes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 501 [Min Grade: C]

ENVE 607 Environmental Systems Analysis 3.0 Credits

Surveys system concepts, theories, and analytical techniques, and their application to urban and environmental problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 642 Control of Gas and Vapor Pollutants From Industrial and Mobile Sources 3.0 Credits

In this course, students will learn how different physical and chemical mechanisms can be used to prevent, separate, recover or destroy the gas/vapor air pollutants. The control mechanisms are studied in detail. Students then learn how to apply those mechanisms in the design of conventional, or new, devices and systems for control of gas/vapor air pollutants.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD or Senior.

Prerequisites: ENVE 460 [Min Grade: D]

ENVE 644 Design of Particulate Control Devices 3.0 Credits

Students will learn how different mechanisms can control characteristics, formation, transport, separation and destruction of airborne particulate pollutants. Students learn how to apply the studied material in the first part of this course to design conventional or new devices and systems for control of particulate air pollutants.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVE 460 [Min Grade: D]

ENVE 646 Advanced Solid Waste Systems 3.0 Credits

Introduces and analyzes the newest advances in solid waste technology, with an emphasis on design, treatment, and processing techniques.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 501 [Min Grade: C] and ENVR 546 [Min Grade: C] and ENVR 636 [Min Grade: C]

ENVE 657 Incineration 3.0 Credits

Covers destruction of solid and liquid hazardous wastes at high temperature in a combustion device, including requirements for destruction of toxic materials and control of discharges to the atmosphere.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 501 [Min Grade: C]

ENVE 660 Chemical Kinetics in Environmental Engineering 3.0 Credits

Covers chemical and biological kinetics, mass-transfer considerations and hydraulic regimes in water and wastewater treatment, and water quality management. Includes absorption and stripping of gases and volatile organics and applications to aeration and ozonation processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 661 Env Engr Op-Chem & Phys 0.0-3.0 Credits

Provides a theoretical study of the chemical and physical unit operations of environmental engineering, including sedimentation, coagulation, precipitation, adsorption, oxidation-reduction, ion exchange, disinfection, membrane processes, and filtration.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVE 660 [Min Grade: C]

ENVE 662 Enviro Engr Unit Oper-Bio 3.0 Credits

Provides a systematic study of the microbiological and biochemical processes for the treatment of aqueous and solid wastes, including aerobic and anaerobic processes and composting.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVE 660 [Min Grade: C]

ENVE 665 Hazardous Waste & Groundwater Treatment 3.0 Credits

Covers principles of hazardous waste and groundwater treatment and in situ technologies. Presents application of processes, including solvent extraction, steam and air stripping, adsorption, ion exchange, oxidation, dechlorination, stabilization, wet air and supercritical oxidation, incineration, soil washing, and soil vapor extraction.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 660 [Min Grade: C]

ENVE 681 Analytical and Numerical Techniques in Hydrology 3.0 Credits

This course provides an introduction to some of the analytical and numerical methods that are widely used to solve problems in hydrology, including translating physical processes into partial differential equations and solving these problems using both analytical and numerical solution methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATH 200 [Min Grade: D] and ENGR 232 [Min Grade: D]

ENVE 682 Subsurface Contaminant Transport 3.0 Credits

This course covers principles governing contaminant movement in aquifers. It includes advection, dispersion, reactive transport, microbial and colloidal transport, matrix diffusion, density-coupled transport, and multiphase flow. It also emphasizes field-scale applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVE 681 [Min Grade: C]

ENVE 683 Stochastic Subsurface Hydrology 3.0 Credits

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVE 682 [Min Grade: C]

ENVE 684 Water Resource Systems Analysis 3.0 Credits

This course covers mathematical optimization techniques as applied to water resource systems. Example applications include water supply management, irrigation planning and operation, water quality management and ground water management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 702 Adv Enviro Instrumentatn 0.0-3.0 Credits

Uses instrumental analysis to assess environmental quality.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 602 [Min Grade: C] and ENVR 604 [Min Grade: C]

ENVE 726 Environmental Assessment 3.0 Credits

Examines the National Environmental Policy Act of 1969 and its implementation according to the regulations of the Council on Environmental Quality. Discusses air, water, noise, biological, cultural, and socioeconomic impacts. Includes methods of impact analysis and means to compare alternative actions.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 727 Risk Assessment 3.0 Credits

Covers quantitative relations between environmental exposures and effects. Includes computer methods for risk analysis and development of environmental guidelines and standards.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ENVE 750 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

ENVE 761 Enviro Engr Unit Oper Lab 0.0-3.0 Credits

Covers application of unit operations including filtration, adsorption, oxidation, coagulation, and biodegradation to the treatment of potable water, wastewater, and hazardous waste.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 661 [Min Grade: C] and ENVR 662 [Min Grade: C]

ENVE 766 Waste Wtr Treat Plant Des 3.0 Credits

Covers application of principles of environmental engineering unit operations to the treatment of municipal, industrial, and hazardous wastes by biological, physical, and chemical means. Includes applications of computers to the design process.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 662 [Min Grade: C] and ENVR 751 [Min Grade: C]

ENVE 767 Surface Water Mixing Processes 3.0 Credits

This course covers the hydrodynamic mixing and transport processes in free-surface flows. Basic mixing processes including molecular diffusion, turbulent diffusion and dispersion are also covered. Emphasis will be on the solution of the advection-diffusion equation with various boundary conditions. Additional topics include boundary exchanges, non-ideal mixing in rivers, and analysis of jets and plumes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CIVE or major is ENVE.

Prerequisites: CIVE 664 [Min Grade: C]

ENVE 768 Sediment & Contamin Trnsport 3.0 Credits

This course covers the transport of sediments and reactive solutes in surface waters as well as the classic theory for bed-load and suspended sediment transport. The interplay of stream flow, frictional resistance, and sediment transport is also covered. The biogeochemical processes that influence contaminant mobility and the integration of physical and chemical processes in contaminant transport models are also discussed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CIVE or major is ENVE.

Prerequisites: CIVE 767 [Min Grade: C] or ENVE 767 [Min Grade: C]

ENVE I599 Independent Study in ENVE 0.0-12.0 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 I699 Independent Study in ENVE 0.0-12.0 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 I799 Independent Study in ENVE 0.0-12.0 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 I899 Independent Study in ENVE 0.0-12.0 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 I999 Independent Study in ENVE 0.0-12.0 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 T580 Special Topics in ENVE 0.0-12.0 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 T680 Special Topics in ENVE 0.0-12.0 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 T780 Special Topics in ENVE 0.0-12.0 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 T880 Special Topics in ENVE 0.0-12.0 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 T980 Special Topics in ENVE 0.0-12.0 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 Policy

Courses

ENVP 522 Environmental Law 3.0 Credits

Examines administrative law applicable to the management of environmental programs, including constitutional constraints on the responsibilities of administrators and major court decisions on environmental issues. Covers due process, inspection, citizen actions, evidence and other matters.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: (ENVR 501 [Min Grade: C] or ENVS 501 [Min Grade: C]) and (ENVR 511 [Min Grade: C] or ENVS 511 [Min Grade: C] or ENVR 521 [Min Grade: C] or ENVS 521 [Min Grade: C])

ENVP 552 Political Economy of Climate Change 3.0 Credits

Climate change is one of the most debated issues in recent decades. It is increasingly accepted that climate change is one of the major threats for the stability and development of human society. Without going into the depths of geoscience and historical climatology, this course analyzes the evidence of climate change, the causes of it, the politics of controversies about climate change, and the proposals to deal with it.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVP 555 Cities and Climate Change 3.0 Credits

Climate change poses a host of challenges for American cities, ranging from what trees to plant, to increases in heat-related deaths, to critical infrastructure protection in the face of increasingly severe weather events. And it is an open question as to whether American city governments have the organizational capacity, resources, and political will, to engage in the type of long-term planning that climate change will require. What are the most likely effects that climate change will have on different American cities? What should American cities be doing, and what have American cities done so far, to prepare themselves for climate change? What responsibilities do cities have to try to mitigate the causes of climate change? What factors likely determine American cities' responses to climate change?.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVP 572 Environmental Policy 3.0 Credits

This interdisciplinary seminar investigates how interests and ideas interact in environmental policymaking. Students will explore how conceptual and political innovations play out across several environmental issues, including wildlife management, energy development, and the regulation of environmental risks.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVP 720 Environmental Cost-Benefit Analysis 3.0 Credits

This course deals with cost-benefit analysis in the environmental content. We examine the theoretical basis for welfare measurement and then proceed to examine various methods for monetary valuation of environmental goods, with an emphasis on empirical implementation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVP 650 [Min Grade: C]

ENVP 760 Social Change & Environment 3.0 Credits

Introduces the processes of social change and the key collective actors and institutions involved in the creation of U.S. environmental policies. Provides an understanding of the historical and social processes by which environmental policy is created and changed through a political process among a number of different coalitions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVP 774 Environmental Policy Economic Analysis 3.0 Credits

This course presents theories and applications in the design of economic instruments for controlling environmental problems. We also examine briefly economy-wide factors driving how firms and households react to these policies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 650 [Min Grade: C]

ENVP 875 Environmental Justice 3.0 Credits

Seminar course focusing on the concept of environmental justice/injustice; empirical evidence of inequalities; theories of environmental injustice; politics of environmental health and illness; legal remedies at local and international level; and the environmental justice movement.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Environmental Science

Courses

ENVS 501 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

ENVS 506 Biostatistics 3.0 Credits

Covers measures of biostatistics, including central value and dispersion, sampling and distribution, statistical inference, analysis of variance, regression and correlation, and time series. Emphasizes application.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 511 Evolutionary Ecology 3.0 Credits

Studies the basic principles of evolution and ecology, including natural selection, the ecological niche ecological succession, and the food web, and effects of human activities on ecosystems. Views humans as a species.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 512 Systematic Biology 3.0 Credits

This course is an introduction to systematic biology, the science of discovering, describing and classifying organisms to construct a reference system for life on earth. Topics include concepts of species and higher taxa; sources and application of evidence for inferring phylogenetic relationships, including nucleotide sequences, morphology and fossils; characters, homology and parsimony; phylogenetic tree construction and classification; overview of nomenclature and taxonomy; and using phylogenies to discover pattern and process in evolutionary and comparative biology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 515 Plant Animal Interaction 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

ENVS 522 Tropical Ecology 3.0 Credits

Covers the ecology of tropical forests, including biogeography, history, current processes, and effects of economic developments of rain forest and dry forest of the Old and New World tropics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 523 Tropical Field Studies 3.0 Credits

This is a study abroad course focusing on the ecology of tropical forest ecosystems. We will visit and compare forest ecosystems in several ecological life zones. The course will combine lectures, natural history surveys, faculty-led field research problems, and learning experiences with local residents to explore the biological diversity and function of tropical forests, including the effects of human impacts. Some background in Biology or Ecology is useful.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 526 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

ENVS 527 Molecular Ecology Lab 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

ENVS 528 Conservation Biology 3.0 Credits

This course will detail the loss of biodiversity and explore related issues, including the theories and practices of conservation biology 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

ENVS 530 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

ENVS 533 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

ENVS 535 Aquatic Insects and Water Quality 3.0 Credits

Healthy water quality has always been an essential part of human survival and culture. This course outlines the importance of using aquatic macroinvertebrates (principally insects) for assessing water quality and its wide use by government, consulting businesses and citizen groups. Nearly 90 groups of aquatic macroinvertebrates used in stream assessment and in sampling will be identified.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 538 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

ENVS 552 Ornithology 3.0 Credits

Birds are among the most ubiquitous, diverse, and charismatic animals and we know a great deal about their biology. This course aims to teach students who are enthusiastic about natural history about the biology of birds and covers a variety of topics including evolution, ecology, behavior, conservation, and diversity of birds and uses the world renowned specimen collections housed in the Academy of Natural Sciences of Drexel University.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 553 Field Ornithology Lab 2.0 Credits

The Delaware Valley is the cradle of North American Ornithology. This course aims to give students a hands-on lab and field experience in identifying birds found in the Delaware Valley. Half of the classes are held outside at local parks and refuges and the remainder are in the lab where students will study specimens from the world renowned collections housed at the Academy of Natural Sciences of Drexel University.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 554 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

ENVS 555 Biogeography 3.0 Credits

This course is a survey of the field of Biogeography, the study of biological diversity across space and time. Factors and evolutionary history that influence both the ecology and evolution of organismal diversity will be covered. Topics will range from how species distributions arise to how we define species and how we reconstruct the influence and importance of both ecology and evolutionary history on their distributions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 564 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

ENVS 565 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 observations, analysis of data and written report. Graduate students supervise weekly assignment review sessions, organize peer review sessions and revise the laboratory manual.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 582 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 analyses. Non-vascular species are examined but not emphasized.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 5 credits

Prerequisites: ENVR 511 [Min Grade: C] or ENVS 511 [Min Grade: C]

ENVS 583 Ecology of the New Jersey Pine Barrens 4.0 Credits

Course focuses on the ecology of the New Jersey Pine Barrens. Students learn field survey 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

Prerequisites: ENVS 511 [Min Grade: C] or ENVR 511 [Min Grade: C]

ENVS 585 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

ENVS 588 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 25 foot Drexel research vessel, Peter Kilham.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVS 511 [Min Grade: C] or ENVR 511 [Min Grade: C]

ENVS 590 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

ENVS 591 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

ENVS 593 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

ENVS 594 Entomology Lab 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

ENVS 601 Advanced Environmental Chemistry 3.0 Credits

Covers thermodynamic and kinetic principles and their application to the study of chemical changes and reactions in the water or air environments.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVR 501 [Min Grade: C] or ENVS 501 [Min Grade: C]

ENVS 605 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

ENVS 609 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 610 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

ENVS 612 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

ENVS 613 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

ENVS 614 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

ENVS 615 Advanced Environmental GIS 3.0 Credits

This course is structured to build upon techniques and skills learned in an introductory level GIS class. This advanced course is technically oriented and will introduce high-level geospatial analyses in an environmental science context. Provides instruction and theory of geospatial modeling, mapping, and future trends.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: ENVS 708 [Min Grade: D] or ENVE 555 [Min Grade: D]

ENVS 617 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

ENVS 618 Coastal Biogeochemistry 3.0 Credits

This course covers fundamental biogeochemical and ecological concepts necessary to critically examine influential and current relevant literature.

Topics include eutrophication, hypoxia, ocean acidification, climate change, and greenhouse gas exchange in nearshore coastal waters such as estuaries, coastal rivers and watersheds, mangroves, seagrasses, salt marshes, wetlands, mud and sand flats, and coral reefs. Analytical tools such as stable isotopes, ecosystem models, and process measurements will be used.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 670 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: Not repeatable for credit

ENVS 692 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

ENVS 708 Environmental GIS 3.0 Credits

This introductory course is technically oriented and will provide a foundational understanding of GIS in an environmental context. Covers GIS principles and practices and applies spatial investigation procedures to analyze geographic data, including mapping and computer systems, attribute and spatial data models, data organization in GIS, GIS data analysis, and future trends for this technology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 711 Aquatic Toxicology 3.0 Credits

Applies the principles of toxicology to fish and aquatic invertebrates. Includes applications of laboratory and field tests to evaluate aquatic effects, and methods of data analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 726 Environmental Assessment 3.0 Credits

Examines the National Environmental Act of 1969 and its implementation according to the regulations of the Council on Environmental Quality. Discusses air, water, noise, biological cultural, and socioeconomic impacts. Includes methods of impact analysis and means to compare alternative actions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 797 Research 0.0-20.0 Credits

Requires actual formulation and investigation of a research problem and a written report.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS 864 Graduate Research Seminar 1.5 Credit

The BEES Graduate Research Seminar is a weekly series of scientific presentations by faculty, graduate students and outside speakers. The seminars are opportunities for learning about and discussing ongoing research in the Department and current issues in biodiversity, earth and environmental science.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 891 Research Methods I 3.0 Credits

Introduces research methods and literature, procedures for the collection and analysis of data, and preparation of technical papers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

ENVS 898 Master's Thesis 0.0-20.0 Credits

Master's thesis.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS 998 Ph.D. Dissertation 0.0-20.0 Credits

Requires each student working on a dissertation to file a written report each term with his or her supervisory committee and the program graduate advisor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS I599 Independent Study in ENVS 0.0-12.0 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 I699 Independent Study in ENVS 0.0-12.0 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 I799 Independent Study in ENVS 0.0-9.0 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 I899 Independent Study in ENVS 0.0-12.0 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 I999 Independent Study in ENVS 0.0-12.0 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 T580 Special Topics in Environmental Science 0.0-9.0 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

ENVS T680 Special Topics in Environmental Science 0.0-9.0 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

ENVS T780 Special Topics in Environmental Science 0.0-9.0 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

ENVS T880 Special Topics in Environmental Science 0.0-9.0 Credits

Covers topics of current interest to faculty and students. Specific topics for each term are announced prior to registration. May be repeated for credit if topics vary.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

ENVS T980 Special Topics in Environmental Science 0.0-12.0 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 504 Materials Exploration 3.0 Credits

In this course students experiment with materials, connectors, color, texture and form as they relate to the body. Students will learn how to transform and manipulate fabric by uncovering processes that allow the metamorphosis of planar materials into three-dimensional works.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: (VSST 104 [Min Grade: C] or VSST 101 [Min Grade: C]) and (VSST 105 [Min Grade: C] or VSST 102 [Min Grade: C]) and (VSST 106 [Min Grade: C] or VSST 103 [Min Grade: C]) and VSST 110 [Min Grade: C] and VSST 111 [Min Grade: C]

FASH 510 Presentation Techniques 3.0 Credits

This course is designed to introduce presentation techniques and skills used in the Fashion Industry. Students will learn to prepare presentation boards, portfolios, and brochures via traditional and digital media.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 504 [Min Grade: C] or FASH 604 [Min Grade: C]

FASH 511 Textile Design 3.0 Credits

Instructs the student in both traditional and digital techniques and Textile Design. Investigates layout, repeat and co-ordinated fabric groups.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FASH or major is IAD.

Prerequisites: VSST 102 [Min Grade: C] or VSST 105 [Min Grade: C]

FASH 514 Fashion Presentation 3.0 Credits

Requires two-dimensional presentation of original collections based on various facets of the industry. Stresses professional skill development in medium of choice.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 212 [Min Grade: C]

FASH 515 Computer Aided Design for Patternmaking 3.0 Credits

Covers the production, storage, and retrieval of fashion patterns using computer-assisted design software and Macintosh hardware. Requires students to use previously acquired pattern-making and design skills to produce patterns on the computer and plotter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 342 [Min Grade: C] or FASH 528 [Min Grade: C] or FASH 628 [Min Grade: C]

FASH 516 Computer Aided Design for Fashion Design 3.0 Credits

Provides an overview of computers in the fashion industry. Develops students' presentation skills using industry software and commercial graphics programs.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 511 [Min Grade: C] or FASH 611 [Min Grade: C]

FASH 517 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

Prerequisites: FASH 528 [Min Grade: C] or FASH 628 [Min Grade: C]

FASH 528 Draping Design 3.0 Credits

Differences in the material properties of fabric require the designer to use a variety of approaches to take a design concept to realization. Building on skills mastered in FASH 341-Flat Pattern Design, students will learn to create garments by combining those skills with draping directly on the dress form.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 341 [Min Grade: C]

FASH 529 Fashion Design I 3.0 Credits

Inspiration and research is essential to the creation of new ideas and the fulfillment of design problems. Fashion Design I examines the use of both unusual and familiar sources of inspiration to develop uniquely creative garments. Resources may include: architecture, film, furniture, historic costume (DHCC), industrial design, interior design, nature, painting, sculpture, transportation, etc. The ability to think on paper is stressed as well as the manipulation of a variety of materials and media through the conceptualization and development of both singular realizations and coordinated groups.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 528 [Min Grade: C] or FASH 628 [Min Grade: C]

FASH 530 Fashion Design II 3.0 Credits

Stresses industrial limitations as they apply to design and creativity. Covers fabrication, costing, market requirements, and specifications for all facets of the industry. Primary area of concentration is knitwear. Professional critiques evaluate student work.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 529 [Min Grade: C] or FASH 629 [Min Grade: C]

FASH 531 Fashion Design III 3.0 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 530 [Min Grade: C] or FASH 630 [Min Grade: C]

FASH 532 Fashion Drawing for Industry 3.0 Credits

Offers the Fashion student the ability to generate technical renderings of garments along with associated specifications requirements as per industry expectations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 528 [Min Grade: C] or FASH 628 [Min Grade: C]

FASH 543 Tailoring 3.0 Credits

In this course, building on skills mastered in FASH 341-Flat Pattern Design and FASH 528-Draping Design, the student is instructed in the complex pattern-making, draping, construction and fitting techniques necessary to produce a tailored suit or coat.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 529 [Min Grade: C] or FASH 629 [Min Grade: C]

FASH 550 Fashion Design IV 3.0 Credits

Expands and broadens technical skills and lays the groundwork for development of the graduate collection. Projects include couture eveningwear techniques.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 531 [Min Grade: C] or FASH 631 [Min Grade: C]

FASH 600 Fashion Industry Internship 0.0 Credits

Provides relevant off campus employment for students; they experience design and production processes in an industrial setting.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FASH.

FASH 633 Couture Techniques 3.0 Credits

Emphasizes a particular limit of time, cost, or material and expands development of technical solutions to construction and production problems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 550 [Min Grade: C] or FASH 730 [Min Grade: C]

FASH 650 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 12 credits

Prerequisites: FASH 241 [Min Grade: C] and VSST 112 [Min Grade: C]

FASH 651 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: C]

FASH 653 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 629 [Min Grade: C] or FASH 529 [Min Grade: C]

FASH 664 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

Prerequisites: FASH 514 [Min Grade: C] and FASH 530 [Min Grade: C]

FASH 666 Business of Fashion 3.0 Credits

Presents the following topics in seminar: fashion merchandising as a link between producer and final consumer, 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 psychographic factors, manufacturing components and processes, and case studies.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FASH 685 Collection I 3.0 Credits

Requires proposal, design, and execution of related garments to form a collection. Emphasizes the designer's goals. Includes professional critique.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 550 [Min Grade: C] or FASH 730 [Min Grade: C]

FASH 686 Collection II 3.0 Credits

Continues FASH 685 Collection I. Includes professional critique.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: FASH 685 [Min Grade: C] or FASH 865 [Min Grade: C]

FASH 699 Comprehensive Examination in Fashion Design 0.0 Credits

Provides a comprehensive examination in the field of fashion design. Required of candidates for the M.S. degree upon satisfactory completion of the coursework for the degree.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

FASH 752 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: C]

FASH 767 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 I599 Independent Study in Fashion Design 0.0-12.0 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

FASH I699 Independent Study in Fashion Design 0.0-12.0 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

FASH I799 Independent Study in Fashion Design 0.0-12.0 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

FASH I899 Independent Study in Fashion Design 0.0-12.0 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

FASH I999 Independent Study in Fashion Design 0.0-12.0 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

FASH T580 Special Topics in Fashion Design 0.0-12.0 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

FASH T680 Special Topics in Fashion Design 0.0-12.0 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

FASH T780 Special Topics in Fashion Design 1.0-4.0 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

FASH T880 Special Topics in Fashion Design 0.0-12.0 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

FASH T980 Special Topics in Fashion Design 0.0-12.0 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

Finance

Courses

FIN 601 Corporate Financial Management 3.0 Credits

The objective of this course is to develop the intuition and tools to analyze corporate financial decisions. The topics to be covered include the time value of money, capital budgeting, stock and bond valuation, the link between risk and return, the cost of capital, and business valuation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 501 [Min Grade: C] or ACCT 510 [Min Grade: C]

FIN 602 Advanced Financial Management 3.0 Credits

Provides an in-depth treatment of long-term financing decisions, including estimation of the cost of capital, financial leverage, dividend policy, and capital structure determination.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 601 [Min Grade: C]

FIN 610 Corporate Governance 3.0 Credits

Examines the role of corporate governance in effective financial management. Topics include corporate structure, executive compensation, and boards of directors.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 601 [Min Grade: C]

FIN 622 Financial Institutions & Markets 3.0 Credits

Analyzes the economic functions of financial markets and intermediaries. Examines monetary policy formation and its impact on financial markets.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 601 [Min Grade: C]

FIN 624 Risk Management 3.0 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

Prerequisites: FIN 601 [Min Grade: C] and (STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or STAT 510 [Min Grade: C] or ECON 540 [Min Grade: C])

FIN 626 Investment Management 3.0 Credits

Covers theoretical and analytical frameworks used to value securities such as common stocks and bonds.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 601 [Min Grade: C]

FIN 635 Entrepreneurial Finance 3.0 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 601 [Min Grade: C]

FIN 640 Mergers and Acquisitions 3.0 Credits

Covers internal vs. external growth, forces of expansion, analysis of relevant quantitative factors, accounting and tax problems, and forms of expansion.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 602 [Min Grade: C]

FIN 642 Business Conditions and Forecasting 3.0 Credits

Introduces various techniques such as trend analysis, time series analysis, and econometric methods to forecast business fluctuations and financial asset prices.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 601 [Min Grade: C] and (STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or STAT 510 [Min Grade: C] or ECON 540 [Min Grade: C])

FIN 648 International Financial Management 3.0 Credits

Uses analytical tools and data to formulate optimal financing and investment strategies in global markets. Analyzes exchange rate determination and international asset price linkages.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 601 [Min Grade: C]

FIN 649 Comparative Financial Analysis 3.0 Credits

The analysis of financial statements for the purposes of valuation and the assessment of creditworthiness and liquidity; financial ratio analysis.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 601 [Min Grade: C] and FIN 626 [Min Grade: C]

FIN 650 Derivative Securities 3.0 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 624 [Min Grade: C]

FIN 660 Advanced Portfolio Management 3.0 Credits

The course is designed to provide the student with a fundamental understanding of portfolio management; introduce the student to international investing and alternative investment strategies; foster intuitive understanding of the material; and integrate theoretical concepts with practical investment applications.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 601 [Min Grade: B]

FIN 670 Applied Portfolio Management 3.0 Credits

This course is the second in the sequence of experiential courses for MS students in which students will develop a business plan for offering financial service products with particular emphasis on portfolio management strategies. A majority of your work will be outside of the classroom in the development and preparation of the business plan to be presented in class.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 601 [Min Grade: C]

FIN 790 Seminar in Finance 3.0 Credits

Requires students to present the results of research on the application of financial theory to the establishment of financial policy. Requires oral report and written paper of graduate quality.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 602 [Min Grade: C]

FIN 794 Seminar in Investments 3.0 Credits

Requires students to present the results of research on the application of theory to portfolio management problems.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: FIN 626 [Min Grade: C]

FIN 910 Doctoral Seminar in Corporate Governance 3.0 Credits

Doctoral Seminar on research in Corporate Governance. Topics include board composition, executive compensation, and governance effects on mergers and acquisitions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

FIN 920 Doctoral Seminar in Asset Pricing 3.0 Credits

Provides an introduction to techniques used in asset pricing.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

FIN 921 Doctoral Seminar in Behavioral Finance 3.0 Credits

Much of finance research is based on market participants and managers behaving rationally. Financial decisions in the lab and the field systematically deviate from rational benchmarks, despite pecuniary incentives to get it right. Behavioral finance examines these deviations and their implications for welfare and prices. This course provides an introduction to the field for doctoral students in financial economics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

FIN 922 Doctoral Seminar in Corporate Finance 3.0 Credits

Covers theoretical and empirical topics in corporate finance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

FIN 924 Doctoral Seminar in Financial Markets 3.0 Credits

The course provides a theoretical framework to analyze the behavior of prices in financial markets.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

FIN 928 Doctoral Seminar in Financial Econometrics 3.0 Credits

The course provides econometric techniques for empirical analysis of financial economics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

FIN 931 Seminar on Current Issues in Finance 3.0 Credits

This course explores the role that market participants, namely analysts, investment banks and advisors, and insiders play in providing information to the market, while investigating conflicts of interest that potentially alter the information produced by these agents.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

FIN 998 Dissertation Research in Finance 1.0-12.0 Credit

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

FIN I599 Independent Study in FIN 0.0-12.0 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 I699 Independent Study in FIN 0.0-5.0 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

FIN I799 Independent Study in FIN 0.0-12.0 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 I899 Independent Study in FIN 0.0-12.0 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 I999 Independent Study in FIN 3.0 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 9 credits

FIN T580 Special Topics in FIN 0.0-12.0 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 T680 Special Topics in FIN 0.5-9.0 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 T780 Special Topics in FIN 0.0-12.0 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 T880 Special Topics in FIN 0.0-12.0 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 T980 Special Topics in FIN 0.0-9.0 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

Food

Courses

FOOD 503 Global Cuisine Studio 3.0 Credits

This course will serve as a foundation for a variety of regional and traditional cuisines, including French, Italian, Chinese, Korean, Indian, and Caribbean and Island cuisines. Graduate students will master both the fundamental culinary skills for these cuisines and explore the rich academic literature on their historical, sociological, scientific, and technical aspects.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 12 credits

FOOD 520 Culinary Studio 3.0 Credits

This course focuses on improvisational, interactive exercises designed to build culinary skills rather than replicate recipes. The emphasis is on culinary arts as an integrative creative enterprise synthesizing food science, aesthetics, management and performance. Activities are structured around five competencies: problem solving, speed, flavor and palate development, leadership and teamwork, and communication.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FOOD 525 Garde Manger Laboratory 3.0 Credits

Introduces students to techniques used in the fabrication, selection and preparation of cold buffet production. Items include cold appetizers, canapes, garnishes, hors d'oeuvres, salads, and sandwiches; with additional focus on decoration, form, and presentation of cold food items.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FOOD 530 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: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FOOD 600 Advanced Studies with a Master Chef 3.0 Credits

This course is a 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: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FOOD 605 Culture and Gastronomy 3.0 Credits

This course is devoted to the study of and the wide range of sociological and anthropological implications of foodways on society and culture.

Food — finding it, growing it, raising it, having it or not, what, where, how and with whom you dine are all historical and cultural determinants. No single item is more significant to the evolution of a civilization, no single item provides a more revealing window on any culture — anywhere anytime. Food fascinates and is essential. To have a knowledge and understanding of the sociological/anthropological implications of what we eat and why we ate it throughout history will serve students throughout their careers.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FOOD 606 The Contemporary Food System 3.0 Credits

This course will explore the structure and function of the contemporary food system, and compare it to some alternative historical models to ask: how did this system develop? What problems does it try to solve? What unintended consequences flow from this current food system?.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FOOD 612 Food Writing 3.0 Credits

This course will explore the many categories of food writing – reviews, memoirs, journalism – and the many outstanding practitioners in the many forms. In this course we examine the role that food plays and how food is used both as an element of expression and as a transforming agent in long form food journalism, book form food focused fiction, memoir, mystery, non-fiction single-item history, foodways studies, biography, and original research Culinary Science academic papers.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FOOD 626 Kitchen Garden 3.0 Credits

This course introduces students to the seasonal preparation and maintenance of the plot and raised beds of the sustainable/organic urban Kitchen Garden situated in the Summer-Winter Community Garden. Students will sow seeds indoors, and nurture vegetable plants in preparation for transplanting into the garden, and conduct literature research into the principles and practices of urban gardening. Produce will be used in food production courses, and in menu preparations in the student operated restaurant.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FOOD 699 Thesis Research in Culinary Arts and Science 0.0-9.0 Credits

Students pursuing a thesis consult with a faculty advisor to identify a suitable problem in food science and develop and carry out appropriate methodology to address the problem. This course may be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Prerequisites: FDSC 501 [Min Grade: B-] or SCTS 502 [Min Grade: B-]

FOOD 801 Food Systems Practicum/Project 2.0 Credits

This course will provide students with 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 part time, or full time employment opportunities. Alternatively, students may embark on an independent project with both an industry and faculty mentor.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FOOD 890 Seminar in Culinary Arts and Science 1.0 Credit

In this course, current topics in food studies will be studied with presentations by invited speakers and students. Students receiving credit for this course must present their work at least once during the quarter.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Food Science

Courses

FDSC 501 Research Methods for Food Science 3.0 Credits

This course introduces students to common research tools and skills in the field of food science and studies, as well as to basic concepts in data analysis and research ethics.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 506 Food Composition & Behavior 3.0 Credits

Examines the composition of foods and chemical and physical changes in food components occurring during food preparation and processing.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 550 Food Microbiology 3.0 Credits

Discusses factors affecting microbial growth in foods. Also covers methods of enumeration of food-borne organisms, microbial spoilage of foods, foods and ingredients from fermentation, food-borne pathogens and their control, and sanitation and HACCP in food processing.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 551 Food Microbiology Laboratory 2.0 Credits

Companion laboratory course to FDSC 550. Covers methods of isolation and enumeration of microorganisms important in foods, food fermentations, and methods of control of microorganisms.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 550 [Min Grade: C], NFS 650 [Min Grade: C] (Can be taken Concurrently)

FDSC 554 Microbiology & Chemistry of Food Safety I 3.0 Credits

Covers the study of microbiological and toxicological factors affecting the safety of food, including natural toxicants, food additives, and food-borne diseases, toxicoses, and parasites.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 550 [Min Grade: B] (Can be taken Concurrently)

FDSC 556 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 processing, enzymatic activity, microbial action, and chemical change.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 557 Advanced Food Product Development 3.0 Credits

The course covers the advanced stages of new food product development, food ingredients and functionality, and new product management and marketing. The course also provides in-depth understanding of various thermal and non-thermal food processing techniques used to extend the shelf-life of food. Effect of these processing techniques on food quality will also be discussed. During the lab portion of this class, students will design a new food product suitable for specific markets while considering taste, texture, stability and packaging.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 350 [Min Grade: C] (Can be taken Concurrently)

FDSC 558 Nutritional Impact of Food Processing Methods 3.0 Credits

Covers the effect of processing on foods emphasizing nutritional and chemical aspects. Includes synthetic foods, food additives, current food processing methods, nutrition policy, consumer dietary patterns, and food production trends.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 560 Food Chemistry 3.0 Credits

Covers chemical and physical behavior of food constituents and application of physicochemical principles to processed food systems.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 561 Food Analysis 3.0 Credits

Covers the application of chemical analysis techniques to food. Food composition analysis (lipids, proteins, carbohydrates) and measurements of chemical reactions in foods (browning, lipid oxidation, starch hydrolysis, protein denaturation) are studied. Also focused upon is the maintenance of food quality during processing and storage.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 568 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: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 570 Meat Science 3.0 Credits

Meat science covers a range of technical information on meats including their muscle characteristics and composition, microbiology, nutritional content and processing.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 577 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: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 610 The Science of Wine 3.0 Credits

Wine production is a very interdisciplinary field, at the crossing of agronomy (grape growing), chemistry, microbiology (wine making), sensory science (wine tasting) and cultural studies. The class will discuss the application of each discipline to wine production, with an emphasis on how scientific knowledge and technologies have impacted wine making and wine consumption around the world, and what empirical knowledge and practices developed over centuries has brought to science. Some of the key concepts developed during the course will be experienced through tasting of synthetic solutions and wines. Students must be 21 years or older prior to the first day of class.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 654 Microbiology & Chemistry of Food Safety II 3.0 Credits

Advanced study of chemical of food safety significance with emphasis on the effects of components normal to food. Risk assessment, regulations and control will be covered.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: FDSC 454 [Min Grade: D] or FDSC 554 [Min Grade: C]

FDSC 662 Sensory Evaluation of Food 3.0 Credits

Discusses historical and current theories addressing the anatomy and mechanism of human chemical sensing systems (taste and odor perception and their receptor sites). Includes dietary, environmental, and physiological influences of the chemical senses. Describes functional methods of subjective or organoleptic testing involving human subjects (psychophysics) and provides laboratory experiments demonstrating practical application of selected techniques.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

FDSC 669 Readings in Food Science 3.0 Credits

Covers current research and its practical application in food production, processing storage, and preparation. Encourages individual investigation.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 6 credits

FDSC 890 Seminar in Food Science 1.0 Credit

Current topics in food science will be studied with presentations by invited speakers and students. This course may be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 3 credits

FDSC 997 Research in Food Science 1.0-12.0 Credit

Students consult with a faculty advisor to identify a suitable problem are in food science and develop and carry out appropriate methodology to address the problem. This course may be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 4 times for 12 credits

FDSC I599 Independent Study in FDSC 0.0-12.0 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

FDSC I699 Independent Study in FDSC 0.0-12.0 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

FDSC I799 Independent Study in FDSC 0.0-12.0 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

FDSC I899 Independent Study in FDSC 0.0-12.0 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

FDSC I999 Independent Study in FDSC 0.0-12.0 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

FDSC T580 Special topics in FDSC 0.0-12.0 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

FDSC T680 Special topics in FDSC 0.0-12.0 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

FDSC T780 Special topics in FDSC 0.0-12.0 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

FDSC T880 Special topics in FDSC 0.0-12.0 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

FDSC T980 Special topics in FDSC 0.0-12.0 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

Forensic Science

Courses

General Business

Courses

BUSN 501 Measuring and Maximizing Financial Performance 3.0 Credits

This course is an introduction to the concepts of financial accounting and financial management. The content of this course includes preparation and analysis of financial statements. Also covered are the time value of money, risk and return, and corporate financing choices.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 502 Essentials of Economics 3.0 Credits

Topics in macroeconomics and microeconomics, including market equilibrium, monetary and fiscal policy, profit maximization, and market future.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 505 Financial Performance of the Firm - Accounting 1.5 Credit

This course provides detailed coverage of the financial statements (income statement, balance sheet, statement of stockholders' equity, and statement of cash flows) and their construction. Students will also learn how to analyze the impact of corporate transactions on companies' financial condition and operating performance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is MBA.

BUSN 506 Financial Performance of the Firm - Finance 1.5 Credit

Understanding the strengths and weaknesses of a firm and examining the effects of decisions on future performance. Topics include ratio analysis, cash flow measurement, pro-forma financial statements, external financial requirements, and time value of money.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 507 Essentials of Economics I 1.5 Credit

This course teaches basic microeconomic theory and how to apply it to the analysis of real world issues. Students will study supply and demand, the economics of production, and the economics of market structures such as competition, monopoly, and oligopoly.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 508 Essentials of Economics II 1.5 Credit

This course teaches basic macroeconomic theory and how to apply it to the analysis of real world issues. Students will learn national income accounting, price indexes, inflation, unemployment, aggregate demand, aggregate supply, fiscal policy, the banking system, monetary policy, capital flows, and exchange rates.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 601 Health Care Law and Pharmaceutical Regulations 3.0 Credits

This course provides students with tools of legal and regulatory analysis and presents principles of health law and an overview of federal regulatory program affecting the pharmaceutical industry, the medical community, and patients. Topics include laws and regulation governing: the development of regulations, fraud and abuse, the drug/device/biologic approval processes and post-approval regulation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 602 Business Strategies in Drug Development 3.0 Credits

The course covers the basic steps of the drug development process for students with an understanding of the management principles for new product introduction and the economics supporting product development. Lectures will cover drug development fundamentals, clinical development plans, management decision-making, regulatory strategy development and planning for product launch and post-approval marketing stages.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 603 Market Policies and Practices 1.0 Credit

This course provides a comprehensive introduction to project management, client based consulting engagements, research techniques and the skills required to solve unstructured business problems.

The frameworks, methods, and opportunities to practice will improve participant's decision-making skills in their current roles, as well as provide a strong critical thinking discipline that will assist them in their ongoing and future program coursework. This course acts as a springboard to Master of Science practicum experiences which give students an introduction to marketing research.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 614 Foundations of Career & Professional Development 0.0 Credits

This course provides foundational instruction in professional etiquette and career development. Students will learn through lecture, small group activities, and one-on-one meeting with their career advisor the tools to create a professional resume and cover letter, LinkedIn profile, and learn how to network effectively within their industry. Upon successful completion students will be able to commence their internship/job search with the correct tools and knowledge.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 615 Graduate Internship 0.5-3.0 Credits

Graduate-level internships provide an opportunity for practical application of theories learned in the classroom. Students typically spend three months employed at a business that is linked to their academic interests. Full-time employment is up to 40 hours/week while part-time employment is up to 20 hours/week. Variable credits based on duration of internship.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 2 times for 9 credits

Restrictions: Can enroll if program is MBA or MS.

BUSN 651 Healthcare Business Practice I: Foundations 3.0 Credits

This is an introductory course in the business aspects of the delivery of health services and pharmaceutical/life sciences. This course will offer an overview of the healthcare marketplace and focus on the unique features of this industry. It is a multi-disciplinary survey course that will establish a foundation to develop the skills necessary for a successful business career in the healthcare, pharmaceutical, and life sciences industry.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 652 Healthcare Business Practice II 3.0 Credits

This is a continuation in the business aspects of the delivery of health services and pharmaceutical/life sciences. This course is designed to develop more specialized knowledge and skill necessary for a successful business career in the healthcare, pharmaceutical, and life sciences industry.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 651 [Min Grade: C]

BUSN 653 Healthcare Business Practice III: Capstone 3.0 Credits

This is the third course in the LeBow Healthcare concentration focusing on the business aspects of the delivery of health services and pharmaceutical/life sciences. This course is designed to finalize students' preparations for a successful business career in the healthcare, pharmaceutical, and life sciences industry by focusing on specialized knowledge areas and by providing an intensive experiential learning experience that will integrate students' knowledge of the business of healthcare.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 651 [Min Grade: C] and BUSN 652 [Min Grade: C]

BUSN 701 Industry Mgmt Perspectives 3.0 Credits

Using theory of the firm to analyze specific industries. Examine pricing, advertising, R&D, and investment strategies. External speakers will be featured to share experience and provide.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: (ACCT 602 [Min Grade: C] or ACCT 601 [Min Grade: C]) and (FIN 620 [Min Grade: C] or FIN 601 [Min Grade: C]) and (STAT 602 [Min Grade: C] or STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C]) and (ECON 624 [Min Grade: C] or ECON 601 [Min Grade: C]) and (MKTG 620 [Min Grade: C] or MKTG 601 [Min Grade: C]) and POM 601 [Min Grade: C]

BUSN 710 Business Analytics Capstone Project 3.0 Credits

The course serves as a capstone for the MS business analytics program. The course provides an opportunity for students to develop a project that draws on their skills in the areas of data management, modeling, and statistical analysis to support data driven decision-making processes. The capstone project also serves to further students' skills in terms of developing business insights from quantitative analysis and knowledge of functional areas of business and/or specific industries. Whenever possible, projects will be based on a real business problem faced by organizations in the business community.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MIS 612 [Min Grade: C] and OPR 601 [Min Grade: C] and STAT 630 [Min Grade: C] and STAT 642 [Min Grade: C] and MIS 632 [Min Grade: C]

BUSN 715 Business Consulting Projects 3.0 Credits

This course is designed to give students an opportunity to work on a live project with a company in the region. The purpose of BCPs is to tackle real business issues, providing data and analysis in a concentrated timeframe. The student teams, with the support of advisors and faculty, will focus their energy on helping clients achieve new insights to business challenges.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 2 times for 9 credits

BUSN 910 Applied Organizational & Consumer Behavior 4.0 Credits

The course provides an interdisciplinary and integrative understanding of various theoretical perspective on how to organize effectively. Theories, research and practice from the areas of strategic management, organizational behavior, human resource, management, MIS and marketing will be explored for ways to leverage both internal and external data to compete in the 21st century economy and build business strategy and translate that into organizational knowledge strategy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 911 Opportunities in a Data Driven Economy 4.0 Credits

This course explores the growing role of data in Business. It examines the critical skills and capabilities an organization needs for success, including leadership, culture, methods and tools for becoming data driven, while also balancing human judgment. Lectures, readings, cases, and guest speakers consider the impact and challenges of gathering, storing, analyzing and providing access to data to facilitate effective decision making.

College/Department: LeBow College of Business/General Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 910 [Min Grade: B]

BUSN 912 Corporate Growth and Risk Strategies 4.0 Credits

This course will discuss competitive advantage aspects as they relate to organizational growth and risk management including in contexts related to intercompany relationships. Theories, research and practice from the areas of strategic management, organizational behavior, human resource, management, MIS and marketing will be explored to learn theories frameworks on corporate development and growth and risk management studies associated with such development and growth.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 910 [Min Grade: B] and BUSN 911 [Min Grade: B]

BUSN 913 Driving Innovation and Design 4.0 Credits

This course explores the latest thinking on competitive strategies for innovation, innovation culture, product design & design thinking, creative insights and stimulating creativity behavior and such measurements using an interdisciplinary approach.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 912 [Min Grade: B]

BUSN 914 Navigating the Changing Business Environment 4.0 Credits

This course provides the foundation to apply current economic, consumer behavior and HR capital trends guided by scholarly based findings and analysis to apply to business issues in the new digital and global economy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 913 [Min Grade: B]

BUSN 921 Applied Behavioral Research 4.0 Credits

This course introduces behavioral research thinking. The course will provide an overview of applied behavioral research methodologies, including experimental, quasi-experimental, and survey research techniques. Students will learn the advantages of each methodology and when to apply it. Students will also be introduced to measurement theory, validity, reliability, and how to conduct research ethically. There will be detailed discussions on the data and how it was collected as well as hands-on demonstrations of the statistical methodologies that were applied. Students will learn what the statistical assumptions are, what the parameters mean, and how to practically interpret the results.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 923 Qualitative Inquiry Methods 4.0 Credits

This course introduces students to approaches in 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. 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

Prerequisites: BUSN 921 [Min Grade: B]

BUSN 924 Analyzing Quantitative Data 4.0 Credits

In this course, students will learn to test hypotheses and assess theory in business and behavioral contexts as those relate to analyzing survey data, archival data, and experimental data. Through hands-on exercises that revisit and reconstruct published research, students will learn commonly used statistical methods that test hypotheses and learn how to interpret the results, as well as look for problems as revealed through the statistical testing that might lend support to alternative models. Methods discuss include linear regression, dimension reduction, analysis of variance and GLM, and logistic regression models.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 922 [Min Grade: B] or BUSN 925 [Min Grade: B]

BUSN 925 Survey Research 4.0 Credits

This course will introduce students to the art and craft of survey research. Students will become familiar with the theoretical underpinnings of survey research and at the same time get hands-on experience designing, deploying, and analyzing surveys. The course will cover all aspects of conducting survey research: selecting a sample, formulating individual questions, measurement scales, designing a questionnaire, and analyzing the collected data.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 921 [Min Grade: B]

BUSN 941 Dissertation Research, Applied Methodology Workshop 4.0 Credits

This applied methodology workshop focuses candidates on development of well-defined research questions, appropriate methodology approaches, outline of the Hypotheses, and elucidation about the Importance of the research topics.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BUSN 942 Dissertation Research, Data Collection Strategy 4.0 Credits

This applied dissertation research course focuses candidates on the development of well-defined data collection strategy. This may include, but is not limited to, analyzing archival data, designing the survey to be used, or determining how to use existing organizational changes in a quasi-experimental design to assess phenomena. This will include IRB permission as necessary.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 941 [Min Grade: B]

BUSN 943 Dissertation Research, Literature Review and Proposal Defense 4.0 Credits

This applied dissertation research course focuses candidates on the development of the literature review section that will be included in the dissertation. The literature review should present the theoretical background of the dissertation and support the propositions and hypotheses.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 942 [Min Grade: B]

BUSN 944 Dissertation Research, Data Collection Process 5.0 Credits

This applied dissertation research course focuses candidates on the development of the data collection process for the dissertation. The data can be collected through surveys, quasi-experimental designs, panel data, or any other source approved by the dissertation chair and committee.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 943 [Min Grade: B]

BUSN 945 Dissertation Research, Data Analysis 5.0 Credits

This applied dissertation research course focuses candidates on completing the data analysis for the dissertation. It is expected that the student will consult with the Dissertation Chair and professors on the appropriate analyses methods that should be applied.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 944 [Min Grade: B]

BUSN 946 Dissertation Research, Discussion and Contribution Chapter 1.0 Credit

This applied dissertation research course focuses candidates on completing the Discussion and Contribution chapter of the dissertation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 945 [Min Grade: B]

BUSN 947 Dissertation Research, Final Defense 1.0-9.0 Credit

This applied dissertation research course focuses candidates on completing the Dissertation and after consultation and approval by the Dissertation Chair to submit it for Final Defense before the Committee.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

Prerequisites: BUSN 946 [Min Grade: B]

BUSN 996 Summer Research Activity for PHD Students 0.5-9.0 Credits

During the Summer Quarters, PhD students in Business and Economics are expected to undertake research activity with a faculty mentor(s). This course is designated to record that activity during the summer quarter only. The research undertaken should advance the PhD student's research towards passing the candidacy exam requirements. This course is only open to PhD Students at LeBow including those in the School of Economics. The course is not open to PhD candidates or non-LeBow students.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 1 times for 18 credits

Restrictions: Can enroll if classification is PhD.

BUSN 997 Research Activity for PhD Students in LeBow College of Business 0.5-9.0 Credits

PhD students in Business and Economics may undertake research activity with a faculty mentor in lieu of a course. This course is designated to record that activity. The research undertaken should advance the PhD student's research towards passing the candidacy exam requirements. This course is not open to PhD candidates or non-LeBow students.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 2 times for 27 credits

Restrictions: Can enroll if classification is PhD.

BUSN 998 Dissertation Research Business 1.0-12.0 Credit

Dissertation Research Business.

College/Department: LeBow College of Business/General Business

Repeat Status: Can be repeated 9 times for 120 credits

BUSN I599 Independent Study in BUSN 0.0-12.0 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 I699 Independent Study in BUSN 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

BUSN I799 Independent Study in BUSN 0.0-12.0 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 I899 Independent Study in BUSN 0.0-12.0 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 I999 Independent Study in BUSN 3.0 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 9 credits

BUSN T580 Special Topics in BUSN 0.0-12.0 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 T680 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

BUSN T780 Special Topics in BUSN 0.0-12.0 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 T880 Special Topics in BUSN 0.0-12.0 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 T980 Special Topics in BUSN 0.5-9.0 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

Geography Education

Courses

EDGE 510 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. This course also 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 511 Geography Education: Teacher Laboratory 1.5 Credit

This course is designed to prepare post-baccalaureate pre-service and in-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 EDGE 510: Geography Education.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDGE 510 [Min Grade: C]

EDGE I599 Independent Study in EDGE 0.0-12.0 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 I699 Independent Study in EDGE 0.0-12.0 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 I799 Independent Study in EDGE 0.0-12.0 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 I899 Independent Study in EDGE 0.0-12.0 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 I999 Independent Study in EDGE 0.0-12.0 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 T580 Special topics in EDGE 0.0-12.0 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 T680 Special topics in EDGE 0.0-12.0 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 T780 Special topics in EDGE 0.0-12.0 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 T880 Special topics in EDGE 0.0-12.0 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 T980 Special topics in EDGE 0.0-12.0 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

Global & International Education

Courses

EDGI 500 Introduction to Global, International & Comparative Education 3.0 Credits

Exploration and Analysis of international and comparative education. Comparative method serves as the framework to understand comparative analysis. Theories of the state serves as the framework to understand global theories of education across cultures.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 502 Global, International and Comparative Education II 3.0 Credits

Exploration of tradition of national culture and its influence on education as well as an examination of educational and societal developments from a comparative cross-national perspective.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 504 History and Theory of Comparative Education 3.0 Credits

Examination of the history of comparative education development and higher education systems of different nations as well as analysis of issues related to comparative education research and the internationalization of globalization of postsecondary education.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 506 Comparative Higher Education Systems 3.0 Credits

Examination of higher education systems around the world including the cultural and historical bases of these systems and their spread across the globe.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 508 Understanding Research in International & Comparative Education 3.0 Credits

Examination of major concepts, methods and current trends in international and comparative education research.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 510 Culture, Society & Education in Comparative Perspective 3.0 Credits

Exploration of global education through concepts of culture, cultural relativism and ethnocentrism from a comparative perspective.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 512 Globalization and Educational Change 3.0 Credits

Exploration of issues related to economic globalization, politics of globalization, educational change, and the ways individuals and groups of people have changed and must further change to meet new global challenges in the 21st Century.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 514 Education and National Development 3.0 Credits

Exploration of the role of education as a primary agent of the socio-economic, cultural and technological advancement of developing countries in world regions.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 518 Analysis of Policy Issues in Global & International Education 3.0 Credits

Analysis of current public policy issues using various models of policy analysis across cultures and the globe with specific emphasis in creating, monitoring and evaluating frameworks to guide education sector policy work.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 520 Political Economy of Education Reform 3.0 Credits

Focus on the principal issues in the economics of education and in education and economic development.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 530 Peace Education 3.0 Credits

Exploration of the conditions required for the construction of peace, the various forms of conflict, philosophical bases of human rights, discrimination with particular focus on curriculum reform that emphasizes knowledge, understanding and respect for cultures of others at the national/global level.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 532 International Organizations in International Education 3.0 Credits

Examine current international organizations, foreign assistance and their influence on educational policy. Both public and private organizations will be explored.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 533 Culture and Learning: From Violence Toward Peace 3.0 Credits

This course provides students with a critical understanding of the role of “culture” in influencing the dynamics of conflicts, including those that can be manifested in physical violence, as well as strategies for resolving or transforming such conflicts. Expressions of forms of discrimination, including prejudices, stereotyping, xenophobia, ethnocentrism and racism will be considered as important basic conceptual tools for peace educators in resolving intercultural conflicts.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 534 Conflict Resolution in an International Context 3.0 Credits

Examination of conceptual underpinnings of peace and conflict resolution and the paradigmatic models of conflict resolution currently practiced, as well as the substantive enquiry into a variety of approaches to building peace at local, national and global levels.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 535 Practices of Conflict Management & Peace Building 3.0 Credits

This course focuses on the development of practical and conceptual tools for the transformation of conflict on the micro-level. Taking the perspective that all participants will be involved in both conflict and ‘peace processes’ of different sorts and in different capacities throughout their future professional and personal lives, the aim is to engage with these processes through various situational learning exercises. This will provide an opportunity for the practical deployment and development of peace-building skills.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 536 Action Strategies for Peace Education 3.0 Credits

The major assumption of this course is that peace education is a challenge and a need to face not only in formal educational systems but also in community settings, non-formal and informal education. This course will examine the implementation of peace education programs linked to various settings, and analyze the challenges and issues of the different approaches of governments, communities, and other institutions. The course explores concepts such as citizenship, respect, learning community and interactive dialog.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 541 Special Issues in Sustainability 3.0 Credits

The environmental movement of the 1960s and 1970s started as a reaction to the ecological degradation of the environment; in the 1980s and 1990s the sustainability revolution emerged, but what is sustainable development and how does it apply to education? Through readings, videos and board discussions, this class will examine concepts that include ecological footprint, ecocriticism, advertisement awareness, technology appraisal, ecological intelligence, systems thinking, etc. There are various schools of thought regarding sustainability in three areas – the environment, the economy, and society.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 560 Colloquium in Global Education 1.5 Credit

The multifaceted global issues that face today’s educators and students represent unique opportunities and challenges to develop global, international and intercultural awareness, knowledge and perspective. This course provides a monthly forum for students to engage with Drexel faculty and visiting scholars about these issues, and to promote critical intellectual reflection and exchange between the academy and the broader society.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDGI 600 Study Abroad Experience 3.0 Credits

From a city-base in a foreign country, student actively engages in a country’s literary, artistic, and cultural traditions through firsthand encounters with literary specialists, authors, artists, and artisans. Homestay model serves as portal for enhanced opportunities for language acquisition, cultural analysis and interpretation.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GIED.

EDGI 610 International Ecotourism & Education 3.0 Credits

From a city-base in a foreign country, student integrates the different perspectives of diverse natural, biological and social science disciplines to improve understanding of relationships between human societies and the natural environment.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GIED.

Corequisite: EDGI 600

EDGI 715 Co-op with Portfolio 1.5 Credit

Students participate in 10 weeks of a part time co-op to provide students with real-life, hands-on experience in international development. Weekly seminar component.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GIED.

Prerequisites: EDGI 514 [Min Grade: C]

EDGI 716 GIE Co-op Experience with Seminar 4.5 Credits

Students continue to identify career fields and professional development opportunities in the field of global and international education through action research. Students gain practical skills through a co-operative learning assignments/placement and complete a culminating project and/or research as proposed in EDGI 715.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is GIED.

Prerequisites: EDGI 715 [Min Grade: C]

EDGI I599 Independent Study in EDGI 0.0-12.0 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

EDGI I699 Independent Study in EDGI 0.0-12.0 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

EDGI I799 Independent Study in EDGI 0.0-12.0 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

EDGI I899 Independent Study in EDGI 0.0-12.0 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

EDGI I999 Independent Study in EDGI 0.0-12.0 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

EDGI T580 Special topics in EDGI 0.0-12.0 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

EDGI T680 Special topics in EDGI 0.0-12.0 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

EDGI T780 Special topics in EDGI 0.0-12.0 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

EDGI T880 Special topics in EDGI 0.0-12.0 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

EDGI T980 Special topics in EDGI 0.0-12.0 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

Higher Education

Courses

EDHE 500 Foundations of Higher Education 3.0 Credits

Study of historical growth and advancement of colleges and universities in U.S. from Colonial era to "virtual" public and private universities.

Integrated overview of contemporary issues, policies and practices that characterize the operational environments of higher education institutions in the 21st century; including financial management, accreditation, curriculum, and institutional planning.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 510 Governance, Management & Administration in Higher Education 3.0 Credits

Organizational and administrative structures within the institutional hierarchy are explored as students examine the relationship between the university and the community it serves, the role of outreach in the modern university, and the role of faculty, staff, and student unions in academic operations and Risk Management.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 520 Student Development & Customer Service Management 3.0 Credits

Examines Academic Support and Student Life Services from customer satisfaction perspective including admissions, orientation, student health and counseling, and Greek life. Best practices in Customer Relationship Management are introduced.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 530 Higher Education Law 3.0 Credits

This course is designed to introduce students to the key laws and legal concepts that shape the operations of higher education institutions and the rights and responsibilities of administrators, faculty, staff and students. The course examines the issues involved in interpreting and applying laws and policies in a campus setting.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 540 Outcomes, Assessments & Continuous Improvement 3.0 Credits

Introduction to "typical" institutional accreditation process. Best practices presented for performing an institutional self-study, defining appropriate outcomes aligned with institution's strategic plan as well as introduction to appropriate quantitative and qualitative assessment methods.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 601 Strategic Planning & Evaluation 3.0 Credits

Provides a survey of the theory and practice of planning and evaluation in higher education and nonprofit organizations. Includes development of critical issues, goals, strategies, outcomes research planning, and protocol development.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 602 Managing Campus Operations 3.0 Credits

Detailed overview of key areas affecting campus operations that fall under Finance and Administration units including parking and transportation, non-exempt HR, facilities management, construction, risk management, and environmental health. Introduction to campus master plan development process for strategic planning.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 606 Higher Education Career Development 3.0 Credits

Provides understanding of career patterns of faculty, deans, vice presidents, provosts, and presidents while exploring academic employment markets of these professions. Traditional career paths, diverse points of entry in Higher Education and career development of faculty are explored as well as administrative roles of managing academic units, decision making and change implementation.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 608 Leadership for Learning 3.0 Credits

This course provides students with an understanding of leadership within the context of learning at the individual level and at the organizational level. Course content addresses traditional, contemporary, and alternative theories of leadership with connections to learning theories that facilitate individual and organization development in multiple contexts. E-Learning opportunities will be incorporated as mechanisms for addressing 21st century learning leadership. This course helps enhance their professional development to effectively lead in learning focused organizations.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 634 Proposal Writing & Sponsored Project Management 3.0 Credits

Provides knowledge and skills required to acquire and manage sponsored projects from a variety of sources including learning and practicing process of developing proposal, organizational vision, goal setting, political realities, and budget in addition to compliance management and reporting.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 640 Foundations of Institutional Research 3.0 Credits

Provides comprehensive understanding of institutional research including roles and responsibilities. Students are introduced to database systems, statistical software and research methods to explore multifaceted links of institutional research to key divisions within higher education institutions.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 644 Student Assessments & Academic Program Evaluation 3.0 Credits

Exposes research tools and theoretical models related to assessing student outcomes and student success measures. Benchmarking and importance of evaluating academic programs and curricula to proactively respond to institutional reporting requirements and accreditation.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 646 Survey Tools, Statistical Software & Effective Reporting 3.0 Credits

Introduction of latest survey tools and statistical software for institutional research. Develops skills related to data gathering and effective reporting with use of latest application and support technologies to maximize research related to institutional effectiveness, program evaluation, and student outcomes.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 650 Introduction to Enrollment Management 3.0 Credits

Introduction to history of enrollment management and how it fits university system. Provides a strong understanding of enrollment process, organizational structure, federal and legislative issues, and importance of diverse student body.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 652 Enrollment Marketing, Recruitment & Retention 3.0 Credits

Comprehensive overview of principles and practices of strategic process including marketing and recruitment through graduation. Exposure to contemporary issues and legal problems in enrollment management.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 654 Financial Aid & Enrollment Management 3.0 Credits

Strategic relationships between financial aid and enrollment management are examined in order to secure desired student mix. Financial Aid guidelines and career management strategies are discussed to explore integration of traditional student financial aid and development of aid packages.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 656 Enrollment Management Database Systems & Management 3.0 Credits

Provides hands-on experience with database systems and programs that support enrollment management offices incorporating Microsoft suite application, SCT Banner, and People Soft. Collaborative assignments will require student manipulate, analyze and report data in different database systems. Strategies to "optimize" the recruitment mix to maximize state budget allocations are examined.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 662 Critical Issues in Student Affairs 3.0 Credits

Profession of Students Affairs and most critical issues examined through use of current texts and articles. Topics include overview of the field, diversity, fiscal/budgetary issues assessment and staff training and development. Other topics include campus conduct, academic integrity, freedom of speech, sustainability and other current issues.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 663 Safety and Crisis Management 3.0 Credits

Examination of a broad range of campus safety and crisis management issues and exploration of safety and security strategies and consideration of essential elements of a model crisis response plan. Students will work toward understanding macro and micro safety and security issues and responses, and will design a sample crisis response model as the final course assignment.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 664 Strategies for Educational Success 3.0 Credits

Examines research on historical and contemporary responses to inequality in education; includes multicultural education, culture of poverty, single race/sex schools; addresses new trends and strategies affecting equity in education, including immigrants, sexual identity, age, gender, organizations, developmental education, and special needs learners (i.e. older adult learners and students with disabilities).

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 668 Transformational Leadership 3.0 Credits

Reviews research about community college leadership, with an emphasis on transformational leadership, creation and implementation of a vision; develops skills in how to identify, interact, and mobilize key community organizations and constituents with an emphasis on board relations and community development.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 669 Diversity in Higher Education 3.0 Credits

Course examines research on issues of race, class, gender and disability in education in historical and contemporary contexts; emphasizes evidence-based data analysis, specifically qualitative analysis of data; introduces qualitative analysis of data, assumptions, designs, collection, analysis, and research ethics.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 680 Foundations of Evaluation 3.0 Credits

This course provides an overview of the field of evaluation. The course is designed to introduce the student to the basics of evaluation, including the uses of evaluation, formative and summative evaluation, evaluation standards, and various evaluation models. The course will also explore working with multiple stakeholders and the social, cultural, and ethical issues involved when conducting evaluation. The course will focus primarily on evaluation in educational settings.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 714 Introduction to Research Methods 3.0 Credits

This course will introduce students to the process and conduct of educational research. Students will learn about the characteristics of specific research designs and will review a research study employing the specific design. Students will use established criteria given evaluate research studies. There will be an emphasis on the purpose and function of the review of the literature in educational research. Survey and interview design will also be discussed.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDHE 715 Higher Education Co-op I with Portfolio 1.5 Credit

The HE co-op I is the first half of a two quarter sequence in which students work in administrative offices to incorporate their knowledge and develop skills learned in the HE program. The first half of the co-op is designed to prepare students to undertake the hands-on co-op projects they will begin in the second quarter of the co-op.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HE.

EDHE 716 Higher Education Co-op II 4.5 Credits

Students are required to participate in a part-time co-op that lasts no less than two quarters (20 weeks). The co-op is structured to provide students with real-life, hands on experience in higher education. Students work in administrative offices and incorporate the skills and tools they have garnered in the MSHE program.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HE.

EDHE I599 Independent Study in EDHE 0.0-12.0 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

EDHE I699 Independent Study in EDHE 0.0-12.0 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

EDHE I799 Independent Study in EDHE 0.0-12.0 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

EDHE I899 Independent Study in EDHE 0.0-12.0 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

EDHE I999 Independent Study in EDHE 0.0-12.0 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

EDHE T580 Special topics in EDHE 0.0-12.0 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

EDHE T680 Special topics in EDHE 0.0-12.0 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

EDHE T780 Special topics in EDHE 0.0-12.0 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

EDHE T880 Special topics in EDHE 0.0-12.0 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

EDHE T980 Special topics in EDHE 0.0-12.0 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

History

Courses

HIST 502 Themes in Urban History 3.0 Credits

This course introduces students to the history and theory of urbanism, particularly but not exclusively in the United States. It discusses spatial stratification, theories of urban change and urban social and ecological movements, poverty and inequality, as well as new forms of postcolonial urbanism. It highlights the historical relationships between urban planning, public policy, public health, and engineering. The course also considers public appropriation of planning, the long-term effects of planning. It explores theories of urban political economy and ecology. The course may change content from time to time and may be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

HIST 696 Seminar in Science, Technology, and Society 3.0 Credits

Provides an in-depth research seminar in science, technology, and society, organized around a particular theme selected by the instructor.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

HIST 697 Practicum: Science and Technology in Action 3.0 Credits

Provides a practicum in science, technology, and society. Focuses on practice in a science or engineering discipline through study of a recent invention or scientific project.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: HIST 696 [Min Grade: C]

HIST 698 Master's Thesis 0.5-9.0 Credits

Independent research supervised by an STS faculty member toward completion of a required Master's Thesis.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 18 credits

HIST I599 Independent Study in HIST 0.0-12.0 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 I699 Independent Study in HIST 0.0-12.0 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 I799 Independent Study in HIST 0.0-12.0 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 I899 Independent Study in HIST 0.0-12.0 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 I999 Independent Study in HIST 0.0-12.0 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

Homeland Security Management

Courses

HSM 544 Introduction to Homeland Security 3.0 Credits

This course will provide students with an overview of the concepts that will help them to understand Homeland Security issues at the strategic level. This course will also examine the conceptual framework of other courses that will be covered in the Homeland Security Management program.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

HSM 549 Terrorism and Homeland Security 3.0 Credits

This course presents terrorism in a historical context, describes its causes and motivations, delineates its operational strategies, and shows how terrorist organizations rise and fall.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

HSM 554 Critical Infrastructure Protection 3.0 Credits

Presents the theory necessary for students to obtain a working knowledge of the various threats posed to critical infrastructure by terrorism.

Topics include types of terrorist attacks, WMD, terrorist's preparation for an attack, protecting critical infrastructure, protective security, and emergency response. Students will also conduct research on select topics.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

HSM 644 Public Management in Crisis 3.0 Credits

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. The benefits of this knowledge will be greater security and the protection of life and property.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

HSM 645 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

HSM 646 Infrastructure Disaster Recovery 3.0 Credits

This course is designed to integrate theoretical perspectives about infrastructure disaster recovery with practical knowledge, skills and abilities. The course identifies, examines and integrates; crisis management, continuity management, contingency planning, and organizational continuity, recovery and restoration issues related to infrastructure disaster recovery in both the private and public sectors.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

HSM 680 Special Topics in Homeland Security Management 0.5-12.0 Credits

Covers special topics of interest in homeland security management.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 11 times for 12 credits

HSM 695 Applied Project in Homeland Security Management I 3.0 Credits

Provides the student with an opportunity to develop a substantive homeland security, or intelligence studies project of their own choosing, possibly continuing on research and development initiated in earlier courses. The project will include strategies and management of information security, legal issues, risk analysis, and response to compromise.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: CST 614 [Min Grade: C] and HSM 554 [Min Grade: C]

HSM 696 Applied Project in Homeland Security Management II 3.0 Credits

Provides the student with an opportunity to develop a substantive homeland security, or intelligence studies project of their own choosing, possibly continuing on research and development initiated in earlier courses. The project will include strategies and management of information security, legal issues, risk analysis, and response to compromise.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: HSM 695 [Min Grade: C]

HSM 699 Independent Study in Homeland Security Management 0.5-6.0 Credits

Provides individual study or research in homeland security management under faculty supervision.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 5 times for 6 credits

HSM I599 Independent Study in HSM 0.0-9.0 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

HSM I699 Independent Study in HSM 0.5-6.0 Credits

Provides individual study or research in homeland security management under faculty supervision.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 5 times for 6 credits

Hotel & Restaurant Management

Courses

HRM 501 Foundations of the Hospitality Industry 3.0 Credits

This is a gateway course to provide students of various backgrounds the information and conceptual tools needed to grasp the fundamentals of the global hospitality industry as understood in its widest sense. Students will become familiar with the production and distribution of hospitality products. Trends in the industry will also be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HRM 505 Customer Service for Professionals 3.0 Credits

This course covers the principles of managing in a service environment with an emphasis on procedures and results that are necessary for all service organizations. Analysis, planning, and problem solving strategies will be examined to empower successful customer oriented employees along with consideration of factors that influence customer service organizations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 515 Destination and Resort Management 3.0 Credits

A study of destination and resort management from a global perspective including strategic planning and competitive analysis of domestic and international resort destinations. Students will study the various aspects of resort management in the context of high levels strategic planning that includes market research, market positioning, feasibility studies, and revenue forecasting for resort destinations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 520 Hospitality Management Information Systems 3.0 Credits

Covers the use of technology and computer information systems in the hospitality industry. The course emphasizes high level strategic planning for leveraging technology and information systems to gain competitive advantages and improve a business's position in the marketplace. Includes structured decision making in the acquisition and implementation of technology including feasibility analysis and financial forecasting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 555 Hospitality Human Resource Management 3.0 Credits

This course will study the human resource function from a strategic and developmental standpoint within a variety of hospitality and tourism contexts.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 565 Culinary Tourism 3.0 Credits

This course explores culinary tourism opportunities, the role of food tourism in developing, sustaining and promoting regional identities, and draws knowledge and presents perspectives from the fields of anthropology, folklore and foodways, and food and tourism studies. Although taught online, it will include engaging field trips.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

HRM 572 Gaming Information Systems 3.0 Credits

Covers the use of technology and computer information systems in the casino industry. The course emphasizes high level strategic planning for leveraging technology and information systems to gain competitive advantage and improve a casino's position in the marketplace. Includes structured decision making in the acquisition and implementation of technology including feasibility analysis and financial forecasting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 520 [Min Grade: C]

HRM 575 Current Issues in Gaming 3.0 Credits

This course will examine current issues in the casino and gaming industry. An in-depth examination of trends, policies, and impacts on gaming operations with an emphasis on casino operations will be potential topics for discussion.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 595 Economics of Tourism 3.0 Credits

This course explores the economic issues that influence the tourism industry and examines the sociological dynamics shaping the tourism environment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 610 The Global Tourism System 3.0 Credits

An in-depth investigation of the components of the global tourism system to provide the conceptual framework for students to understand the economic dynamics of tourism. The course will familiarize students with the major areas of production and distribution of hospitality products. Future trends in tourism will be examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 612 Tourism and Sustainability 3.0 Credits

Students in this course will examine limits to mass tourism and alternatives such as ecotourism, community-based-tourism pro-poor tourism, and their contributions to sustainable world development. Other topics include how environmental changes affect tourism and how tourism affects the environment and the role of tourism in economic development.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 614 Tourism Development 3.0 Credits

This course will provide an in-depth evaluation of the major issues in travel and hospitality development. It will review the relationships among development and tourism development, differences between attractions and products, defining target markets, elaborating development plans, destination management, and measuring success.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 616 Tourism Marketing and Branding 3.0 Credits

This course will cover the major issues related to the marketing of travel and tourism products according to the specific nature of the travel and tourism industry. The course will include strategic marketing, travel market analysis, and the major tools available for creating successful marketing and branding of travel and tourism products.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 650 Strategic Management & Leadership in Hospitality 3.0 Credits

This course covers the concepts of strategic management in the hospitality business environment and the role of strategic leadership practices. Strategic decision making principles will be examined to create competitive advantages for hospitality industry leaders and organizations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C] and PRST 503 [Min Grade: C]

HRM 670 Casino Financial Analysis 3.0 Credits

This course covers the unique aspects of analyzing the financial results of casino programs and product offerings including marketing promotion analysis, special even manifest analysis, player development, executive profit and loss, table game mix, and slot floor product and position analysis. Volume forecast methods will also be studied.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 520 [Min Grade: C]

HRM 672 Security and Risk Management 3.0 Credits

This course covers strategic issues in casino security including high-level planning and risk analysis. Students will complete an in-depth case study analysis of court cases in the casino and hospitality industry that can potentially have a significant impact on capital expenditures and operating strategies. Students will learn to analyze risk and make effective strategic decisions regarding loss prevention.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 572 [Min Grade: C]

HRM 674 Tribal Gaming Management 3.0 Credits

This course explores the topics of gaming, casino management, sovereignty, and other public policy issues. In addition, tribal casino management will be emphasized to examine the unique operational and developmental aspects of this type of gaming.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501 [Min Grade: C]

HRM 676 Casino Marketing 3.0 Credits

This course covers the unique aspects of casino marketing including player loyalty programs, promotional strategies, customer relationship marketing, branding, database marketing, player development and junket programs. The course is taught from a global perspective with an emphasis on strategy and positioning in the marketplace.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 505 [Min Grade: C]

HRM 680 Research Methods for Hospitality and Tourism 3.0 Credits

This course presents strategies for approaching hospitality research. Students will explore how to find, read and analyze scholarly articles, consult and conduct a literature review, read and write purpose statements and research questions; explore quantitative and qualitative research methods, strategies for data collection; strategies for analyzing and interpreting data; and reporting research results and recommendations in various presentation and publishing formats.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: HRM 501

HRM 997 Research Project in Hospitality Management 1.0-12.0 Credit

Students consult with a faculty advisor to identify a suitable problem area in hospitality management and develop and carry out appropriate methodology to address the problem. This course may be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 4 times for 12 credits

Prerequisites: HRM 501 [Min Grade: C] and PRST 504 [Min Grade: C]

HRM I599 Independent Study in HRM 0.0-12.0 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

HRM I699 Independent Study in HRM 0.0-12.0 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

HRM I799 Independent Study in HRM 0.0-12.0 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

HRM I899 Independent Study in HRM 0.0-12.0 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

HRM I999 Independent Study in HRM 0.0-12.0 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

HRM T580 Special Topics in HRM 0.0-12.0 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

HRM T680 Special Topics in HRM 0.0-12.0 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

HRM T780 Special Topics in HRM 0.0-12.0 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

HRM T880 Special Topics in HRM 0.0-12.0 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

HRM T980 Special Topics in HRM 0.0-12.0 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

Human Resource Management

Courses

HRMT I599 Independent Study in HRMT 0.0-12.0 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 I699 Independent Study in HRMT 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

HRMT I799 Independent Study in HRMT 0.0-12.0 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 I899 Independent Study in HRMT 0.0-12.0 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 I999 Independent Study in HRMT 0.0-12.0 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 T580 Special Topics in HRMT 0.0-12.0 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 T680 Special Topics in HRMT 0.5-9.0 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 T780 Special Topics in HRMT 0.0-12.0 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 T880 Special Topics in HRMT 0.0-12.0 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 T980 Special Topics in HRMT 0.5-9.0 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

Industrial Design

Courses

Information Science & Systems

Courses

INFO 505 Information Professionals and Information Ethics 3.0 Credits

Surveys the social, ethical, and legal issues that affect information professionals and organizations. Addresses such topics as access to and ownership of information, intellectual freedom, and privacy. Studies the structure and components of the information professions and the evolving role of information professionals.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 506 Users, Services, & Resources 3.0 Credits

Introduces the principles and practices of providing effective information services for a variety of user communities. Develops practical skills in meeting users' information needs. Focuses on current methods of providing information services and instruction in different contexts and techniques for evaluating reference sources and services.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 507 Leading and Managing Information Organizations 3.0 Credits

Introduces basic theories, approaches, and concepts of leadership, management, and organizational behavior as they apply to libraries, archives, and other information organizations. The course explores principles, practices, and techniques needed to develop and enrich effective information organizations.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 508 Information Innovation through Design Thinking 3.0 Credits

This introductory course provides an overview of basic phases of design processes for students in information disciplines. Design thinking is a way of engaging with the world that emphasizes creativity and constructive change; students will learn about techniques for several key design practices: empathizing with others, framing a problem, ideation, experimentation, and storytelling. By applying these techniques in a variety of contexts related to information, students will practice innovation in the information professions with an emphasis on understanding the social implications of potential innovations.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 517 Principles of Cybersecurity 3.0 Credits

Provides the foundation for understanding the key issues associated with protecting information assets, determining the levels of protection and response to security incidents. Presents a general overview and is suitable for individuals with little exposure to IT security.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 532 Software Development 3.0 Credits

Provides a hands-on introduction to software development. Includes programming concepts and a series of programming exercises done by students working in pairs or in small groups. Also covers general concepts and issues in software development to help students understand why creating high quality software is very difficult.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 540 Perspectives on Information Systems 3.0 Credits

Examines various types of information systems and the ways in which these systems support activities of individuals and organizations. Investigates application architectures that occur commonly in information systems. Provides an overview of knowledge domains that comprise the information systems discipline.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 552 Introduction to Web Design for Information Organizations 3.0 Credits

Introduction to creating websites that incorporate interactive web services to support users in information organizations. Students learn to establish websites that meet usability, accessibility and intellectual property standards, via composition of text and graphic files, and use of scripts for interactive application to support community information resource needs.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 555 Introduction to Geographic Information Systems 3.0 Credits

Explores the concepts and uses of geographic information systems (GIS). Structured as an applications-based course where students learn how to acquire, clean, integrate, manipulate, visualize and analyze geospatial data through laboratory work.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 560 Introduction to Archives I 3.0 Credits

Provides an introduction to the theory and practice of archives, including an overview relating to the elements of an archival program and the role and work of archivists. Focuses on the functions of the archives, such as acquisition, appraisal, arrangement and description, preservation, reference, outreach, and technology in archives.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 561 Introduction to Archives II 3.0 Credits

Continues the introduction to archival theory and practice begun in Introduction to Archives I. Provides additional depth in several areas, including appraisal, arrangement and description, focusing on model and standards. Addresses legal, ethical, cultural, and political issues as well as the range of historical and contemporary archival formats.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 590 Foundations of Data and Information 3.0 Credits

Introduces and explores principles, techniques, and theoretical contexts of data, information, and digital content across a range of settings. Addresses organizing practices and knowledge, and implications for back-end system functionality, and front-end user access. Addresses existing and emerging data standards and tools applicable to data and information, as well as social and economic aspects, services, and future boundaries and contexts for data and information. Specific topics include information structures and standards, representation, metadata, knowledge organization, classification, linked data, network analysis, interface design, and AI implications.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 591 Data and Digital Stewardship 3.0 Credits

Examines traditional and emerging approaches to data management, data curation, and data service across the full range of information organizations (including, libraries, archives, museums, data centers, software industries, etc.). Introduces foundations of data infrastructures and data representation in all the activities related to care and management of digital objects over their lifecycles. Discusses methods and issues related to accessibility, security, preservation, privacy and ethics of using and managing digital records.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 590 [Min Grade: C] or INFO 522 [Min Grade: C]

INFO 600 Web Systems & Architecture 3.0 Credits

This course presents the fundamentals of data communications and software architectures for distributed computing technologies. It introduces students to key web systems technologies and architectures, including hardware configurations, HTTP, HTML, XML-based data standards and other major software components.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 540 [Min Grade: C] (Can be taken Concurrently) INFO 530 [Min Grade: C] or INFO 590 [Min Grade: C] or CS 520 [Min Grade: C]

INFO 604 Object-Oriented Programming for Information Systems 3.0 Credits

This course provides a hands-on introduction to object-oriented programming language. The language will be a class-based object-oriented programming language in common usage in industry. The class will cover classes, objects, constructors and destructors, access control, inheritance, and use of object libraries and language specific features.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 532 [Min Grade: C]

INFO 605 Database Management Systems 3.0 Credits

A first course in database management systems. Covers a broad introduction to database management issues, techniques, and systems. Topics to be covered include database issues, evolution and landscapes of database systems, relational databases, database systems lifecycles, database analysis and design using the Entity-Relationship model, SQL, indexes, views, security, and transaction concepts. Emphasizes concepts and techniques related to relational database systems and hands-on experience in creating, using, and querying simple database applications using SQL.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 540 [Min Grade: C], DSCI 511 [Min Grade: C], DSCI 521 [Min Grade: C] (Can be taken Concurrently) INFO 530 [Min Grade: C] or INFO 590 [Min Grade: C] or CS 520 [Min Grade: C]

INFO 606 Advanced Database Management 3.0 Credits

An advanced course for database professionals. Focus on data engineering aspects of relational database systems. Topics include advanced database design techniques using the Entity-Relationship Model, normalization and denormalization, Security and Database Administration, advanced query processing techniques using SQL, and database application developments using PL/SQL procedures, functions, triggers, and packages.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 605 [Min Grade: C]

INFO 607 Applied Database Technologies 3.0 Credits

Covers principles, techniques, and database systems related to managing big data. Topics to be covered include business intelligence, data warehousing, online analytic processing (OLAP), ETL, big data architectures, and hands-on experience in managing unstructured data management using a NoSQL database.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 605 [Min Grade: C]

INFO 608 Human-Computer Interaction 3.0 Credits

Focuses on the physiological, psychological and engineering basis of design and evaluation of human-computer interfaces covering such topics as; theoretical foundation of HCI; cognitive modeling of user interactions; task analysis techniques for gathering design information; iterative design cycles; formative and summative usability testing; and project planning and report writing.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 610 Analysis of Interactive Systems 3.0 Credits

Examines current methods in the analysis of interactive systems. Topics address the rationale and practices associated with techniques for assessing and evaluating how well they fit social and institutional context of use. Provides opportunities for both hands-on analysis work and reflection on theoretical foundations of interactive-systems analysis.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 608 [Min Grade: C]

INFO 611 Design of Interactive Systems 3.0 Credits

Examines current methods in the design of new interactive systems. Topics address the rationale and practices associated with techniques for assessing and modeling user and organizational needs, exploring design alternatives, communicating and justifying design choices, and prototyping designs. Provides opportunities for both hands-on design work and reflection on theoretical foundation of interactive systems design.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 608 [Min Grade: C]

INFO 612 Knowledge Base Systems 3.0 Credits

Introduces the concepts, principles, and techniques of knowledge base systems, with a focus on implementation of a working expert system. Presents the expert system development life cycle with a focus on analysis and conceptual modeling techniques.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 530 [Min Grade: C] or INFO 540 [Min Grade: C]

INFO 613 XML and Databases 3.0 Credits

Introduces background and basics of XML and XML Schema. Focuses on storing and extracting XML data in Relational Database Systems. Covers the process of modeling real-world problems in XML. Investigates native XML database management systems. Discusses current issues in XML and XML storage research.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 605 [Min Grade: C]

INFO 615 Designing with Data 3.0 Credits

Although user experience design has always involved collecting data about users' needs and preferences, new forms and quantities of user data have created a need for new data analysis skills and professional ethics training among designers. This class introduces students to A/B testing and statistical methods to prepare them to design and run large scale user experiments that can inform design decisions. Students practice using tools and methods as well as composing experiment reports and design recommendations.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 508 [Min Grade: C], INFO 608 [Min Grade: C], DSRE 620 [Min Grade: C] (Can be taken Concurrently)

INFO 616 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. Includes theoretical and research literature on the design of social and collaborative systems.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 608 [Min Grade: C], INFO 508 [Min Grade: C], DSRE 620 [Min Grade: C] (Can be taken Concurrently)

INFO 620 Information Systems Analysis and Design 3.0 Credits

Offers an advanced treatment of systems analysis and design with special emphasis on object-oriented analysis and design techniques based on the Unified Modeling Language (UML). Discusses major modeling techniques of UML including use-case modeling, class modeling, object-interaction modeling, dynamic modeling and state diagrams and activity diagrams, subsystems developments, logical design, and physical design.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 605 [Min Grade: C] (Can be taken Concurrently) INFO 600 [Min Grade: C]

INFO 622 Content Representation 3.0 Credits

Focuses on fundamental decisions in designing subject access systems and alternative approaches to indexing. Explores current issues in content representation of text and non-text information resources in information systems.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 623 Social Network Analytics 3.0 Credits

The goals of this course are to understand the social network analysis methods and how they can be applied in studying the social network properties in both online and physical environments. The course introduces the knowledge and tools necessary for conducting social network analysis which is widely used in the social and behavioral sciences, social computing, economics, marketing, and informatics.

The social network perspective focuses on relationship among social entities. It covers graph and matrix representation, centrality and prestige measures, cohesive analysis, positional and role analysis. Students gain practical experience with social network analysis and visualization tools.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 624 Information Retrieval Systems 3.0 Credits

Covers the theoretical underpinnings of information retrieval to provide a solid base for further work with retrieval systems. Emphasizes systems that involve user-computer interaction. Covers aspects of information retrieval including document selection, document description, query formulation, matching, and evaluation.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 540 [Min Grade: C], DSCI 511 [Min Grade: C], DSCI 521 [Min Grade: C] (Can be taken Concurrently) INFO 530 [Min Grade: C] or INFO 590 [Min Grade: C] or CS 520 [Min Grade: C]

INFO 629 Applied Artificial Intelligence 3.0 Credits

Introduces the concepts, principles, and techniques of artificial intelligence (AI). Prepares students for computing projects where artificial intelligence methods are applied, building upon basic programming skills. Studies, differentiates, and applies basic principles of neural networks and deep learning, conversational systems, recommender systems, search algorithms, natural language processing, and text understanding. Considers various applications of Artificial Intelligence such as recommender systems for e-commerce, personal assistants, image analysis, robotics, text analytics, driverless cars, decision-making application, machine translation, gaming, etc.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 532 [Min Grade: C] or INFO 600 [Min Grade: C] or INFO 552 [Min Grade: C]

INFO 633 Information Visualization 3.0 Credits

Introduces concepts and principles of information visualization from both theoretical and practical perspectives. Emphasizes the development of critical thinking and problem solving abilities in the context of information visualization. Provides exposure to current information visualization tools.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 634 Data Mining 3.0 Credits

This course introduces the concepts and principles of knowledge discovery in databases (KDD), with a focus on the techniques of data mining and its function in business, governmental, medical or other information-intensive environments.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: DSCI 511 [Min Grade: C], DSCI 521 [Min Grade: C] (Can be taken Concurrently) INFO 605 [Min Grade: C]

INFO 646 Information Systems Management 3.0 Credits

Addresses information technology-enabled change and policy issues in the management of information systems (IS). Stresses systems development, staffing and organization, technology infrastructure, project selection, justification and funding, and data. Studies the issues and their resolution in the context of an IS plan. Emphasizes communication about the issues to senior management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 620 [Min Grade: C]

INFO 648 Healthcare Informatics 3.0 Credits

The course presents an overview of all aspects of healthcare informatics, including medical, nursing and bioinformatics. It provides an introduction to the applications of information systems in a variety of healthcare environments, including education, research and clinical settings. It includes extensive reading and critical discussion of relevant professional research literature.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 649 Library Programming 3.0 Credits

Provides an overview of the broad range of cultural, educational, and social library programming initiatives available for children, adolescents, and adults in academic libraries, public libraries, and school library media centers. Teaches community analysis, planning and evaluation. Emphasizes the collaborative nature of developing and implementing library programs.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 650 Public Library Service 3.0 Credits

Surveys information services provided through public libraries, with attention to governmental and funding issues, determinants of use, extending services to non-users, and cooperation among libraries.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 651 Academic Library Service 3.0 Credits

Examines the role of library service in higher education, with emphasis on problems of organization, administration, services, and the relationship of the library to the overall educational program.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 654 Enterprise Content Management 3.0 Credits

Introduces foundational concepts, practices, and principles of Enterprise Content Management (ECM). Major topics covered include: ECM system architecture, standards, workflows, publishing, analytics and performance. Includes hands-on activities working with an ECM and integrated software. The course also includes ECM system selection and evaluation, and addresses issues associated with legacy and next generation systems, local and global implementations, ownership and control.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 590 [Min Grade: C]

INFO 655 Intro to Web Programming 3.0 Credits

Provides a hands-on workshop in programming for Internet information systems using an appropriate programming language (Java is used currently). 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: INFO 532 [Min Grade: C] or INFO 552 [Min Grade: C]

INFO 657 Digital Library Technologies 3.0 Credits

Introduces technologies that enable the design and implementation of digital libraries. Focuses on hands-on activities relating to content description technologies (such as XML) systems technologies, and user interface technologies. Students learn through building components of digital libraries collaboratively.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 552 [Min Grade: C] or INFO 530 [Min Grade: C] or INFO 540 [Min Grade: C] or INFO 590 [Min Grade: C]

INFO 658 Information Architecture 3.0 Credits

Introduces fundamental concepts, methods and theories in Information Architecture for virtual, physical, and hybrid worlds. Focuses on organization, representation, and navigation of conceptual space. Topics include foundations, Web design, cognitive aspects, search, interaction design, knowledge organization, and user experience.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 552 [Min Grade: C] or INFO 530 [Min Grade: C] or INFO 540 [Min Grade: C] or INFO 590 [Min Grade: C]

INFO 659 Introduction to Data Analytics 3.0 Credits

Provides an overview of data analytics foundations and techniques for information professionals. Introduces fundamental concepts and theories of data and data science. Discusses methods and techniques of data representation, data analysis, and data visualization. Covers a range of tools and systems that can be used to discover insight and derive values from data.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: DSCI 511 [Min Grade: C], DSCI 521 [Min Grade: C] (Can be taken Concurrently) INFO 530 [Min Grade: C] or INFO 540 [Min Grade: C] or INFO 590 [Min Grade: C] or INFO 648 [Min Grade: C]

INFO 660 Cataloging and Classification 3.0 Credits

Introduces and provides intensive practice in the fundamentals of library cataloging and classification with primary focus on modern printed materials, but also includes reference to other media. Instruction on critical reading, interpretation, and use of current professional standards and documentation for the creation of MARC records. Encompasses discussion of relevant historical and theoretical issues in the construction of contemporary bibliographic databases.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 662 Metadata and Resource Description 3.0 Credits

Introduces the critical roles played by metadata for resource description and discovery. Provides instruction on application and implementation of current metadata schemes and tools. Provides practice in creating metadata records, analyzing the usage of metadata elements and vocabulary schemes, and evaluating the metadata quality of digital repositories.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 665 Collection Management 3.0 Credits

Introduces the basic steps of collection management, including community analysis, planning, policy preparation, selecting & acquiring materials, evaluating, preserving and publicizing collections. Explores a variety of related issues, including the impact of user expectations, publishing trends, electronic access, resource sharing, and outsourcing, on collection management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 670 Cross-platform Mobile Development 3.0 Credits

Introduces students to advanced client-server technologies for web programming and mobile application creation. Focuses on the concepts and practices of mobile development using a cross-platform framework and mobile-oriented HTML/CSS/Javascript libraries. Emphasizes client-side design and integration with server APIs. Addresses related design patterns, frameworks, and team processes for web-based mobile programming. Topics include: Web programming and mobile-oriented web/app design; Cross-platform mobile development (e.g. with Cordova/ PhoneGap); Design for client and server integration with API layers; App development with mobile interfaces, libraries, and plugins; Web/mobile programming frameworks and design patterns (e.g. MVC).

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 655 [Min Grade: C]

INFO 676 Applied Ontology 3.0 Credits

Presents the fundamentals of ontology modeling, development, and application in Web-based information systems. Focuses on the broad foundational coverage of key concepts, principles, and technologies in using ontologies for content management, knowledge representation, and semantic reasoning. Major topics include the history of ontology, data models, XML documents, the Semantic Web technologies, RDF, OWL, ontology development tools, and a variety of different ontologies and their applications in different domains.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 590 [Min Grade: C]

INFO 679 Information Ethics 3.0 Credits

Presents the philosophical foundations of applied ethics and technology with primary focus on the uses and abuses of information, human moral agency in relation to new information and communication technologies, and the meaning of social responsibility in the global information society, including the concepts of global information justice and human rights.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 680 US Government Information 3.0 Credits

Studies the nature of United States federal government documents and techniques for their acquisition, organization, and use.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 682 Storytelling 3.0 Credits

Provides an overview of the study and practice of storytelling in face-to-face and digital environments. Familiarizes students with a wide range of print and digital storytelling resources from a variety of world cultures. Focuses on oral presentation and organization skills.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 683 Resources for Children 3.0 Credits

Acquaints prospective professionals with the resources published for use by and with children in grades K to 8. Provides an opportunity to develop basic standards for evaluation of resources. Includes recent research concerning children and the central role of resources in the development of their reading/viewing/listening interests and tastes.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 684 Resources for Young Adults 3.0 Credits

Acquaints prospective professionals with the materials intended for use by and with young adults. Provides an opportunity to develop basic standards for evaluation of materials and to learn about recent research concerning young adults and their information needs, reading interests, tastes, and development.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 687 Issues in Information Literacy 3.0 Credits

This course covers two broad topics: 1) the concept of information literacy and related key issues such as information accuracy, authenticity, privacy, and how information evolves in online environments; and 2) how people learn—basic learning theories, approaches, and preferences that can be applied in a variety of information contexts, such as public libraries, academic libraries, special libraries, corporations, and government entities.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 690 Understanding Users: User Experience Research Methods 3.0 Credits

This course introduces common user experience (UX) research methods that designers use to inform, generate, and test design ideas. Students will learn about and practice a series of research methods such as interviewing, field studies, focus groups, card sorting, and surveys, to understand users' needs, preferences, and experiences with computing systems. Students will learn about how different data collection techniques serve different purposes in the design process and select or adapt appropriate methods to meet their needs.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 508 [Min Grade: C], INFO 608 [Min Grade: C], DSRE 620 [Min Grade: C] (Can be taken Concurrently)

INFO 691 Prototyping the User Experience 3.0 Credits

This course introduces students to prototyping techniques and tools for a range of user experience and design contexts. Students will learn about and practice a series of methods such as sketching, wire-framing, physical prototyping, functional prototyping, and wizard-of-oz approaches. Students will learn about how different prototyping techniques serve different purposes in the design process and select or adapt appropriate methods to meet their needs.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 508 [Min Grade: C], INFO 608 [Min Grade: C], DSRE 620 [Min Grade: C] (Can be taken Concurrently)

INFO 710 Information Forensics 3.0 Credits

Focuses on the principles and practices of the forensic investigation and analysis of information in modern organizations and distributed information systems. Includes studies of information processes, events, time measurement, casual factors, information volatility, technical and procedural forensic methods, rules of evidence and case law.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 530 [Min Grade: C] or INFO 540 [Min Grade: C] or INFO 590 [Min Grade: C] or CS 520 [Min Grade: C]

INFO 712 Information Assurance 3.0 Credits

Describes how to protect an organization's information resources and assets within national and international context. Topics include organizational policies and assurance requirements, relationships between assurance and security, and information assurance planning assessment and management.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: DSCI 511 [Min Grade: C], DSCI 521 [Min Grade: C] (Can be taken Concurrently) INFO 530 [Min Grade: C] or INFO 540 [Min Grade: C] or INFO 590 [Min Grade: C] or CS 520 [Min Grade: C]

INFO 725 Information Policy and Ethics 3.0 Credits

Introduces the philosophical, conceptual, and practical fundamentals, foundations, and issues—past and present—of information policy and ethics including computing, data, and management. Foci include policies in government documents, issues relating to the practical development and implement of information policies for a variety of organizations, companies and governments, the uses and abuses of information, human moral agency in relation to new information and communication technologies, and the meaning of social responsibility in the global information society.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 731 Managing Health Informatics Projects 3.0 Credits

Introduces sociotechnical issues encountered when implementing informatics projects in diverse health-related settings. Students apply concepts and skills relevant to scoping, planning and executing health informatics projects in organizations.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 732 Healthcare Informatics: Planning & Evaluation 3.0 Credits

Introduces planning and evaluation of healthcare informatics applications. Through critical reading, students learn the planning and evaluation cycle and become familiar with quantitative and qualitative methods and measures. Through lectures and assignments, students select a healthcare problem, formulate a problem statement, select evaluation methods and measures and write a proposal.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 733 Public Health Informatics 3.0 Credits

Presents an overview of issues, methods and tools of public health informatics. Explores topics including knowledge management, literacy skills for the public health provider and the health consumer, public health surveillance systems, public health applications of clinical data, Geographic Information Systems (GIS), and eHealth/mHealth applications.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 648 [Min Grade: C] or PBHL 516 [Min Grade: C]

INFO 750 Archival Access Systems 3.0 Credits

Introduces students to the creation, maintenance, and evaluation of archival access systems. Covers the theoretical concepts that underlie archival description and their evolution into the current set of electronic information systems. Reviews current descriptive standards. Addresses user needs and different formats.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 755 Electronic Records Management 3.0 Credits

Presents records management theory and practice from the perspective of the archivist. Covers the transformation of the profession and its practices as it adapts to electronic record keeping. Introduced records management principles and applies them to the contemporary digital office environment. Relates records management concepts to other information management disciplines.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 756 Digital Preservation 3.0 Credits

Explores concepts, principles, and practice for preserving digital information resources. Topics include selection, organization, and access for materials in trusted repositories. Both technological and policy perspectives are addressed.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 799 Independent Study 2.0-12.0 Credits

Provides individual investigation in special areas of information science and technology not regularly covered in the courses offered. Topic for study must be approved, in advance of registration, by the faculty adviser, the instructor involved, and the associate dean. 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 811 Applied Research Methods 3.0 Credits

Provides an overarching understanding of several applied research methodologies that are relevant to decision makers, practitioners and scholars. Stresses identification of the appropriate research methodology for a given problem, as well as the advantages and disadvantages of each. Emphasizes real-world factors associated with the research process.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is PHD.

INFO 812 Research Statistics I 3.0 Credits

This course provides the knowledge and tools necessary for conducting and understanding many types of empirical studies in the field of information science. It examines the fundamentals of descriptive and inferential statistics, and hypothesis testing. It covers analysis of variance and introduces regression. Students gain practical experience with a statistical package such as SPSS.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is PHD.

INFO 813 Quantitative Methods 3.0 Credits

Introduces research designs and methods of quantitative analysis for various problems in information systems, management of information resources, and scholarly and professional communication. Presents statistical techniques through packaged computer programs.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is PHD.

INFO 816 Qualitative Research Methods 3.0 Credits

Provides doctoral students with an opportunity to explore and experience qualitative research methods, tools, and techniques, with emphasis on historical, philosophical, and theoretical underpinnings of the qualitative perspective. Concerned with analysis of the social construction and reproduction of human activity. Explores interpretive research methods that try to analyze social sense-making.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is PHD.

Prerequisites: INFO 811 [Min Grade: C]

INFO 821 Foundations in Information Science 3.0 Credits

This class introduces students to concepts in the theory and research of information science, including the historical foundations and evolution of the field, as well as contemporary trends in theory, major areas of study, and methods of investigation.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 823 Foundations in Human-Centered Computing 3.0 Credits

Provides an introduction to Human-Centered Computing (HCC) theories and methods that advance our understanding of the complex and tightly coupled relationships between people and computing. Students will analyze and synthesize literature, identify gaps in HCC knowledge, and practice research design that investigates not only interactions between humans and computers, but also ways that people and societies influence and are influenced by computational artifacts such as traditional computers, handheld and mobile devices, robots, and wearable computers, at scales ranging from an individual device with a single user to complex, evolving socio-technical systems.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 825 Foundations in Data Science 3.0 Credits

Introduces data science as an area of study of fundamental knowledge and skills for conducting data-driven scientific research. Covers methods for exploratory data analysis and techniques of statistical learning and inferences for building predictive models. Discusses techniques for model selection and result evaluation. Covers effective visualization methods to communicate insight about data and analytics results.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Prerequisites: INFO 812 [Min Grade: B] and INFO 813 [Min Grade: B]

INFO 830 Issues in Information Studies 3.0 Credits

This doctoral seminar course examines a current research topic in library information science or information systems. Students may repeat the course in different research topics.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if program is PHD.

Prerequisites: INFO 861 [Min Grade: C] and INFO 863 [Min Grade: C]

INFO 861 Topics in Information Science 3.0 Credits

This course introduces students to the community of practice in information science research by a broad introduction to a common body of knowledge. It helps prepare students to join in the collective work to expand that body of knowledge. It covers a variety of the most important texts and papers in the field of information science. Must have doctoral student status or master student with permission of instructor.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is PHD.

INFO 863 Topics in Information Systems 3.0 Credits

This course introduces students to the community of practice in information systems research by a broad introduction to a common body of knowledge. It helps prepare students to join in the collective work to expand that body of knowledge. It covers a variety of the most important texts and papers in the field of information systems. Must have doctoral student status or master student with permission of instructor.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is PHD.

INFO 871 PhD Process and Practice 1.0 Credit

PhD Process and Practice (PPP) is a one-credit seminar offered in the Fall quarter. The course sections cover topics and skills that are necessary for success as a PhD student.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

INFO 873 Special Topics Seminar 1.0 Credit

Provides students with an opportunity to read critically and to discuss literature in the area-specific topics or methods. Aims to help doctoral students to read, discuss, and present contemporary information studies problems and research. Helps students engage in research in the covered areas.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 2 times for 3 credits

INFO 890 Capstone Project 3.0 Credits

Explores information practices as an open-ended team activity. Initiates and completes an in-depth individual or multi-term capstone study emphasizing information processes, design thinking, or technology to service people and/or organizations. The Capstone explores information and data-related issues and challenges involved in the application domain of the individual or team's choice. Applies a development process structure for project planning, specification, design, implementation, evaluation, final report, and individual reflective piece. Research focused capstones must have a designated faculty mentor in addition to a capstone faculty coordinator.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: INFO 505 [Min Grade: C] and INFO 508 [Min Grade: C] and INFO 590 [Min Grade: C]

INFO 896 Health Informatics Experience 3.0 Credits

The Health Informatics Experience capstone is a culminating experience that enables students to apply what they have learned to address a specific problem in an approved health-related environment. It may be research or practice-related. This course should be taken in the final term of the student's program.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated 1 times for 6 credits

INFO 998 Ph.D. Dissertation 1.0-12.0 Credit

Provides individual work on an approved topic leading to a doctoral dissertation in information science and technology.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if program is PHD.

INFO I599 Independent Study in INFO 0.0-9.0 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 I699 Independent Study in INFO 0.0-9.0 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 I799 Independent Study 2.0-12.0 Credits

Provides individual investigation in special areas of information science and technology not regularly covered in the courses offered. Topic for study must be approved, in advance of registration, by the faculty adviser, the instructor involved, and the associate dean. 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 I899 Independent Study in INFO 0.0-9.0 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 I999 Independent Study in INFO 0.0-9.0 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 T780 Special Topics 2.0-12.0 Credits

May be repeated for credit if topic varies.

College/Department: College of Computing and Informatics

Repeat Status: Can be repeated multiple times for credit

Interior Design

Courses

INTR 515 Sustainability: History, Theory and Criticism 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

INTR 641 Furniture Design 4.0 Credits

A hands-on investigation of furniture design. Covers design of interior and exterior environmental elements, through explorations in craftsmanship; 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

INTR 722 Graduate Studio A 4.0 Credits

Focuses on a given residential environment with specific architectural identity meeting the residential space requirements of particular clients and recognition of and respect for the quality of interior architecture, volume and its ornament. Develops original approaches to furniture planning, lighting, interior elaboration, furniture, color and finish selection. Professionally juried.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 232 [Min Grade: B-]

Corequisite: INTR 723

INTR 723 Studio A Seminar 2.0 Credits

Focused study on the impact of interior architectural and decorative detailing on the interior environment through the understanding of precedent studies and ornamentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 232 [Min Grade: B-]

Corequisite: INTR 722

INTR 732 Graduate Studio B 4.0 Credits

Investigates the manipulation of spatial volume within the context of small-scale environments. Projects build in complexity in terms of use, tectonics and structure emphasizing concept development, iterative design process and various ways of making. Professionally juried.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 722 [Min Grade: C]

Corequisite: INTR 733

INTR 733 Studio B Seminar 2.0 Credits

Focused study in digital communication and making and its role in the design of the interior environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 722 [Min Grade: C]

Corequisite: INTR 732

INTR 742 Graduate Studio C 4.0 Credits

Focuses on the design of an interior with emphasis on programmatic requirements and environmental behavior leading to a synthesized and identifiable environment. Emphasizes concept, pre-design research, programming, space planning and presentation. Professionally juried.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 732 [Min Grade: C]

Corequisite: INTR 743

INTR 743 Studio C Seminar 2.0 Credits

Investigation in interior detailing and the impact it has on the identity of the interior environment. Focused study and understanding of the design attributes of materials, construction systems and use of detail as a design process and generator.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 732 [Min Grade: C]

Corequisite: INTR 742

INTR 752 Graduate Studio D 4.0 Credits

Focused on design of a mid to large scale commercial interior with emphasis on programmatic requirements, parti, adjacency diagrams and office systems. Applies a design concept based on client identity through interior planning and appropriate selection of furniture, materials and finishes consistent with contract interiors. Requires building code analysis, and demonstrated understanding of building codes. Professionally juried.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 742 [Min Grade: C]

Corequisite: INTR 753

INTR 753 Studio D Seminar 2.0 Credits

Focused study and application of building codes and construction documentation of a mid-large scale commercial interior environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 742 [Min Grade: C]

Corequisite: INTR 752

INTR 762 Graduate Studio E 4.0 Credits

Studio context will provide for investigative study on subjects of specific environmental concern reflective of current trends, through the study of a large scale interior environment. Professionally juried.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 752 [Min Grade: C]

Corequisite: INTR 763

INTR 763 Studio E Seminar 2.0 Credits

Focused study and analysis of professional practice covering contemporary business methods, practices, and procedures in the operation of a design firm, including legal and ethical implications.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 752 [Min Grade: C]

Corequisite: INTR 762

INTR 860 Advanced Independent Study in Interior Design 1.0-4.0 Credit

Provides advanced individual 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

INTR 861 Advanced Visual Methods 3.0 Credits

An advanced course in visualization focusing on hybrid representation strategies. Specialized topics in digital and hand rendering and exploration of the visual language of presentation and rendering techniques for design development and visualization of interior spaces.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR 862 Interior Systems I 3.0 Credits

Focused study in environmental systems and understanding of the impact and integration between systems and the built environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR 863 Advanced Digital Methods 3.0 Credits

Intensive focus on advanced modeling and rendering software. Lighting, materiality, form and spatial experience are explored through realistic three-dimensional digital models.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 861 [Min Grade: C]

INTR 864 Material Investigations 3.0 Credits

This course provides for investigative study of materials that shape the interior environment. Exploration of materials through application, research, codes and hands-on presentation are addressed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR 865 Interior Systems II 3.0 Credits

Develops and deals with many dimensions of light that must be understood if natural and artificial lighting are to be incorporated in the interior design of a building. Provides a series of investigations that allow the student to predict visual effects, meet minimum sight requirements, and ensure visual comfort. Professionally juried.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 862 [Min Grade: C]

INTR 868 Presentation Seminar 0.0-3.0 Credits

Provides an opportunity for independent and investigative study in various aspects of the presentation of ideas. Encourages experimentation with fine arts media, drafting media, and digital media, with an emphasis on professionalism and craft. Professionally juried.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR 870 Environmental Topics in Design 0.0-3.0 Credits

Provides an opportunity for investigative study on subjects of specific environmental concern to students and faculty. 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

INTR 872 Advanced Design Theories and Applications 3.0-4.0 Credits

Advanced exploration of design theories and applications. An emphasis is placed on the development and exploration of theoretical stances in text, projects and/or artifacts.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 2 times for 12 credits

INTR 874 Fabrication and Making 3.0-4.0 Credits

Exploration into design fabrication and making methodologies. A variety of procedures, techniques and tools are utilized to design and fabricate at full scale within the built environment.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR 894 Thesis Programming 3.0 Credits

Focuses on the process of defining an appropriate thesis topic, writing a succinct proposal, research methodologies and the development of a research plan.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR 897 Thesis - Development 3.0 Credits

Provides faculty guidance to enable students to identify and investigate an aspect of interior design. May include establishment of philosophical base, data collection, study of comparable or similar programs and spaces, writing of a design program, building selection and measurement, and preliminary design development. Includes professionally juried presentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 894 [Min Grade: C]

INTR 898 Thesis - Documentation 3.0 Credits

Allows development and refinement of design responses to the program of INTR 897 through in-depth analysis of the design problem. Involves evaluation of work on the basis of the understanding of the design process, the execution of the concept and the extent of development, and the emergence of a design character appropriate both to the student as a designer and to the resolution of the specific problem. Includes professionally juried final presentation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: INTR 897 [Min Grade: C]

INTR 899 Comp Exam for Interior Design 0.0 Credits

Required of candidates for the M.S. degree.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

INTR I599 Independent Study in Interior Design 0.0-12.0 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 9 times for NaN credits

INTR I699 Independent Study in Interior Design 0.0-12.0 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

INTR I799 Independent Study in Interior Design 0.0-12.0 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

INTR I899 Independent Study in Interior Design 1.0-4.0 Credit

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 I999 Independent Study in Interior Design 0.0-12.0 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

INTR T580 Special Topics in Interior Design 0.0-12.0 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

INTR T680 Special Topics in Interior Design 0.0-12.0 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

INTR T780 Special Topics in Interior Design 1.0-4.0 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

INTR T880 Special Topics in Interior Design 0.0-12.0 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

INTR T980 Special Topics in Interior Design 0.0-12.0 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

International Business

Courses

INTB 620 International Business Management 3.0 Credits

Examines decision-making in international business operations, including evaluation of role and policies of the multinational firm. Covers topics including community relations, labor relations, and personnel and financial management.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 502 [Min Grade: C] or ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

INTB 632 Economic Analysis of Multinational Corporations 3.0 Credits

Analysis of MNCs as an economic unit. Explores the determinants of organizational structure expansion strategies, and R&D strategies of multinational corporations. Impact of MNCs on competitiveness, technology transfer, and trade policy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 502 [Min Grade: C] or ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

INTB 790 Seminar in International Business 3.0 Credits

Requires students to present the results of research on the application of theory to contemporary economic, political, and social problems as they affect U.S. business operations abroad. Requires oral presentation and written report of graduate quality.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

INTB I599 Independent Study in INTB 0.0-12.0 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 I699 Independent Study in INTB 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

INTB I799 Independent Study in INTB 0.0-12.0 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 I899 Independent Study in INTB 0.0-12.0 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 I999 Independent Study in INTB 0.0-12.0 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 T580 Special Topics in INTB 0.0-12.0 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 T680 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

INTB T780 Special Topics in INTB 0.0-12.0 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 T880 Special Topics in INTB 0.0-12.0 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 T980 Special Topics in INTB 0.0-12.0 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

Intra Professional Studies

Courses

IPS 500 Healthcare Improvement Concepts and Strategies 1.0-3.0 Credit

This interprofessional course will cover a range of topics in improvement capability, patient safety, population health, person- and family-centered care, leadership, and quality, cost, and value. Students will work independently and collaboratively to examine contemporary issues in healthcare, strategies for healthcare improvement and professional development. This course is designed as an elective for 1-3 credits that can be utilized for multiple purposes within different programs.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 501 Legal Compliance: Structure and Implementation 4.5 Credits

This course introduces students to the concept of legal compliance, and the skills needed to implement and maintain policies that enable organizations to thrive in the current regulatory system. Particular emphasis is given to areas such as auditing, investigating, and reporting. Additional topics include corporate oversight, the role of regulators, the general flow of a compliance professional's work, as well as the compliance landscape/compliance roles.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 504 Regulations in Health Care 4.5 Credits

This course provides an overview of the rules and regulations governing the current health care system. Students will learn how to apply statutory and regulatory principals to a variety of health care situations they will encounter in the field. Topics include unearthing and prosecuting health care fraud, the complexity of the payor system, and the regulatory structure associated with nursing homes and long-term care facilities.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 505 Health Care Quality and the Legal Context 4.5 Credits

This course will provide students with tools for analyzing and assessing levels of patient safety and the quality of care being provided in a variety of health care settings such as physician practices, managed care plans, and long-term care facilities. This course will also explore developments in patient care, utilization review, risk management, and liability.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 506 HIPAA: A Patient's Legal Right to Privacy 4.5 Credits

This course will examine the privacy and security provisions of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) which provides the legal basis for federal protection of health care information. Students will explore the relationship between HIPAA and other privacy laws and will learn how to ensure compliance with all of HIPAA's provisions.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 10 credits

IPS 507 Mindfulness Meditation 3.0 Credits

Mindfulness Meditation is a powerful technique that helps to promote health and well-being of the mind, body and spirit. Mindfulness practices reduce the negative effects of stress and improve focus and awareness in order to help one live a more meaningful life. This course explores the neuroscience and physiology of Mindfulness Meditation. Through weekly experientials students cultivate a personal practice for effective stress management, resilience and reflections rooted in Mindfulness Based Stress Reduction techniques.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 510 Reproductive Women's Health Across the Life Cycle 3.0 Credits

Using an integrated clinical and public health perspective, this course examines reproductive women's health to gain deeper understandings of the complex interplay between women and their reproductive health care needs across the lifecycle. Students will leave this course appreciating the diversity existing within women's health and how reproductive health care promotes health and wellness to women in the context of where women live, work, and play. Students across Drexel University are invited to take this course. There is not a clinical requirement to this course. For those enrolled in the maternal child health (MCH) programs offered in the Dornsife's School of Public Health, this course count towards MCH specialization.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 519 Forensic Science Foundations 3.0 Credits

This course examines the defining characteristics of offender behavior including the importance of obtaining complete victim histories, investigation of a motive and suspects as it relates to healthcare and practice. Investigative and therapeutic factors and approaches including examination of environment, place, time and crime scene indicators will be explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 528 Victimology – Contemporary Trends 3.0 Credits

This course examines the wide range of victimization experiences from the perspective of the crime victim, the offender, families, and the healthcare community. Basic tenets of assessment and intervention with victims and survivors are explored. Emphasis will focus on understanding the etiologic and motivation issues as well as response patterns to victimization and perpetration dynamics from a healthcare provider perspective.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 533 Forensic Mental Health 3.0 Credits

This course examines the various foundations of offender behavior including theory, research and motivational models. Basic tenets of assessment and intervention with offenders will be examined from a healthcare perspective.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 534 Introduction to Patient Sexuality 3.0 Credits

This course provides an overview of major topics relevant to patient sexuality for clinical and non-clinical students, including: components of healthy sexuality; patient sexuality throughout the lifespan; models for discussing sexuality with patients; gender identity; sexual orientation; sexual assault and abuse; shame, stigma, and discrimination; and cultural/religious influences on sexuality.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 535 Sexual Function and Dysfunction 3.0 Credits

This course will explore sexual function and dysfunction through a biopsychosocial framework, including: various models of the sexual response cycle; sexual anatomy and physiology; common patient sexual problems and behaviors; alternative sexual practices and paraphilias; pregnancy and infertility; sexually transmitted infections; sexual side effects of medications; sexuality and illness/disability.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: IPS 534 [Min Grade: B]

IPS 536 Sexuality Counseling & Interviewing 3.0 Credits

This course will provide opportunities for students to advance their skills of communicating about sexuality while deepening their experience in addressing sensitive sexuality issues. Interviewing techniques will be applied to various patient sexuality scenarios through use of role-playing and standardized patients.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: IPS 534 [Min Grade: B]

IPS 537 Medical Management of Sexual Health and Wellness Across the Continuum 3.0 Credits

This course will be the capstone course for all clinical students (MDs, NPs, PAs). It will allow students to gain hands-on experience in the clinical care and management of patient sexual health. Students will learn through case studies, simulation lab experiences, and shadowing clinical supervisors.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: (IPS 534 [Min Grade: B] and IPS 535 [Min Grade: B] and IPS 536 [Min Grade: B])

IPS 538 Foundations of Sexuality Education and Health Promotion 3.0 Credits

This course will provide an overview of theories and models of learning and health behavior change that are applicable to sexual health. It will explore public health frameworks, harm reduction models, and empowerment models.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: (IPS 534 [Min Grade: B] and IPS 535 [Min Grade: B] and IPS 536 [Min Grade: B])

IPS 544 Quality and Safety in Healthcare 3.0 Credits

This course provides a broad introduction to the essential competencies required by healthcare professionals to improve practice and health care delivery. Based upon the quality and safety standards, class activities are designed to build the knowledge, skills and attitudes necessary to serve in leadership roles to drive quality improvement and safety within healthcare systems.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 545 Introduction to Human Trafficking 3.0 Credits

This foundational course introduces the learner to human trafficking and examines those involved, where and why it occurs and how to identify and intervene, or not, on a victim's behalf.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 546 Psychosocial Dimensions of Human Trafficking 3.0 Credits

This course introduces the complex psychosocial dimensions affecting victims/survivors of human trafficking and those who engage in human trafficking. In addition, the role of culture in working with HT victims as well as linguistic and cultural barriers to accessing care will be examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 547 Human Trafficking: Domestic and Global Trends 3.0 Credits

This course focuses on domestic/global trends, policies, laws and resources related to human trafficking. Students will examine factors that facilitate or impede this phenomenon in the domestic and international arenas.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 548 Foundations in Transdisciplinary Professional Collaboration 3.0 Credits

This course will introduce students to the essential components of transdisciplinary professional collaboration and professional communication. Students will explore strategies for developing and maintaining effective inter and intraprofessional working relationships with learners, practitioners, patients/clients/ families and communities which is foundational in achieving optimal health outcomes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 549 The Military and Veteran Culture 3.0 Credits

This course is recommended for students who have little to no experience working with veteran populations and those who want to know more about the military and veteran cultures. Topics covered in this course are formal and informal military structures, military chain of command, military and veteran terminology, military training, effects of military training, life and expectations on former military members. This course also covers the challenges of returning home from the military life, re-integrating with civilian family structure, and re-integrating into civilian life as a whole.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 550 The Unique Health Care Needs of our Military and Veterans 3.0 Credits

This course explores the unique healthcare needs of veterans. The short and long term health effects of war on soldiers are examined. Exploring the medical and social diagnoses of common ailments, and their treatments is explored. Common health care issues such as traumatic brain injury, military sexual trauma, suicide, polytrauma and depression are healthcare issues that are common to this population as a result of their military experiences will be examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 551 Veteran Advocacy 3.0 Credits

This course explores advocacy groups and services available to U.S. veterans and their families. It discusses strategies to assist and advocate for U.S. veterans and their families who live in a civilian society unfamiliar with their military experiences. Also covers the challenges of returning home from the military, re-integrating with civilian family structure, and re-integrating into civilian life in general. A broad knowledge base of veteran's benefits and advocacy groups available to assist the veteran are examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 552 Veteran Healthcare Policy 3.0 Credits

Beginning with the history of the professional soldier in the American society, students will trace the history of American public policy development concerning veteran healthcare, developing a comprehensive understanding of how policy frames health service delivery. This course provides an overview of how federal, regional and local policies affect the delivery of healthcare and, in general, care, to veterans.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 553 Neuroscience of Learning 3.0 Credits

This course introduces neuroanatomy and processes associated with learning, memory, emotion, and perception. The course examines the relationship between stress, trauma, sleep, health, and aging on cognitive function as well as recovery of cognitive function after brain injury.

Current and emerging research in cognitive neuroscience is explored to inform educational practices to meet the needs of diverse learners.

Topics include neuroplasticity, neuroimaging, learning cycle, effective differentiation, and self-efficacy.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 554 Online Neuropedagogy, Regulations & Online Instruction 3.0 Credits

This course examines common neuromyths and the relationships between memory, comprehension, metacognition, and neuroplasticity. Students compare key theorists and their approaches to the learning process. This highly interactive course integrates technology platforms, tools, and applications to engage students in a community of inquiry. Students are introduced to dichotomous approaches including deductive and inductive instruction, procedural and metacognitive scaffolding, sequencing and chunking, and reflective thought. Students demonstrate their understanding of neuroplasticity, neuroimaging, the learning cycle, effective differentiation, and self-efficacy through personal development and evaluation for online instruction.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: IPS 553 [Min Grade: B]

IPS 562 Comparative Health Systems 1.0-6.0 Credit

The course will examine and compare the major models of health systems globally. Topics will include historical, political, social, ethical and economic context for selected countries. Standard measures of health outcomes will be analyzed. This course is designed as an elective that can be utilized for multiple purposes within different programs of study and may include an optional study abroad immersion experience. The study abroad experience will be either one week (1 credit) or two weeks (2 credits).

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HSAD or major is NURS.

IPS 564 The Business of Healthcare 3.0 Credits

This course provides a forum for the exploration and evaluation of financial management and the financial environment of the healthcare industry. The student will develop an understanding of the budgeting and accounting process and how a fiscally responsible budget works in a climate of decreased government funding, shared cost mechanisms and decreased personnel resources in addition to basic financial management principles and tools.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 584 Analysis of Performance Standards in Healthcare Quality 3.0 Credits

This course provides an introduction to the essential skills of data analysis. Students gain an understanding of how to apply strategies to measure selected indicators, manage data and apply statistical analysis principles to drive quality improvement and evaluation of program outcomes. This course will focus on how to develop and revise effective outcome measures for an organization to determine progress in meeting quality measures of accreditation and regulatory bodies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: IPS 544 [Min Grade: B] or NURS 544 [Min Grade: B]

IPS 585 Science of Safety, Human Factors, and System Thinking 3.0 Credits

This course provides a broad introduction to the science of safety, human factors and systems thinking as it relates to healthcare and safety. Students will examine system and design principles for safety and outcome improvements. Students will build knowledge, skills and attitudes necessary to serve in leadership roles to drive quality improvement and safety within healthcare systems.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: IPS 584 [Min Grade: B]

IPS 586 Creating a Culture of Safety 2.0 Credits

This course will focus on strategies to create a culture of safety in the healthcare environment. The course incorporates established standards of practice and strategies designed to promote a safe care environment, build team competencies, leadership and communication skills.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: IPS 585 [Min Grade: B] (Can be taken Concurrently)

IPS 600 Capstone: Applying Neurobiology to Instruction 3.0 Credits

The capstone course synthesizes program concepts and advanced critical theory relating to the application of neurobiology to cognitive processing, transfer of learning, and instruction. Students design and develop a discipline specific capstone project, building upon evidence-based research and resources. The capstone project actively engages students in peer-review and self-evaluation. The course culminates with student presentations that demonstrate technical and applied knowledge, critical-thinking, and communication skills. Must be completed during the final term of the program.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: IPS 553 [Min Grade: B] and IPS 554 [Min Grade: B]

IPS 601 Quality, Safety and Risk Management Capstone 5.0 Credits

The practicum provides an opportunity for the student to apply content that has been learned in previous coursework and operationalize the role of the Quality, Safety and Risk Management professional in appropriate healthcare organizations and facilities. In this course, the student will complete and present the capstone project to health care systems administration and other stakeholders.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: IPS 586 [Min Grade: B]

IPS 670 Interdisciplinary Perspectives of Health Law 3.0 Credits

This course introduces students to areas of law and legal theory that serve as the basis for the U.S. health care system. Students will examine statutes, regulations, and case law that regulate health care practice. Students will observe a courtroom proceeding, integrate professional knowledge with health law principles, and analyze testimony of a clinical expert witness. Some of the areas to be studied include: torts, administrative law, provider liability, defenses, health policy, access to care, federal regulations, the patient safety movement, distinction between criminal and civil action with an emphasis on domestic violence (DV) law and interpersonal violence (IPV) case studies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

IPS 763 Teaching Strategies and Learning Technologies in Health Professions Education 3.0 Credits

This course focuses on approaches for engaging health professions students through active teaching strategies. Learners will explore key elements for course alignment, appropriate use of technology, integration of authentic assessment and best practices in teaching health professions students. Approaches for motivating and handling the challenging learner will be highlighted.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NHP 762 [Min Grade: B]

IPS 765 Assessment, Measurement, and Evaluation in Health Professions Education 3.0 Credits

This course explores the theories and practices that are the basis of measurement, assessment, and evaluation in higher education in a health professions program. Emphasis is placed on test development, written assignments, clinical/performance evaluation, and psychometrics. Contemporary issues related to measurement, assessment, and evaluation encountered by higher education faculty teaching in a health professions academic program will also be examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: IPS 763 [Min Grade: B]

IPS T580 Special Topics in Intra Professional Studies 1.0-6.0 Credit

This course covers special topics of relevance and significance to healthcare professionals. Topics decided upon by faculty will vary from term to term within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

IPS T680 Special Topics in Intra Professional Studies 1.0-5.0 Credit

This course covers special topics of relevance and significance to healthcare professionals. Topics decided upon by faculty will vary from term to term within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

IPS T780 Special Topics in Intra Professional Studies 1.0-5.0 Credit

This course covers special topics of relevance and significance to healthcare professionals. Topics decided upon by faculty will vary from term to term within the area of study.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Legal Studies

Courses

BLAW 510 Analyzing Legal Options in Decision-Making 1.0 Credit

The course covers the evaluation and management of the legal risks of business transactions, relationships, and organizations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BLAW 605 Legal Options in Decision Making 3.0 Credits

The course covers laws governing and relating to commercial transactions, relationships, organizations and ethics with emphasis on the application of law in decision making.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is BUSN.

BLAW 620 Legal Aspects of Employment 3.0 Credits

Examines and analyzes legal aspects of employment as governed by law and judicial decisions, 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

BLAW 624 Social Forces and the Law 3.0 Credits

Analyzes the social, economic, and moral forces shaping the legal environment of business, including environmental problems, consumer protection, civil rights, and equal opportunity.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BLAW 626 Fundamentals of Business Organizations Law 3.0 Credits

An introduction to various business organization legal topics, including those most commonly covered in the Uniform Certified Public Accountant (CPA) examination, such as agency, partnerships, and corporations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BLAW 631 Real Estate Law for Managers and Developers 3.0 Credits

Integrates real property laws and the rights, obligations and limitations pertaining to property ownership with the legal aspects of management and acquisition of various types of commercial and residential properties.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

BLAW 646 Legal Issues in New Ventures 3.0 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 I599 Independent Study in BLAW 0.0-12.0 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 I699 Independent Study in BLAW 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

BLAW I799 Independent Study in BLAW 0.0-12.0 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 I899 Independent Study in BLAW 0.0-12.0 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 I999 Independent Study in BLAW 0.0-12.0 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 T580 Special Topics in BLAW 0.0-12.0 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 T680 Special Topics in BLAW 0.5-4.0 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 T780 Special Topics in BLAW 0.0-12.0 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 T880 Special Topics in BLAW 0.0-12.0 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 T980 Special Topics in BLAW 0.0-12.0 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

Linguistics

Courses

LING 560 Foundations of Linguistics 3.0 Credits

Foundations of Linguistics provides a foundation in the analysis of language, including topics of phonology, morphology, syntax, and semantics. Using a problem-based approach, students examine areas of language use such as first and second language acquisition, the analysis of world languages other than English, and variation in language use (sociolinguistics).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Management

Courses

MGMT 510 Business Problem Solving 3.0 Credits

Decision-making and problem-solving prowess is a skill that can and should be learned. Why do well-intentioned, smart, experienced professionals make poor decisions far too often? It may be because they haven't been taught a disciplined process for making quality decisions. Perhaps they've relied on intuition, brains, luck, common sense, and training within the narrow bounds of their professional expertise. Unfortunately, in today's professional environment these attributes may not be enough to sustain advantage. This course will help managers build confidence in the quality of their complex problem solving and decision making abilities, making them better leaders, and preparing them for effectively solving future challenges.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 520 Strategy Analysis 2.0 Credits

Strategy Analysis will help you understand the fundamental question: Why do some firms perform better than others? Strategy Analysis will offer you the frameworks and tools necessary to assemble and analyze information required to arrive at the answer to the fundamental question.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 530 Managing and Leading the Total Enterprise 2.0 Credits

In this course, you will assume the leadership of an existing business and manage it through expansion, releasing new products, raising capital, and achieving success against agile and capable competitors. A dynamic total enterprise simulation puts you in the board room with a team of professionals who together will use critical thinking to guide your company through several simulated years of operations. You will know, sense, experience, and understand the challenges that business leaders confront, analyze, and overcome on a regular basis. This experiential learning course will provide you with the ability to integrate cardinal business concepts for managing the total enterprise and unmatched practical experience in applying your knowledge, making better business decisions, and measuring your success.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 601 Managing the Total Enterprise 3.0 Credits

Business Simulation focusing on the need to integrate strategic and operational concepts, issues and decisions in moving technological enterprise from start-up to success.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 602 Innovation Management 3.0 Credits

This course will focus on the role of innovation in building the competitive advantage of firms. It will focus on the process of innovation, sources of innovation, and types of innovation – both process and product. Theories of diffusion of innovation, factors driving and impeding innovation, and resistance to innovation will be highlighted. Critical issues of management of innovation will be discussed.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 603 Technology Strategy 3.0 Credits

Technological change has been a persistent force in the conduct and performance of contemporary organizations. This course will focus on the markets and institutions shaping technology shifts and strategies that firms can employ to address these shifts. Key concepts covered include standards and dominant designs, network effects, technology lockout, modularity and product architecture, platform technologies, complementary products and multi-sided markets. A special topic on recent developments in technology applications will also be discussed.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 630 Corporate Strategy 3.0 Credits

This course focuses on the strategic management of firms spanning multiple business lines or geographic areas. As opposed to Strategy Analysis that focuses on individual businesses, in this course we examine issues specific to multi-business corporations. For example, what are a firm's core competences that can be exploited in multiple settings? Which new markets or businesses should a firm enter? How should those businesses be entered? How should one manage the portfolio of a diversified firm? How should a firm work with other firms? How does synergy matter when it comes to diversification, mergers or acquisitions? By considering these questions critical to analyzing and managing a multi-business organization, this course has important implications for business students across disciplines and function areas.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MGMT 520 [Min Grade: C]

MGMT 635 Advanced Strategy Business Simulation 3.0 Credits

This experiential learning course provides the student with the ability to apply integrated business concepts for managing the total enterprise using a more complex business simulation than used in MGMT 530 after obtaining the knowledge, skills, and abilities from other MBA core and elective courses. In this course, students will assume the leadership of an existing business and manage it through expansion, releasing new products, raising capital, negotiating labor contracts, and achieving success against agile and capable competitors. A dynamic total enterprise simulation puts the student in the board room with a team of professionals who together will use critical thinking to guide the company through several simulated years of operations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MGMT 520 [Min Grade: C] and MGMT 530 [Min Grade: C]

MGMT 640 Strategic Human Resource Management 3.0 Credits

This course examines how line managers can determine the most effective HR practices. HR practices examined include job designs, reward systems, development and appraisal systems, and internal and external staffing approaches. Students are encouraged to think strategically about different aspects of managing the organization's human assets.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 650 Corporate Venturing 3.0 Credits

This course will examine how organizations can create and sustain capacity for entrepreneurship and better manage the innovation process. This course will focus on the organizational and project level to explore the many ways that organizations can establish structures and processes for entrepreneurship.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 652 New Venture Planning 3.0 Credits

Students draw on their entire business education and practical experience and bring it to bear upon a plan for launching a new venture. Working in small teams, students research a new project or service; prepare marketing, sales and operation plans; and make financial plans.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 655 Knowledge Management 3.0 Credits

Provides a broad overview of the emerging field of knowledge management. The primary focus of the course will be on the concepts and approaches useful for managing knowledge from a corporate strategies perspective. Covers KM tools and techniques, and management approaches.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 665 Management Consulting 3.0 Credits

This course will provide the students an overview of the tasks and processes involved in performing a management consulting project. The course will focus on key process such as scouting, client definition and contracting, problem definition and formulation, implementation, evaluation and follow up. Through case studies students will be exposed to different consulting models including action research, expert and process consultation. The challenges involved in being an internal versus external consultant to an organization will be discussed. The course will also cover the details of a consulting career with examples from major consulting firms (e.g., Boston Consulting Group, Ernst & Young).

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 670 Business Ethics 3.0 Credits

Presents several frameworks by which to view ethics and decision-making. Links theory and practice through the study of business ethics as it relates to a variety of management issues. Focuses on the individual, the organization, and the system. Includes case studies, field work, readings, and interaction with visiting guest lecturers.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 676 Sustainability and Value Creation 3.0 Credits

Managing strategically must incorporate environmentalism as a key component for creating value to all stakeholders. Sustainability, the capacity of a company to do good for society and the environment, is critical to competitive advantage. This course is intended to familiarize students whose primary background is not science or engineering based with relevant frameworks and perspectives about the necessity of incorporating sustainability into competitive strategies. In particular, the course addresses: description of key concepts and stakeholders; public policy issues, lessons learned from the success and failures of integrating sustainability into management both nationally and globally.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 680 Leading for Innovation 3.0 Credits

This course is presented and delivered by LeBow's Centers of Excellence. The course integrates the thought leadership of our Centers. Through an experiential learning platform, the course will focus on the way leaders, both entrepreneurs and executives, need to innovate as they lead their businesses for value creation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 686 Strategy Implementation 3.0 Credits

This course will focus on the frameworks and tools necessary and often used in strategy implementation. The course will stress the need to tailor an implementation approach to be aligned with the intended strategy, and responsive to external stakeholders, both shareholders, customers and others. In successive sessions, the course will focus on rational components of execution such as structure and reward systems, and the human components such as culture, networks and power. The distinct roles of top management and middle management will be illustrated, and examples will include both single industry and diversified firms.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MGMT 602 [Min Grade: C]

MGMT 770 MBA Capstone 2.0 Credits

This core course will provide a student with an exposure to integrated decision making situation from the CEO's perspective. This course will enable students to appreciate the complexities of formulating and solving complex business problems. We will also discuss how the "soft" side of things effect business performance. Finally, unlike the analytic focus of strategy analysis, the students will be forced to think through specific action plans and implementation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MGMT 520 [Min Grade: C]

MGMT 906 Foundations of Research in Behavioral Science 3.0 Credits

MGMT 906 is a broad-based course that is intended to familiarize students with basic material on theory building in behavioral research. It course will expose the students to different perspectives on theory building, logic of discovery and verification, major scholars in philosophy of science and business disciplines who have shaped our practice of principles of measurement, research designs and strategies.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is PHD.

MGMT 907 Research Analysis in Behavioral Sciences 3.0 Credits

The objective of this course is to introduce students to methodologies and analytical techniques that are important for carrying out behaviorally-oriented research in business disciplines. Specific topics include hypothesis development, measurement, sampling and data collection, ethical issues in research, and data analysis/reporting.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is PHD.

Prerequisites: MGMT 906 [Min Grade: C] and (STAT 932 [Min Grade: C] or STAT 931 [Min Grade: C])

MGMT 908 Advanced Research in Behavioral Science 3.0 Credits

This is a seminar course in advanced research methods. It includes attention to philosophical questions, to political and ethical issues, and to practical matters of method and technique.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is PHD.

Prerequisites: MGMT 907 [Min Grade: C] or MGMT 903 [Min Grade: C]

MGMT 910 Readings in Strategic Management 3.0 Credits

This course introduces students to many of the major theoretical approaches and debates in strategic management. This course supplies a roadmap for students to roam the terrain of organization theory and gear up to generate original research ideas that extend inquiry in a student's chosen area of research.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 935 Seminar in Organization Theory 3.0 Credits

This course aims at equipping students with knowledge about both classical and contemporary organizational theory, which is one of the central pillars of management research. We will cover core topics such as organizational learning, organizational change, contingency theory, institutional theory, and organizational ecology.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

MGMT 940 Seminar in Organizational Behavior 3.0 Credits

This course provides a critical review of significant concepts within the field of organizational behavior. The course starts with individual behaviors concepts such as work motivation, job design, and work attitudes, turns to group processes and leadership; and concludes with a consideration of cultural issues in organizational behavior.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 950 Technology and Strategy 3.0 Credits

The purpose of this seminar is to introduce Ph.D. students to the disciplines of Technology Management and Strategic Management. Since the two disciplines cover a broad area of various research streams, the focus is on the most essential research streams such as knowledge-based view of the firms or transaction cost approach.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MGMT 998 Dissertation Research in Management 1.0-12.0 Credit**College/Department:** LeBow College of Business**Repeat Status:** Can be repeated multiple times for credit**MGMT I599 Independent Study in MGMT 0.0-12.0 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 I699 Independent Study in MGMT 0.0-4.0 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**MGMT I799 Independent Study in MGMT 0.0-12.0 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 I899 Independent Study in MGMT 0.0-12.0 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 I999 Independent Study in MGMT 3.0 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 T580 Special Topics in MGMT 0.0-12.0 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 T680 Special Topics in MGMT 0.5-9.0 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 T780 Special Topics in MGMT 0.0-12.0 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 T880 Special Topics in MGMT 0.0-12.0 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 T980 Special Topics in MGMT 0.5-9.0 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 of Information Systems

Courses

MIS 612 Aligning Information Systems and Business Strategies 3.0 Credits

In this course, we will examine a variety of IS issues which are important to organizations, including information systems strategy, impact of IT on organization and work processes, business process reengineering, systems architecture and project management.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**MIS 624 Systems Analysis & Design 3.0 Credits**

Examines concepts of the information systems development lifecycle and methods for analyzing user information requirements. Focuses on structured techniques for designing a system, managing its development and testing, performing feasibility analyses, and ensuring both user satisfaction and achievement of functional requirements. Covers techniques such as rapid application development (RAD), prototyping, and joint analysis and design (JAD) in detail. Also covers techniques such as data flow diagramming, logical database design, and user interface design.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**MIS 630 Inter-Active Decision Support Systems 3.0 Credits**

Examines the theory of DSS for use in supporting managerial decision making. Also discusses EIS, KBS, data mining, and data warehousing. Describes the benefits of online analytical processing (OLAP) to the organization and how they can be measured. Includes the development and use of DSS by student groups in a case study.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**MIS 632 Database Analysis and Design for Business 3.0 Credits**

Focuses on database analysis and design for a wide range of business functions. Stresses the fundamentals of sound logical database design using techniques such as entity/relationship modeling. Examines the relational database and the object-oriented approaches to database design and handles specific design methods, such as normalization. Also discusses physical database design and data storage methodologies such as raid and hierarchical storage management (HSM). Involves a hands-on orientation with the use of tools such as oracle, Access, and Visual Basic.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**MIS 633 Predictive Business Analytics with Relational Database Data 3.0 Credits**

This course introduces students to data mining through Base Programming, applied statistics, and data visualization methods in SAS. In this course, students learn to solve statistical problems rigorously and think critically with data analysis in SAS. Students acquire the analytical skills in SAS programming, capabilities in recognizing data patterns and visualizing the results.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit

MIS 634 Advanced Business Analytics with Relational Database Data 3.0 Credits

This course is the sequel of MIS 633. This course discusses SAS Advanced Programming as applied to business analytics in a relational database environment. The course deals extensively with SQL, SAS macros, optimization of SAS programs, and exploratory statistical methods as applied in SAS to identify and analyze patterns in the data.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 635 Introduction to Hadoop and MapReduce 3.0 Credits

Today's business climate has created a data-driven economy, generating large amounts of data. Storage and processing of such large-scale datasets requires specialized software tools such as Apache Hadoop.

The mission of this course is to introduce students to the fundamentals of Hadoop and MapReduce.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 636 Python Programming for Business Applications 3.0 Credits

This course focuses on the fundamentals of computer programming with Python and its applications in business practices. Specific emphasis will be placed on solving optimization problems and building predictive models widely used by industry (e.g., network optimization and churn models). Using the Python interpreted programming language, students will develop coding skills and be able to efficiently solve today's relevant business problems.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 641 MIS Policy and Strategy 3.0 Credits

Ties together concepts from all areas of management and the economic, behavioral, functional, and technical aspects of MIS. Defines overall and context-specific information needs of organizations and focuses on the role of MIS in meeting these needs. Examines alternatives for matching MIS department structures and operations to the structures, strategies, and behaviors of organizations. Also investigates, proposes, and analyzes management policy issues relating to the management of the MIS function.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 650 Management of Health Care Info Systems 3.0 Credits

This course explores the concepts, design, and application of the management of information systems in the modern healthcare environment.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 651 Information Systems Outsourcing Management 3.0 Credits

The course presents a balanced presentation of the risks and benefits of outsourcing and what should be the objectives and mindset of successful outsources. It also discusses the appropriate skill set, how to approach this risky endeavor. Although concentrating on information systems outsourcing, its lessons apply to other types of outsourcing.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 652 Business Agility and IT 3.0 Credits

This introductory course will cover the core principles, practices, and frameworks of agile practices and how they can be utilized to drive successful delivery inside an organization. These concepts also tie into the idea of organizational change, and how an enterprise can use these practices and principles on a large scale to shift an organization to one that reacts to change and opportunity at speed to enable success. The course will also emphasize these learnings in the context of real-world Management Information Systems (MIS) projects. Additionally, some related emerging topics such as international/distributed project management and design thinking all in the context of agile methodologies will also be introduced.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 661 Managing with Enterprise Application Software using SAP - Logistics 3.0 Credits

This course examines essential concepts in ERP (enterprise resource planning) and the software that supports operational processes in modern companies. We will use SAP ERP solutions, taking a hands-on approach to applications areas such as procurement, production, fulfillment, or related business processes. After completing this course, students will be equipped with practical skills and competencies for careers in business and information technology where ERP software is used.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS 662 Managing with Enterprise Application Software using SAP - Accounting & Analytics 3.0 Credits

This course examines real-life accounting business processes in modern companies, concepts of enterprise application software like ERP (enterprise resource planning) 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

MIS 901 Research Seminar in MIS 3.0 Credits

This course provides an introduction to research in the fields of Management Information Systems. It covers classic journal articles in the field, various research methods, and provide a perspective in a major research project during the course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MIS I599 Independent Study in MIS 0.0-12.0 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 I699 Independent Study in MIS 0.0-12.0 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 I799 Independent Study in MIS 0.0-12.0 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 I899 Independent Study in MIS 0.0-12.0 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 I999 Independent Study in MIS 0.0-12.0 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 T580 Special Topics in MIS 0.0-12.0 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 T680 Special Topics in MIS 0.5-9.0 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 T780 Special Topics in MIS 0.0-12.0 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 T880 Special Topics in MIS 0.0-12.0 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 T980 Special Topics in MIS 0.5-9.0 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

Marketing

Courses

MKTG 510 Marketing Strategy 2.0 Credits

Marketing is the practice of creating and exchanging value. Marketing strategy can be thought of as a process by which companies allocate scarce resources in order to exchange value in ways that enhance corporate performance and sustainability. The course addresses how creating and delivering superior value can improve relationships with customers and other stakeholders. It also provides students with analytical skills, decision tools, and disciplined frameworks to conduct a market analysis.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MKTG 601 Marketing Strategy & Planning 3.0 Credits

Emphasizes application of strategic planning in marketing to achieve competitive advantage. Examines the role of strategic planning in developing effective marketing programs that enhance the overall performance of the firm.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: BUSN 502 [Min Grade: C] or ACCT 510 [Min Grade: C]

MKTG 602 Marketing Experiential Project 1.0 Credit

This course is a one credit, pass/fail experiential project designed to be the integrative final project for the Graduate level Marketing minor. Students are expected to build upon all of the content from their four marketing courses to design a "real world" project which provides an appropriate learning experience given their choice of Marketing Minor Track and their career objectives. Students will work individually in an independent study format with the instructor of the course to design and carry out the project. The project topic must be approved by the instructor.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MKTG 606 Customer Analytics 3.0 Credits

This course is designed to give you the powerful, cutting-edge tools to leverage customer data for actionable managerial insights. The course will cover how to handle cases where there is almost no data, i.e., estimating a model on a "data diet," and how to infer behavior when we only have summary statistics. You will develop the necessary skills by learning the basic building blocks from stochastic processes and probability distributions, such as the Binomial, Poisson, and the exponential distribution. You will also learn how to estimate these models and evaluate their predictions using Excel.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: (MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]) and (STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or STAT 510 [Min Grade: C])

MKTG 607 Marketing Experiments 3.0 Credits

Focused at the intersection of marketing strategy and marketing analytics students will develop skills that will allow them to design, execute, analyze and communicate A/B and multivariate tests, designed to provide definitive answers to business questions like, "Which advertisement should we use?", "How much should we be willing to spend on an advertisement?", "Which product design should we go with?" Students will gain fluency in executing statistical methods including confidence intervals, regression, optimal design, and sequential experimentation. Students will become adept at communicating data-based conclusions to business leaders and will devise strategies for developing a culture of data-based decision making in business organizations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: (MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]) and (STAT 510 [Min Grade: C] or STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C])

MKTG 622 Buyer Behavior Theory 3.0 Credits

Provides an interdisciplinary study of the theories and research of buyer behavior. Draws on concepts from marketing, anthropology, psychology, sociology, and economics and their application for marketing managers seeking insights into the consumer decision-making process.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 624 Channels of Distribution Management 3.0 Credits

Applies marketing channel theory and research to the design of channel systems, selection of intermediaries, administration of interorganizational channels, and evaluation of distribution performance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 627 Digital Marketing 3.0 Credits

This course explores how organizations and leaders can maximize the business value of social and digital media platforms. The course also provides a framework and best practices for digital media management, enhances understanding of strategic communication within the digital media context, and improves digital media communication, content management, and analytic skills. Assignments include a personal branding weekly project, an in-class digital media marketing simulation, and a final real-world group consulting project on digital media strategy and implementation. Outside experts will provide lectures on specific digital marketing topics on select weeks.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 630 Global Marketing 3.0 Credits

Covers concepts, principles, and practices of international marketing management. Studies cross-cultural differences and distribution systems, pricing methods, promotional methods, trade barriers, and current factors influencing international marketing.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 634 Integrated Marketing Communications Management 3.0 Credits

Takes the marketing manager's viewpoint to examine the management and coordination of all marketing communication to customers and stakeholders. Discusses concepts and strategies in such areas as advertising, sales promotion, personal selling, and public relations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 638 New Product Planning, Strategy, and Development 3.0 Credits

Examines the process of strategic planning for marketing innovation and development of new products in a dynamic business environment. Integrates concepts and techniques from several disciplines to understand new product development.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 646 Services Marketing 3.0 Credits

Covers marketing theory, concepts, strategy, and tactics as applied to the unique characteristics and demands of service organizations and manufacturing firms that use service as a competitive advantage. Evaluates marketing strategies of various service industries using case studies to illustrate the links between internal business processes and external customer satisfaction.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 650 Marketing Management Cases and Problems 3.0 Credits

Applies the case method to the analysis of consumer and industrial product/service marketing situations. Requires students to use systematic techniques to make decisions in product development, communications, distribution, and pricing in an evolving marketing environment.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 652 Marketing Information Management and Research 3.0 Credits

Examines the current tools available to modern marketing decision makers for information management and applies these tools in realistic situations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 653 Pharmaceutical Marketing 3.0 Credits

Examines the current and potential future realities for the pharmaceutical industry in the new marketing environment. Students will be challenged to think at not only the marketing level, but also at the organizational systems level.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 654 Corporate Brand & Reputation Management 3.0 Credits

An examination of how business managers can build the reputation of their organizations in order to gain competitive advantage in the market. The course will focus on how companies can enhance their financial value through increased attention to multiple stakeholders.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 790 Seminar In Marketing Management 3.0 Credits

Examines current developments and contemporary thought in marketing. Requires an in-depth analysis of a special marketing area selected by the student, and oral and written reports of graduate quality.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

MKTG 920 Concept Found Buyer Bhvr 3.0 Credits

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

MKTG 922 Seminar in the Development of Marketing Thought and Theory 3.0 Credits**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**MKTG 926 Seminar in Strategic Marketing Planning 3.0 Credits****College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**MKTG 932 Developing Marketing Channel Systems 3.0 Credits****College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**MKTG 940 Multivariate II 3.0 Credits**

This course is designed to help student researchers enhance their data analysis skills by developing a conceptual understanding of the most widely used multivariate techniques.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if program is PHD.**Prerequisites:** STAT 924 [Min Grade: C]**MKTG 942 Models of Consumer and Firms' Decisions 3.0 Credits**

The course provides a flexible, hands-on understanding of regression & multilevel modeling. Course provides doctoral students starting serious empirical research with a useful toolkit of techniques. Topics include: fitting & understanding classical linear regression & generalized linear regression models (e.g., logistic & Poisson regression), using simulation to check model fit & model properties, understanding the assumptions & challenges underlying causal inference & a few techniques to perform causal inference & understanding multilevel data structures & fitting linear & generalized linear multilevel models.

College/Department: LeBow College of Business**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if classification is PhD.**Prerequisites:** STAT 924 [Min Grade: B]**MKTG 998 Dissertation Research in Marketing 1.0-12.0 Credit****College/Department:** LeBow College of Business**Repeat Status:** Can be repeated multiple times for credit**MKTG I599 Independent Study in MKTG 0.0-12.0 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 I699 Independent Study in MKTG 0.5-3.0 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 I799 Independent Study in MKTG 0.0-12.0 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 I899 Independent Study in MKTG 0.0-12.0 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 I999 Independent Study in MKTG 3.0 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 9 credits**MKTG T580 Special Topics in MKTG 0.0-12.0 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 T680 Special Topics in MKTG 0.5-9.0 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 T780 Special Topics in MKTG 0.0-12.0 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 T880 Special Topics in MKTG 0.0-12.0 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 T980 Special Topics in MKTG 0.5-9.0 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 500 Structure and Properties of Metals 3.0 Credits

Covers crystallography, crystal defects, dislocation mechanisms, phase transformations, recovery and recrystallization, diffusional processes, and strengthening mechanisms.

College/Department: College of Engineering**Repeat Status:** Not repeatable for credit**MATE 501 Structure and Properties of Polymers 3.0 Credits**

Covers step and free radical polymers, copolymerization, molecular weight characteristics, polymer morphology, thermodynamics, viscoelasticity, yielding and crazing, and Boltzmann and T-T superpositions.

College/Department: College of Engineering**Repeat Status:** Not repeatable for credit

MATE 502 Structure and Properties of Ceramic and Electronic Materials 3.0 Credits

Covers bonding; crystal structure; defects; diffusion; electrical conductivity; and mechanical, electrical, dielectric, magnetic, and thermal properties.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 503 Introduction to Materials Engineering 3.0 Credits

This course provides an introductory overview of materials science and engineering at the graduate level. The fundamental linkages between processing, structure and properties will be addressed with emphasis on micro- and nano-structural impacts on properties.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 504 The Art of Being a Scientist 2.0 Credits

This course will provide incoming graduate students with the knowledge to become proactive, empowered graduate students. Reading assignments will highlight examples of student situations and through classroom discussions and in class activities the students will gain an understanding of their ethical and societal responsibilities, the importance of communication and the tools to access and plan their academic and career goals.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 505 Phase Equilibria 3.0 Credits

Covers thermodynamic concepts of phase equilibria, including unary, binary, and ternary systems; pressure effects; and relationships between phase diagrams and structure.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 506 Diffusion 3.0 Credits

Covers atomic migration in solids, self-diffusion, concentration gradients, mathematical analysis of diffusion, and applications of numerical methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 507 Kinetics 3.0 Credits

Covers nucleation phenomena in homogeneous and heterogeneous metallic and ceramic systems, strain energy analysis, composition fluctuation analysis, growth and solution kinetics of second phases, coarsening processes, martensitic transformations, and crystallization of glass.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 510 Thermodynamics of Solids 3.0 Credits

Covers classical thermodynamics, introduction to statistical mechanics, solution theory, thermodynamics of interfaces and crystal defects, and phase diagrams and reaction equilibrium.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 512 Introduction to Solid State Materials 3.0 Credits

This course is a graduate level introduction to solid-state materials. The effects of crystal structure and bonding on properties will be discussed. Quantum theory of solids will be used to elucidate the electronic transport, magnetic, dielectric and optical properties of solid state materials.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 514 Structure, Symmetry, and Properties of Materials 3.0 Credits

Structure–property relationships form a cornerstone for performance-engineering in nearly all materials. Condensed matter systems, including inorganic or organic materials, are defined by their internal structure—the distribution of atoms, defects, and large scale domains with preferred microstructures. This class aims to familiarize materials science students with the real space and k-space structural description of both ideal (defect free) and realistic (imperfect) crystalline materials and the properties derived from the underlying point and transitional symmetry.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATE 503 [Min Grade: C]

MATE 515 Experimental Technique in Materials 3.0 Credits

Covers electron microscopy techniques, scanning transmission and Auger analysis, x-ray diffraction, x-ray wavelength dispersive and energy dispersive analysis, thermal analysis, statistics and error analysis, and design of experiments.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 525 Introduction to Composite Materials 3.0 Credits

Covers classification and definition of composite materials; properties of fibers, matrices, and their interfaces; structural geometry of reinforcing materials; formation and testing of composites; and properties and analysis of composite materials.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 530 Solidification Processing I 3.0 Credits

Covers principles of solidification processing, heat flow during solidification, thermodynamics and kinetics of nucleation and growth, solute redistribution, interfacial stability and morphology, transport phenomena: continuum treatments and structural effects, and rapid solidification.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 531 Solidification Processing II 3.0 Credits

The technology of solidification processing is covered in this course; clean metal processing; crystal growth; squeeze casting; thixo- and compo-casting; diffusion solidification and rheocasting; continuous casting processes, VM, VAR, ESR, and VADER processing; structural control via MDH; rapid solidification processes (RSP); microgravity casting.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 535 Numerical Engineering Methods 3.0 Credits

Covers numerical solution of non-linear equations, linear systems, and integration of ordinary differential equations. Introduces finite differences and finite elements. Provides a user's perspective of finite elements, element selection, convergence, and error estimation. Applications to heat transfer, diffusion, stress analysis, and coupled problems. Maple and ABAQUS (a commercial non-linear finite element program) are used in this course. A term project using ABAQUS is required. Emphasis is placed on materials engineering examples.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 536 Materials Seminar Series 1.0 Credit

MSE hosts visitors from materials and materials-related academic departments, national laboratories and industry to visit and interact with students and to present a seminar. Students will interact with visitors. Lectures on other selected topics: safety and health, ethics in science & engineering research, and writing and presentation skills.

College/Department: College of Engineering

Repeat Status: Can be repeated 12 times for 12 credits

MATE 540 Polymer Morphology 3.0 Credits

Covers crystallography, crystallization, single crystals, bulk crystallization, orientation, amorphous polymers, and experimental techniques.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 541 Introduction to Transmission Electron Microscopy and Related Techniques 3.0 Credits

This course covers fundamentals of electron optics, electron-specimen interaction, and transmission electron microscopy (TEM). Elastic (high resolution and in situ TEM) and inelastic scattering techniques (energy dispersive spectroscopy, electron energy loss spectroscopy) are reviewed. An introduction to scanning electron microscopy (SEM), focused ion beam (FIB), and sample preparation is provided.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 542 Nuclear Fuel Cycle & Materials 3.0 Credits

This course encompasses the nuclear fuel cycle, including extraction, enrichment, transmutation in a nuclear reactor, reprocessing, waste processing, repository performance, materials for nuclear reactors, mechanical and thermal performance will be discussed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 543 Thermal Spray Technology 3.0 Credits

Thermal spray technology and coatings provides "solutions" to a large number of surface engineering problems - wear, corrosion, thermal degradation. This course will [i] be of interest and use to students majoring in materials, mechanical, chemical, electrical & environmental engineering; [ii] provide a thorough grounding and understanding of thermal spray processes, their principles and applications; [iii] integrate this knowledge with practical engineering applications and current industrial surfacing practice.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 544 Nanostructured Polymeric Materials 3.0 Credits

This course is designed to address the role of polymer science in Nanotechnology. Topics that will be covered include block copolymer templated self assembly, polymer thin and thick films, LBL, self assembly, soft lithography and polymer nanocomposites.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATE 501 [Min Grade: C]

MATE 545 Fracture of Polymeric Materials 3.0 Credits

Theoretical strength; defects; brittle fracture; fracture surfaces; fracture mechanics; creep failure; fatigue failure; environmental stress cracking; composite failure; crazing; impact and high-speed failure.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 560 Powder Metallurgy I 3.0 Credits

Covers commercial and near-commercial methods of powder making, material and process variables, atomization mechanisms, powder properties and characterization, powder compaction, and properties in the green state.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 561 Powder Metallurgy II 3.0 Credits

Covers powder consolidation: pressing and sintering; preform forging, rolling, extrusion, and hot isostatic pressing; innovative powder processing techniques, including spray forming; and structure-property relationships in press and sinter and fully dense materials.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 563 Ceramics 3.0 Credits

This course deals with the structure and bonding of ceramics. The fundamental role of point defects on electric and diffusional properties is discussed. Sintering, both solid and liquid phase, is explored. What affects strength, creep, subcritical crack growth and fatigue of ceramics is elucidated. Glasses and their properties are examined.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 565 Crystal Mechanics I 3.0 Credits

Covers crystal plasticity, texture development, continuum aspects of dislocations, interaction and intersection of dislocations, dislocation multiplication, dislocations in crystalline solids, and dislocation boundaries and configurations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 566 Crystal Mechanics II 3.0 Credits

Covers Peierls-Nabarro stress, thermally activated flow, work hardening, creep, superplasticity, ductile and brittle fracture, and fatigue.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 570 Materials Processing I 3.0 Credits

Covers metal deformation processes: slab and deformation work analyses; slip line theory; and upper bound analysis applied to upsetting, drawing, extrusion, rolling, and deep drawing.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MATE 571 Materials Processing II 3.0 Credits

Manufacture of objects from powder--atomization, compaction, sintering, and liquid phase consolidation techniques; deformation processing of powder preforms; manufacture of shapes by high-strength cold deformation-preferred orientation, substructure, strengthening mechanisms.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MATE 572 Materials for High Temperature and Energy 3.0 Credits

This graduate level introduction to high temperature materials and materials used for energy applications, deals with metals and ceramics that are used in systems that produce or store energy, such as power generation facilities, solid oxide fuel cells, batteries, photovoltaics, thermoelectric generators and supercapacitors.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 573 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

MATE 576 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

MATE 582 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

MATE 583 Environmental Effects on Materials 3.0 Credits

Environmental degradation is explored with 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

MATE 585 Nanostructured Carbon Materials 3.0 Credits

Covers advanced carbon materials ranging from diamond to fullerenes and nanotubes. Structure, properties and applications will be discussed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 602 Soft Materials 3.0 Credits

This course is designed to introduce the field of Soft Materials to senior undergraduate and graduate students. Topics that will be covered include Polymers, Gels, Colloids, Amphiphiles and Liquid Crystals.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 605 Computer Simulation of Materials and Processes I 0.0-4.0 Credits

Simulation of equilibrium and transport properties of materials by Monte Carlo and molecular dynamics methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 610 Mechanical Behavior of Solids 3.0 Credits

Covers stress and strain, three-dimensional nomenclature, hydrostatic and deviatoric stresses, isotropic and anisotropic elasticity and plasticity, viscoelasticity, crack growth, and fracture.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 651 Advanced Polymer Processing 3.0 Credits

Covers continuum mechanics; heat transfer; application to extrusion, calendaring, coating, injection molding, film blowing, rotational molding, and fiber spinning; powder processing; design; and equipment selection.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 661 Biomedical Materials I 3.0 Credits

This course covers biocompatibility; implantable devices; survey of materials properties; corrosion;; cardiovascular applications; orthopedic applications; kidney dialysis; artificial heart and lung devices.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 662 Biomedical Materials II 3.0 Credits

This course covers phase equilibria; strengthening of materials; dental cast alloys; denture base materials; adhesives and sealants; porcelain and glasses; dental materials laboratory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MATE 702 Natural Polymers 3.0 Credits

This course provides an introduction to natural and biomimetic polymers with an interdisciplinary view of biology, chemistry and macromolecular science. An understanding of natural building blocks and methods by which nature carries out polymer synthesis and modification reactions is coupled with insights into DNA; structural proteins; polysaccharides; and a wide variety of renewable resources.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MATE 501 [Min Grade: C]

MATE 897 Research 1.0-12.0 Credit

Hours and credits to be arranged.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is MATE or major is MSE.

MATE 898 [WI] Master's Thesis 1.0-12.0 Credit

Hours and credits to be arranged. This is a writing intensive course.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is MATE or major is MSE.

MATE 998 Ph.D. Dissertation 1.0-12.0 Credit

Hours and credits to be arranged.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is MATE or major is MSE.

MATE I599 Independent Study in MATE 0.0-12.0 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 I699 Independent Study in MATE 0.0-12.0 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 I799 Independent Study in MATE 0.0-12.0 Credits

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MATE I899 Independent Study in MATE 0.0-12.0 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 I999 Independent Study in MATE 0.0-12.0 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 T580 Special Topics in MATE 0.0-12.0 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 T680 Special Topics in MATE 0.0-12.0 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 T780 Special Topics in MATE 0.0-12.0 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 T880 Special Topics in MATE 0.0-12.0 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 T980 Special Topics in MATE 0.0-12.0 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

Mathematics

Courses

MATH 504 Linear Algebra & Matrix Analysis 3.0 Credits

Course topics include the QR decomposition, Schur's triangularization theorem, the spectral decomposition for normal matrices, the Jordan canonical form, the Courant-Fisher theorem, singular value and polar decompositions, the Gersgorin disc theorem, the Perron-Frobenius theorem, and other current matrix analysis topics. Applications of the material are outlined as well.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 505 Principles of Analysis I 3.0 Credits

Metric spaces, compactness, connectedness, completeness. Set theory and cardinality, continuity, differentiation, Riemann integral.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 506 Principles of Analysis II 3.0 Credits

A continuation of MATH 505. Uniform convergence, Fourier series, Lebesgue integral in Euclidean spaces, differential calculus in Euclidean spaces, inverse and implicit functions theorems, change of variables in multiple integrals.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 505 [Min Grade: C]

MATH 507 Applied Mathematics I 3.0 Credits

Covers matrix theory, linear transformations, canonical forms, matrix decompositions, and factorizations, including the singular value decomposition, quadratic forms, matrix least squares problems, and fast unitary transforms. Introduces computational linear algebra.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 508 Applied Mathematics II 3.0 Credits

Covers the techniques of mathematical modeling in the physical and biological sciences using discrete and combinatorial mathematics, probabilistic methods, variational principles, Fourier series and integrals, integral equations, calculus of variations, asymptotic series and expansions, and eigenvalue problems associated with Sturm-Liouville boundary value problems. Topics vary from year to year.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 507 [Min Grade: C]

MATH 509 Applied Mathematics III 3.0 Credits

Continues the theme of MATH 508. Topics vary from year to year.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 508 [Min Grade: C]

MATH 510 Applied Probability and Statistics I 3.0 Credits

Covers basic concepts in applied probability; random variables, distribution functions, expectations, and moment generating functions; specific continuous and discrete distributions and their properties; joint and conditional distributions; discrete time Markov chains; distributions of functions of random variables; probability integral transform; and central limit theorem.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 511 Applied Probability and Statistics II 3.0 Credits

Covers probability plots and graphical techniques for determining distribution of data, including sampling and sampling distributions, law of large numbers, parametric point estimation, maximum likelihood estimation, Bayes estimation, properties of estimators, sufficient statistics, minimum variance unbiased estimators, and parametric interval estimation. Introduces hypothesis testing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 510 [Min Grade: C]

MATH 512 Applied Probability and Statistics III 3.0 Credits

Covers hypothesis testing, analysis of variance, multiple regression, and special topics. Introduces linear models.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 511 [Min Grade: C]

MATH 520 Numerical Analysis I 3.0 Credits

Covers polynomial interpolation, numerical solutions of nonlinear equations, numerical integration (Newton-Cotes, Gauss quadrature), error estimates of various numerical methods, and function approximation (polynomial, Fourier, Pade).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 521 Numerical Analysis II 3.0 Credits

Covers numerical linear algebra and matrix computation, direct and iterative methods for solving linear systems and eigenvalue problems, least square problems, various matrix factorizations (QR, singular value decomposition, LU and Cholesky), and Krylov subspace methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 522 Numerical Analysis III 3.0 Credits

Covers numerical solutions of ordinary and partial differential equations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 520 [Min Grade: C]

MATH 523 Computer Simulation I 3.0 Credits

Covers computer simulation of pseudo-random variables, including Monte Carlo methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 510 [Min Grade: C]

MATH 524 Computer Simulation II 3.0 Credits

Covers discrete and continuous event simulation models and techniques.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 523 [Min Grade: C]

MATH 525 Topics in Computer Simulation 3.0 Credits

Covers statistical analysis of simulation data, variance reduction techniques, and advanced topics in simulation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 524 [Min Grade: C]

MATH 530 Combinatorial Mathematics I 3.0 Credits

Covers graphs and networks, with an emphasis on algorithms. Includes minimum spanning trees, shortest path problems, connectivity, network flows, matching theory, Eulerian and Hamiltonian tours, graph coloring, and random graphs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 531 Combinatorial Mathematics II 3.0 Credits

Covers mathematical tools for the analysis of algorithms, including combinatorics, recurrence relations and generating functions, elementary asymptotics, and probabilistic methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 530 [Min Grade: C]

MATH 532 Topics in Combinatorial Math 3.0 Credits

Covers topics in discrete mathematics, including asymptotic enumeration, number theory, probabilistic combinatorics, and combinatoric algorithms.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 531 [Min Grade: C]

MATH 533 Abstract Algebra I 3.0 Credits

Covers groups, transformation groups and group actions, isomorphism and homomorphism theorems, Sylow theorems, symmetric groups, rings, and fields.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 534 Abstract Algebra II 3.0 Credits

Covers factorization domains, Euclidean domains, and polynomial rings, and modules, vector spaces, and linear transformations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 533 [Min Grade: C]

MATH 535 Topics in Abstract Algebra 3.0 Credits

This third course in the Abstract Algebra sequence covers a selection of topics in advanced modern algebra such as symmetries, representation theory, algebraic geometry, homological algebra, Galois Theory and coding theory.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 3 times for 9 credits

Prerequisites: MATH 533 [Min Grade: C] and MATH 534 [Min Grade: C]

MATH 536 Topology I 3.0 Credits

Covers general topological spaces, metric spaces, and function spaces; open sets, limit points, limits of sequences, convergence, separation axioms, compactness, connectedness, continuity, homeomorphisms, and product of N-spaces; and specialized applications to the real line, Euclidean N-space, and well-known function spaces.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 537 Topology II 3.0 Credits

Continues MATH 536.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 538 Manifolds 3.0 Credits

Topics will be selected from the following: Differential structures, immersion theorems, tangent bundles, vector fields and distributions, integral manifolds, integration on manifolds, differential forms, general Stokes Theorem, applications to physics and engineering.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 540 Numerical Computing 3.0 Credits

Intended to introduce students to contemporary computing environments and the associated tools. Uses contemporary software tools and specific applications from science and engineering to illustrate numerical and visualization methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 544 Advanced Engineering Mathematics I 3.0 Credits

Covers solution techniques for ordinary differential equations, including series techniques, Legendre and Bessel functions, Sturm-Liouville theory, and Laplace and Fourier techniques. Introduces symbolic computation as time permits.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 545 Advanced Engineering Mathematics II 3.0 Credits

Covers partial differential equations, including separation of variables and its applications to standard equations. Introduces Green's functions for differential equations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 544 [Min Grade: C]

MATH 546 Advanced Engineering Mathematics III 3.0 Credits

Covers complex analysis, including complex differentiation and integration, Cauchy's theorems and residue theory, and their applications; conformal maps; and applications to fluid flow.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 545 [Min Grade: C]

MATH 553 Sci Comp & Visualization I 3.0 Credits

Covers scientific computing, with an emphasis on numerical computing and visualization techniques. Includes techniques of computational geometry, including an introduction to methods used to describe the shapes of free-form curves, surfaces, and volumes, and applications to computer-aided design and other areas of scientific computing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 540 [Min Grade: C]

MATH 554 Sci Comp & Visualization II 3.0 Credits

Covers scientific visualization, using a computational environment that includes high-performance workstations and supercomputers, and application in science and engineering. Includes applications to finite element and difference methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 553 [Min Grade: C]

MATH 555 Topics in Sci Comp & Visualiz 3.0 Credits

Covers special topics chosen from contemporary problem areas in scientific computing and visualization, including digital image processing, wavelet transforms and their numerical treatment, numerical conformal mapping, and contemporary problem areas in scientific computing and visualization.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 554 [Min Grade: C]

MATH 572 Financial Mathematics: Fixed Income Securities 3.0 Credits

The course is a mathematical introduction to interest rates and interest rates related instruments including loans, bonds, mortgages and swaps. The course emphasizes the mathematical aspects of the subject and computational implementation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 610 Probability Theory I 3.0 Credits

Covers basics of modern probability theory: properties of probability measures, independence, Borel-Cantelli lemma, zero-one law, random variables, distribution theory, and expectations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 633 [Min Grade: C]

MATH 611 Probability Theory II 3.0 Credits

Covers further development of modern probability theory, including modes of convergence of random variables, series of random variables, weak and strong laws of large numbers, characteristics functions, inversion formula and continuity theorem, and central limit theorem.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 610 [Min Grade: C]

MATH 612 Topics in Probability Theory 3.0 Credits

This third course in the probability sequence covers a selection of topics in modern probability theory. Topics may include: theory of sums of independent random variables, inequalities, martingale theory, combinatorial probability.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 6 credits

Prerequisites: MATH 611 [Min Grade: C]

MATH 613 Stochastic Processes I 3.0 Credits

Covers conditional probabilities, expectations, Markov chains, classification of states, recurrence and absorption probabilities, asymptotic behavior, random walk, birth and death processes, and ruin problems.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 510 [Min Grade: C] and MATH 611 [Min Grade: C]

MATH 614 Stochastic Processes II 3.0 Credits

Covers queuing theory, waiting line models, embedded Markov chain method, and optimization problems. Includes applications and simulation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 613 [Min Grade: C]

MATH 615 Topics in Stochastic Processes 3.0 Credits

Covers topics including branching processes, Brownian motion, renewal processes, compounding stochastic processes, martingales, and decision-making under uncertainty.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 613 [Min Grade: C]

MATH 620 Partial Differential Equations I 3.0 Credits

Covers derivation and classification of partial differential equations; elementary methods of solution, including Fourier series and transform techniques; linear and equilinear equations of the first order; hyperbolic, elliptic, and parabolic type equations; maximum principles; existence, uniqueness, and continuous dependence theorems; Riemann's method; method of characteristics; Green's functions; and variational and numerical methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 621 Partial Differential Equations II 3.0 Credits

Continues MATH 620.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 622 Partial Differential Equations III 3.0 Credits

Continues MATH 621.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 623 Ordinary Differential Equations I 3.0 Credits

Covers existence and uniqueness theorems, properties of solutions, adjoint equations, canonical forms, asymptotic behavior, phase space, method of isocline, classification of singular points, linear two-dimensional autonomous systems, non-linear systems, stability theory, Lyapunov's methods, quadratic forms, construction of Lyapunov's function, boundedness, limit sets, applications to controls, linear equations with periodic coefficients, Floquet theory, characteristic multipliers and exponents, existence of periodic solutions to weakly non-linear systems, jump phenomena, subharmonic resonance, and stability of periodic solutions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 624 Ordinary Differential Equations II 3.0 Credits

Continues MATH 625.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 625 Ordinary Differential Equations III 3.0 Credits

Continues MATH 626.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 630 Complex Variables I 3.0 Credits

Covers Cauchy's theorem, Morera's theorem, infinite series, Taylor and Laurent expansions, residues, conformal mapping and applications, analytic continuation, and Riemann mapping theorem.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 631 Complex Variables II 3.0 Credits

Covers entire functions, Picard's theorem, series and product developments, Riemann Zeta function, and elliptic functions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 630 [Min Grade: C]

MATH 632 Topics in Complex Variables 3.0 Credits

Covers topics including global analytic functions, algebraic functions, and linear differential equations in the complex plane.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 631 [Min Grade: C]

MATH 633 Real Variables I 3.0 Credits

Covers algebra of sets, topology of metric spaces, compactness, completeness, function spaces, general theory of measure, measurable functions, integration, convergence theorems, and applications to classical analysis and integration.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 634 Real Variables II 3.0 Credits

Covers Fubini's theorem, Radon-Nikodym theorem, LP-spaces, linear functionals on LP-spaces, Riesz-representation theorem, topological integration, Riesz-Markoz theorem, Luzin's theorem, basic complex functions, analytic functions, and complex-integration.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 633 [Min Grade: C]

MATH 635 Real Variables III 3.0 Credits

Covers topics including differentiation theory, Fourier series and transforms, and singular integrals.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 634 [Min Grade: C]

MATH 640 Functional Analysis 3.0 Credits

An introduction to abstract linear spaces, including normed linear spaces, Hilbert spaces, Banach spaces, and their duals. Fundamental theorems such as the Hahn-Banach theorem, open mapping and closed graph theorems will be covered, along with possible applications to differential and integral equations and fundamentals of distribution theory.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 504 [Min Grade: C] and MATH 506 [Min Grade: C]

MATH 641 Harmonic Analysis 3.0 Credits

Covers modern techniques and applications of harmonic analysis, including Fourier series, Fourier transforms and related topics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 640 [Min Grade: C]

MATH 642 Operator Theory 3.0 Credits

An introduction to basic spectral theory of linear operators, theory of compact operators, and theory of unbounded operators.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 640 [Min Grade: C]

MATH 643 Integral Equations I 3.0 Credits

Covers theory and application of linear integral equations, including the Hilbert-Schmidt theory. Introduces non-linear and singular integral equations and numerical methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 645 Transform Theory I 3.0 Credits

Covers selected topics from wavelet transforms, including properties; asymptotic analyses; and applications of the integral transforms of Laplace, Fourier, Mellin, and Radon.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 640 [Min Grade: C]

MATH 646 Transform Theory II 3.0 Credits

Covers selected topics from wavelet transforms and applications, convolution equations, and the calculus of distributions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 640 [Min Grade: C] and MATH 645 [Min Grade: C]

MATH 660 Lie Groups and Lie Algebras I 3.0 Credits

Covers matrix groups, topological groups, locally isomorphic groups, universal covering groups, analytic manifolds, Lie groups; the Lie algebra of a Lie group, differential forms, and Lie's three theorems; analytic subgroups of a Lie group and compact Lie groups; and semisimple Lie algebras, general structure of Lie algebras, Cartan subalgebras, modules and representation, and computational techniques in representation theory.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 661 Lie Groups and Lie Algebras II 3.0 Credits

Continues MATH 660.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 662 Lie Groups/Algebras III 3.0 Credits

Continues MATH 661.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 670 Methods of Optimization I 3.0 Credits

Provides a rigorous treatment of theory and computational techniques in linear programming and its extensions, including formulation, duality theory, simplex and dual-simplex methods, and sensitivity analysis; network flow problems and algorithms; systems of inequalities, including exploiting special structure in the simplex method and use of matrix decompositions; and applications in game theory and integer programming.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 671 Methods of Optimization II 3.0 Credits

Covers necessary and sufficient conditions for unconstrained and constrained optimization. Includes computational methods including quasi-Newtonian and successive quadratic programming, and penalty and interior methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 672 Methods of Optimization III 3.0 Credits

Covers advanced topics in mathematical programming, including interior point methods in linear programming; stochastic optimization; multi-objective optimization; and global minimax, functional, and non-linear least squares optimization methods.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 670 [Min Grade: C] and MATH 671 [Min Grade: C]

MATH 673 Calculus of Variations 3.0 Credits

Introduction to calculus of variations. Covers applications to geometry, classical mechanics and control theory, Euler-Lagrange equations, problems with constraints, canonical equations, Hamiltonian mechanics, symmetries and Noether's theorem, Hamilton-Jacobi theory, introduction to optimal control, maximum principle, and Hamilton-Jacobi-Bellman equations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 701 Algebraic Combinatorics 3.0 Credits

This course covers methods of Abstract Algebra that can be applied to various combinatorial problems and conversely, combinatorial methods to approach problems in representation theory, algebraic geometry, and homological algebra.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: MATH 533 [Min Grade: C] and MATH 534 [Min Grade: C]

MATH 723 Mathematical Neuroscience 3.0 Credits

This is an introduction to mathematical and computational techniques for analyzing neuronal models. Topics include conductance based models, neuronal excitability, bursting, neural networks, and compartmental models, as well as phase plane analysis, slow-fast systems, elements of applied bifurcation theory, and simulating differential equation models using MATLAB.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 898 Master's Thesis 0.5-20.0 Credits

Master's thesis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

MATH 997 Research 1.0-12.0 Credit

Research.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

MATH 998 Ph.D. Dissertation 1.0-12.0 Credit

Ph.D. dissertation.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

MATH I599 Independent Study in MATH 0.0-12.0 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 I699 Independent Study in MATH 0.5-6.0 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 I799 Independent Study in MATH 0.0-6.0 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 I899 Independent Study in MATH 0.0-12.0 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 I999 Independent Study in MATH 0.0-12.0 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 T580 Special Topics in Mathematics 0.0-9.0 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

MATH T680 Special Topics in Mathematics 0.0-9.0 Credits

Covers special topics of interest to students and faculty.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

MATH T780 Special Topics in Mathematics 0.0-9.0 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

MATH T880 Special Topics in Mathematics 0.0-9.0 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

MATH T990 Special Topics in Mathematics 0.0-9.0 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

Mathematics Education

Courses

MTED 500 Learning and Teaching Number and Operation 3.0 Credits

Course focus is on the key ideas of number and operation and support students in developing a coherent understanding of both our number system and the structural similarities between it and the computation, arithmetic, algebra, and problem solving that appear throughout the school mathematics curriculum.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MTED 501 Proportional and Algebraic Reasoning 3.0 Credits

This course is about learning and teaching algebra, focusing on patterns, functions and graphs, proportionality, and algebraic connections. Participants will collaboratively explore open-ended problems, discussing, evaluating, revising, and analyzing others' solutions. This is the first course in a sequence to prepare teachers for implementing student-centered, content-based and technology-enhanced instruction.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MTED 502 Geometry & Spatial Reasoning 3.0 Credits

This course is about learning and teaching geometry, focusing on characteristics of shapes, representational systems, geometric modeling, and proof. Participants will collaboratively explore open-ended geometric problems, discussing, evaluating, revising, and analyzing others solutions. This is the second of three introductory courses that prepare teachers to enact student-centered learning and teaching.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MTED 503 Data Analysis and Probabilistic & Statistical Reasoning 3.0 Credits

This course is about learning and teaching data analysis and probabilistic and statistical reasoning, focusing on representation of data, measures of center and spread, inferential statistics, proportionality and probability, and introductory statistical analysis. Participants will discuss, evaluate, revise and analyze solutions and methods. This is the third of a 3-course sequence.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MLAT.

MTED 511 Functions through the Curriculum 3.0 Credits

This course will consist of an extended analysis of the conception of function, including its historical development. Participants will gain personal experience in thinking of function as a unifying idea on mathematics as well as with conceptual instructional materials.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MTED 517 Mathematics Methods and Content (PreK-4) 3.0 Credits

Candidates will develop an in-depth understanding of how to effectively deliver standards-aligned academic math content based on age appropriate understanding and individual and group needs, including an appreciation and respect for the individual differences and unique needs of all children in the PK-4 setting. This course requires field experience hours to be completed outside of regular class meetings.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 521 [Min Grade: C]

MTED 518 Advanced Mathematics Methods and Content (PreK-4) 3.0 Credits

This course provides teacher candidates with an advanced perspective on the learning and teaching of mathematics to elementary school students and includes a combination of readings and analysis of current research and activities that integrate mathematical content and pedagogy. This course is designed to support teachers' understandings of PreK-4 mathematics as well as the way that this content serves as the foundation for advanced elementary and middle school mathematics.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: MTED 517 [Min Grade: B]

MTED 519 Teaching Secondary Mathematics 3.0 Credits

The course focuses on major issues in learning and teaching mathematics in the secondary classroom. Topics will include instructional practices, learning theories, assessment and current research in math. This course also includes multimedia and field-based experiences.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MTED 528 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

MTED 551 Resources & Strategies for Effective Implementation of Problems-based Instruction 3.0 Credits

This course will enhance teachers' understanding of the Common Core State Standards' Mathematical Practices and the role of problem solving in addressing them. The goal is to develop participants' ability to support approaches that maximize problem-solving discussions in the classroom and strengthen their students' ability to practice perseverance.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MTED 601 Diagnosing Student Mathematical Thinking 3.0 Credits

This course is about student-centered learning and teaching of mathematics. This goal is to develop participants' expertise in analyzing student work, understanding student thinking, and using that understanding to guide subsequent interactions and interventions with the student.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MLAT.

MTED 611 Virtual Field Experience I - Online Mentoring 1.5 Credit

This course utilizes the Math Forum's online learning environment to provide teachers with opportunities to engage with students, diagnose student understandings, and implement appropriate instructional responses. Key to this course is virtual one-on-one interactions and an opportunity to reflect on these interactions. This is the first of a 2-course sequence.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MLAT.

Prerequisites: MTED 601 [Min Grade: C]

MTED 612 Virtual Field Experience II - Online Mentoring 1.5 Credit

This course utilizes the Math Forum's online learning environment to provide teachers with opportunities to engage with students, diagnose student understandings, and implement appropriate instructional responses. Key to this course is continued virtual interactions and an opportunity to reflect on these interactions. This is the second of a 2-course sequence.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MLAT.

Prerequisites: MTED 611 [Min Grade: C]

MTED 621 Collaborative Instructional Design & Analysis I 3.0 Credits

This course focuses on teachers identifying critical areas from their colleagues' classrooms that are in need of improvement and designing and implementing a substantive, outcome-driven response. The course will involve intensive analysis of curricular goals, intended student outcomes, lesson planning and classroom-based "action research".

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MLAT.

Prerequisites: MTED 601 [Min Grade: C]

MTED 622 Collaborative Instructional Design & Analysis II 3.0 Credits

This course is the second of two courses designed to help teachers identify critical areas from their colleagues' classrooms that are in need of improvement and designing and implementing an appropriate response. The course will involve similar tasks and assignments as MDED 621 but will differ in curricular focus.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MLAT.

Prerequisites: MTED 621 [Min Grade: C]

MTED 642 Mathematics Coaching and Leadership 3.0 Credits

This course explores the attributes of effective mathematics coaching. The goal is to develop candidates' understanding and expertise of the structure, skills, core concepts, facts, methods of inquiry and application of technology required to build and sustain a successful mathematics coaching practice within their chosen specialization (preK-12, pre-K-8 or 6-12).

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: MTED 621 [Min Grade: B]

Corequisite: MTED 643

MTED 643 Practicum in Mathematics Coaching and Leadership 2.0 Credits

This course offers teachers the opportunity to engage in a wide range of practical experiences in authentic educational settings and connect their coaching knowledge with practical issues in real school contexts. As the term develops, participant's required exposure to learning situations and school settings under the guidance of program faculty and trained mentors will increase significantly. There is a substantial field experience component in this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: MTED 621 [Min Grade: B]

Corequisite: MTED 642

MTED 651 Problem Solving Strategies 3.0 Credits

Course focus is on supporting the development of mathematical approaches to problems that allow students to productively engage with and reason through a wide variety of mathematical tasks. Students will develop high levels of competence and sophistication with a wide range of mathematical approaches, including guess and check, consider a simpler problem, analyze in terms of parity, case analysis, etc.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MTED 661 Teach Math Geometer Sketchpad 3.0 Credits

Course explores how the teaching and learning of math in grades 6 through calculus is enhanced by appropriate use of dynamic mathematics software such as Sketchpad. Course activities will include constructing sketches from scratch and using existing activities and highly-authored sketches to cover topics in middle school, algebra, geometry, pre-calculus, and calculus. Sketchpad topics such as animation, action buttons, presentation sketches, custom tools, etc. will also be covered.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MLAT or major is TLC.

MTED 662 Teaching Calculus with Geometer's Sketchpad 3.0 Credits

This course explores teaching the fundamental ideas of calculus, including limits, derivatives, antiderivatives, and integrals through the use of dynamic geometry software. While the course will cover a variety of calculus content, it is not a calculus course. This course is designed to enrich students' understanding of calculus ideas, to corroboratively explore these ideas with colleagues, and to engage in professional conversations about the implications of these experiences and technologies on the teaching of the ideas of calculus at the middle and secondary levels.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MLAT or major is TLC.

MTED 690 Current Research in Mathematics Learning & Teaching 3.0 Credits

This capstone course for the Master of Science program in Mathematics Learning and Teaching will provide students with an introduction to research in mathematics education. Participants will read, analyze, and synthesize seminal research articles in mathematics education and create a proposal for a future classroom-based research project.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MLAT.

MTED 775 Special Topics in Mathematics Education 3.0 Credits

Covers various topics of particular interest to mathematics teachers and education students.

College/Department: School of Education

Repeat Status: Can be repeated 3 times for 9 credits

MTED I599 Independent Study in MTED 0.0-12.0 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

MTED I699 Independent Study in MTED 0.0-12.0 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

MTED I799 Independent Study in MTED 0.0-12.0 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

MTED I899 Independent Study in MTED 0.0-12.0 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

MTED I999 Independent Study in MTED 0.0-12.0 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

MTED T580 Special topics in MTED 0.0-12.0 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

MTED T680 Special topics in MTED 0.0-12.0 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

MTED T780 Special topics in MTED 0.0-12.0 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

MTED T880 Special topics in MTED 0.0-12.0 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

MTED T980 Special topics in MTED 0.0-12.0 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

Mechanical Engineering & Mechanics

Courses

MEM 503 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

MEM 504 HVAC Equipment 3.0 Credits

Covers performance of air handlers, pumps, direct expansion systems, chillers, cooling towers, and similar equipment.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 505 HVAC Controls 3.0 Credits

Covers control theory and application to heating, ventilating, air conditioning, including pneumatic, fluidic, and electronic controls.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 517 Fundamentals of Nanomanufacturing 3.0 Credits

This course introduces conventional methods that emerged from microelectronics and nonconventional or alternative approaches as applied to fabricate nanometer-scale biological and solid-state devices; Preliminary concepts for nanofabrication; Conventional lithographic methods; Nonconventional methods such as nanoimprint lithography and chemical and biological approaches; Cell culturing for application in biology; The safe development and use of advanced nanotechnological manufacturing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (MEM 417 [Min Grade: C] and ENGR 201 [Min Grade: C] and ENGR 202 [Min Grade: C]) or PHYS 201 [Min Grade: C]

MEM 518 Introduction to Nanoscale Metrology 3.0 Credits

Highlights the most innovative and powerful developments in nano/microscale diagnostics; Reviews conventional and non-conventional micro- and nanofabrication, preliminary concepts for nanoscale metrology; Covers optical diagnostics for microfluidics and nanofluidics, scanning electron microscopy, transmission electron microscopy, atomic force microscopy, ionic current blockage measurement, mass spectroscopy and UV-Vis spectroscopy, and laser induced fluorescence.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 530 Aircraft Flight Dynamics & Control I 3.0 Credits

Covers development of dynamic models, linearization, aerodynamic coefficients, control derivatives, longitudinal and lateral modes, and open-loop analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 540 Control Applications of DSP Microprocessors 3.0 Credits

Most of the control systems today are digital and implemented using microprocessors. In this course, the students will learn how to employ the state-of-the-art DSP microprocessors to perform analog-to-digital conversion, digital-to-analog conversion, digital signal processing, decision making, and feedback control action to achieve precise regulation/ tracking, disturbance reduction, and robust stability/performance for physical systems. In addition to lectures by the instructor, the course will feature eight hands-on lab projects centered on the design and microprocessor implementation of digital controllers for MIMO (multi-input-multi-output) electro-mechanical systems. Cross-listed with undergraduate course MEM 459.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 545 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: D] or PHYS 201 [Min Grade: D]

MEM 569 Introduction to Composite Materials I 3.0 Credits

Introduces anisotropic elasticity, lamina stiffness and compliance, plane-stress and plane-strain, stress-strain relations of a lamina, testing methods, engineering elastic constants, failure criteria, and micromechanics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 570 Introduction to Composite Materials II 3.0 Credits

Covers laminated plate theory, stiffness and compliance of laminated plates, effect of laminate configuration on elastic performance, and review of research topics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 569 [Min Grade: C]

MEM 571 Introduction to Robot Technology 3.0 Credits

Covers robot configuration; components, actuators, and sensors; vision; and control, performance, and programming. Includes lectures and laboratory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 572 Mechanics of Robot Manipulators 3.0 Credits

Covers homogeneous transformation, direct and inverse kinematic manipulators, velocities and acceleration, static forces, and manipulators' dynamics, via Lagrange and Newton-Euler formulations. Includes lectures and laboratory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 666 [Min Grade: C]

MEM 573 Industrial Application of Robots 3.0 Credits

Covers path planning and workspace determination, robot accuracy and repeatability measurements, robot cell design, application engineering and manufacturing, material transfer, processing operations, and assembly and inspection. Includes lectures and laboratory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 574 Introduction to CAM 0.0-3.0 Credits

Examines the basic elements used to integrate design and manufacturing processes, including robotics, computerized-numerical controlled machines, and CAD/CAM systems. Covers manufacturability considerations when integrating unit process elements.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 591 Applied Engr Analy Methods I 3.0 Credits

Covers effective methods to analyze engineering problems. This module focuses on analytical and computational methods for problems tractable with vectors, tensors and linear algebra. Uses symbolic/numerical computational software. Examples drawn from thermal fluid sciences, mechanics and structures, systems and control, and emerging technologies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 592 Applied Engr Analy Methods II 3.0 Credits

Covers effective methods to analyze engineering problems. This module focuses on computational and analytical methods for complex variables and ordinary differential equations. Uses symbolic/numerical computational software. Examples drawn from thermal fluid sciences, mechanics and structures, systems and control, and emerging technologies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 591 [Min Grade: C]

MEM 593 Applied Engr Analy Methods III 3.0 Credits

Covers effective methods to computationally and analytically solve engineering problems. This module focuses on solution methods for partial differential equations, Fourier analysis, finite element analysis and probabilistic analysis. Uses symbolic/numerical computational software. Examples drawn from mechanical and civil engineering.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 592 [Min Grade: C]

MEM 601 Statistical Thermodynamics I 3.0 Credits

Covers probability theory; statistical interpretation of the laws of thermodynamics; systems of independent particles; systems of dependent particles; kinetic theory of dilute gases; quantum mechanics; energy storage and degrees of freedom; and thermochemical properties of monatomic, diatomic, and polyatomic gases.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 602 Statistical Thermodynamics II 3.0 Credits

Covers analysis of monatomic solids, theory of liquids, chemical equilibrium, kinetic and thermochemical description of rate processes, transport phenomena, and spectroscopy.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 601 [Min Grade: C]

MEM 603 Advanced Thermodynamics 3.0 Credits

Covers reformulation of empirical thermodynamics in terms of basic postulates; presentation of the geometrical, mathematical interpretation of thermodynamics; Legendre transforms; requirements for chemical and phase equilibrium; first- and second-order phase transitions; Onsager reciprocal relations; and irreversible thermodynamics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 611 Conduction Heat Transfer 3.0 Credits

Covers conduction of heat through solid, liquid, and gaseous media; advanced analytical methods of analysis, including integral transform and Green's functions, the use of sources and sinks, and numerical and experimental analogy methods; and variational techniques.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 612 Convection Heat Transfer 3.0 Credits

Covers convective heat transfer without change of phase or constitution, fundamental equations, exact solutions, application of the principle of similarity and the boundary-layer concept to convective heat transfer, similarity between heat and momentum transfer, and heat transfer in high-velocity flows.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 613 Radiation Heat Transfer 3.0 Credits

Covers radiation heat transfer between surfaces and within materials that absorb and emit. Formulates and applies methods of analysis to problems involving radiation alone and radiation combined with conduction and convection.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 617 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 will be covered. This course also includes two lab sessions through which students will have a hands-on experience in microfabrication.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 619 Microfluidics and Lab-on-a-Chip 3.0 Credits

The course explores applications of microfluidic phenomena and lab-on-a-chip technology. The topics include fluid behavior in microchannels, electrokinetic manipulation, micro-scale separation/surface sciences, transducer effects, and microactuators. Students will also have a hands-on experience through laboratory sessions.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 417 [Min Grade: C] or MEM 617 [Min Grade: C]

MEM 621 Foundations of Fluid Mechanics 3.0 Credits

Covers kinematics and dynamics of fluid motion; Lagrangian and Eulerian description of motion; transport theorem; continuity and momentum equations (Navier-Stokes equations); vorticity vector and equation; three-dimensional, axisymmetric, and two-dimensional complex potential flows; constitutive equations of a viscous fluid; dynamic similarity; Stokes flow; and similarity analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 622 Boundary Layers-Laminar & Turbulent 3.0 Credits

Covers laminar boundary layers; approximate integral method; three-dimensional laminar boundary layer and boundary-layer control; transient boundary-layer flows; the integral momentum equation; origins of turbulence; transition to turbulent flow; Reynolds-averaged equations; Reynolds stress; measurement of turbulent quantities; study of turbulent wall bounded flows, including pipe flow, flow over a flat plate, and flow over a rotating disk; and boundary layer in a pressure gradient.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 621 [Min Grade: C]

MEM 630 Linear Multivariable Systems I 3.0 Credits

State space representation, continuous time and discrete time systems, similarity transformation, invariant subspaces, state response, stability, controllability, observability, Kalman decomposition, spectral and singular value decompositions.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 631 Linear Multivariable Systems II 3.0 Credits

Pole assignment, output feedback, linear quadratic regulator, observer design, stochastic processes, state response to white noise, Kalman filter, linear quadratic Gaussian controller, evaluation of closed loop system.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 632 Linear Multivariable Systems III 3.0 Credits

Model reduction: approximation of transfer functions, modal truncations, oblique projections, component cost analysis, internal balancing; controller reduction: observer-based controller parametrization, Riccati balancing, q-COVER theory, optimal projections.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 633 Robust Control Systems I 3.0 Credits

Covers linear spaces and linear operators; Banach and Hilbert spaces; time-domain spaces; frequency-domain spaces; singular value decomposition; EISPACK, LINPACK, and MATLAB, including internal stability; coprime factorization over the ring of polynomial matrices; matrix fraction description; properties of polynomial matrices; irreducible mfd; Smith-McMillan form; poles and zeros; canonical realizations; and computation of minimal realizations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 634 Robust Control Systems II 3.0 Credits

Covers the structure of stabilizing controllers; coprime factorization over the ring of proper stable rational matrices; algebraic Riccati equation; state space computation of coprime factorization; yvb controller parametrization; linear fractional transformation; state space structure of proper stabilizing controllers; formulation of control problem, H, and H optimization problem; model matching problem; tracking problem; robust stabilization problem; inner-outer factorization; and Sarason's H interpolation theory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 633 [Min Grade: C]

MEM 635 Robust Control Systems III 3.0 Credits

Covers Hankel-norm approximations, balanced realizations, two-block H optimization, generalized multivariable stability margins, structured and non-structured stability margins, structured singular values, robust stabilization and performance, and recent developments in robust control.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 634 [Min Grade: C]

MEM 636 Theory of Nonlinear Control I 3.0 Credits

Provides a comprehensive introduction to the geometric theory of non-linear dynamical systems and feedback control. Includes stability, controllability, and observability of non-linear systems; exact linearization, decoupling, and stabilization by smooth feedback; and zero dynamics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 637 Theory of Nonlinear Control II 3.0 Credits

Covers systems with parameters, including bifurcation and stability; static bifurcation; local regulation of parameter-dependent non-linear dynamics; tracking; limit cycles in feedback systems; perturbation methods; frequency domain analysis; and applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 636 [Min Grade: C]

MEM 638 Theory of Nonlinear Control III 3.0 Credits

Covers high gain and discontinuous feedback systems, including sliding modes, applications, and advanced topics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 637 [Min Grade: C]

MEM 639 Real Time Microcomputer Control I 0.0-3.0 Credits

Covers discrete-time systems and the Z-transform, sampling and data reconstruction, the pulse transfer function, discrete state equations, time-domain analysis, digital simulation, stability, frequency-domain analysis, Labview programming, and data acquisition and processing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 640 Real Time Microcomputer Control II 0.0-3.0 Credits

Covers design of discrete-time controllers, sampled data transformation of analog filter, digital filters, microcomputer implementation of digital filters, Labview programming techniques, using the daq library, writing a data acquisition program, and Labview implementation of pid controllers.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 639 [Min Grade: C]

MEM 646 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

MEM 647 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 646 [Min Grade: C]

MEM 648 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

MEM 649 Application 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

MEM 660 Theory of Elasticity I 3.0 Credits

Summarizes mechanics of materials courses. Covers vector and tensor analysis, indicial notation, theory of stress, equilibrium equations, displacements and small strains, compatibility, and strain energy; formulation of the governing equations and the appropriate boundary conditions in linear elasticity, and uniqueness of the solutions; elementary three-dimensional examples and two-dimensional theory; stress functions; solutions in Cartesian and polar coordinates; and Fourier series.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 663 [Min Grade: C]

MEM 661 Theory of Elasticity II 3.0 Credits

Covers two-dimensional problems by the method of Muskhelishvili, torsion problem, stress function and solutions by means of complex variables and conformal mapping, three-dimensional solutions for straight beams, energy theorems, virtual work and their applications, and Rayleigh-Ritz method.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 660 [Min Grade: C]

MEM 662 Theory of Elasticity III 3.0 Credits

Covers use of Fourier series and Green's functions for plane problems; three-dimensional problems in terms of displacement potentials; use of the Galerkin vector and the Boussinesq-Papkovich-Neuber functions; fundamental solutions to the Kelvin, Boussinesq, Cerruti, and Mindlin problems; and elastic contact. Introduces non-linear elasticity.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 661 [Min Grade: C]

MEM 663 Continuum Mechanics 3.0 Credits

Covers kinematics, Eulerian, and Lagrangian formulations of deformation; theory of stress; balance principles; continuum thermodynamics; and constitutive relations in fluids and solids.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 664 Introduction to Plasticity 3.0 Credits

Reviews stress and strain deviators, invariants and distortional energy, principal and octahedral stresses and strains, Tresca and von Mises yield criteria, yield surface and Haigh-Westergaard stress space, Lode's stress parameter, subsequent yield surface, Prandtl-Reuss relations, work hardening and strain hardening, stress-strain relations from Tresca criteria, incremental and deformation theories, the slip-line field, slip-line equations for stress, velocity equations and geometry of slip-line field, limit analysis, simple truss, bending of beams, lower and upper bound theorems, and plasticity equations in finite-element methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 660 [Min Grade: C]

MEM 665 Time-Dependent Solid Mechanics 3.0 Credits

Part a: Covers elastodynamics, including plane, cylindrical, and spherical waves; characteristics; the acoustic tensor; polarizations and wave speeds; transmission and reflection at plane interfaces; critical angles and surface waves; and waveguides and dispersion relationships. Part b: Covers linear viscoelasticity, including relaxation modulus and creep compliance, hereditary integrals, Laplace transform, correspondence principle, creep buckling and vibrations, viscoplasticity, creep, strain-rate effects, shear bands, and shock waves.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 660 [Min Grade: C]

MEM 666 Advanced Dynamics I 3.0 Credits

Covers analytical statics (principle of virtual work), Lagrange's equations, conservation laws, stability analysis by perturbation about steady state, Jacobi first integral, ignoration of coordinates, classification of constraints, solution of constrained dynamical problems by constraint embedding (elimination) or constraint adjoining (Lagrange multipliers), generalized impulse and momentum, and formulation and solution of non-holonomic systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 667 Advanced Dynamics II 3.0 Credits

Covers vector dynamics in three dimensions, including a detailed study of rotational kinematics, motion of the mass center and about the mass center for a system of particles and a rigid body, moments of inertia, three-dimensional dynamical problems, and comparison between Lagrangian techniques and the vector methods of Euler and Newton. Includes vibrations, Euler's angles, motion of a gyroscope, and motion of an axially symmetric body under no force other than its weight.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 666 [Min Grade: C]

MEM 668 Advanced Dynamics III 3.0 Credits

Covers central forces, effect of the earth's rotation, Foucault's pendulum, variational methods, Hamilton's principle, state space techniques for the integration of equations of motion, and numerical integration of equations of motion on microcomputers through the CSMP program. Depending on student interest, includes either Hamiltonian dynamics (canonical equations, contact transformations, Hamilton-Jacobi theory) or rigid body kinematics of complex dynamical systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 667 [Min Grade: C]

MEM 670 Theory of Plates and Shells 3.0 Credits

Covers elements of the classical plate theory, including analysis of circular and rectangular plates, combined lateral and direct loads, higher-order plate theories, the effects of transverse shear deformations, and rotatory inertia; matrix formulation in the derivation of general equations for shells; and membrane and bending theories for shells of revolution.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 671 Mechanical Vibrations I 3.0 Credits

Free and forced responses of single degree of freedom linear systems; two degree of freedom systems; multiple degree of freedom systems; the eigenvalue problem; modal analysis; continuous systems; exact solutions; elements of analytical dynamics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 672 Mechanical Vibrations II 3.0 Credits

Continuous systems; approximate solutions; the finite element method; nonlinear systems; geometric theory, perturbation methods; random vibrations; computational techniques.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 673 Ultrasonics I 3.0 Credits

Basic elements of ultrasonic nondestructive evaluation, wave analysis, transducers, transform techniques, A,B,C,M,F and Doppler imaging, medical imaging, multiple element arrays, real-time imaging, calibration.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 674 Ultrasonics II 3.0 Credits

Basic elements of guided wave analysis, oblique incidence reflection factor, critical angle reflectivity, surface waves, lamb waves, plate waves, dispersion, phase and group velocity, experimental techniques for guided waves.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 675 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

MEM 676 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 675 [Min Grade: C]

MEM 677 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

MEM 678 Nondestructive Evaluation Methods 3.0 Credits

This course covers the tools necessary for the inspection and evaluation of materials and infrastructures. Most relevant methods used for Non-Destructive Evaluation (NDE) of structural components will be discussed. Physical principles of continuum mechanics, electrical engineering, acoustics and elastic wave propagation underlying the NDE methods will be covered. Sensor data acquisition and digital signal processing will be addressed.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 681 Finite Element Methods I 3.0 Credits

Covers formulation of finite element methods for linear analysis of static and dynamic problems in solids, structures, fluid mechanics, heat transfer, and field problems; displacement-based, hybrid, and stress-based methods; variational and weighted residual approaches; effective computational procedures for solution of finite element equations in static and dynamics analyses; and pre-processing and post-processing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 682 Finite Element Methods II 3.0 Credits

Covers formulation of advanced finite element methods for non-linear analysis of static and dynamic problems in solids, structures, fluid mechanics, heat transfer, and field problems; material non-linearity; large displacement; large rotation; large strain; effective solution procedures for non-linear finite element equations in static and dynamic analyses; and effective finite element methods for eigenvalue problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 681 [Min Grade: C]

MEM 684 Mechanics of Biological Tissues 3.0 Credits

Covers composition and structure of tendons, ligaments, skin, and bone; bone mechanics and its application in orthopedics; viscoelasticity of soft biological tissues; models of soft biological tissues; mechanics of skeletal muscle; and muscle models and their applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 685 Mechanics of Human Joints 3.0 Credits

Covers the structure of human joints, including experimental and analytical techniques in the study of human joint kinematics; applications to the design of artificial joints and to clinical diagnosis and treatments; stiffness characteristics of joints and their applications to joint injuries; and prosthetic design and graft replacements.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 686 Mechanics of Human Motion 3.0 Credits

Examines experimental and analytical techniques in human motion analysis and human locomotion; interdependency of muscle force distribution in human motion; modeling and simulation of bipedal locomotion; energetics, stability, control, and coordination of human motion; and pathological gait.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 687 Manufacturing Processes I 3.0 Credits

Introduces basic manufacturing process technology and the mechanical properties of metals and plastics. Covers dimensional and geometry tolerancing; surface finishing; material removal processes and machine tools; processing of polymers and reinforced plastics, including general properties of plastic materials and forming, shaping, and processing of plastics; and CNC machining and programming. Combines lectures and laboratory work.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 688 Manufacturing Processes II 3.0 Credits

Covers processing of polymers and reinforced plastics, including general properties of plastic materials and forming, shaping, and processing of plastics; CNC machining and programming; casting processes; sheet-metal forming processes; bulk deformation processes; and computer integrated manufacturing systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 687 [Min Grade: C]

MEM 689 Computer-Aided Manufacturing 0.0-3.0 Credits

Covers development of software and hardware for computer-aided manufacturing systems, basic elements used to integrate the manufacturing processes, and manufacturability studies.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 701 Physical Gas Dynamics I 3.0 Credits

Reviews equilibrium kinetic theory of dilute gases. Covers non-equilibrium flows of reacting mixtures of gases, flows of dissociating gases in thermodynamics equilibrium, flow with vibrational or chemical non-equilibrium, non-equilibrium kinetic theory, flow with translational non-equilibrium, and equilibrium/non-equilibrium radiation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 602 [Min Grade: C]

MEM 705 Combustion Theory I 3.0 Credits

Covers thermochemistry, including the relationship between heats of formation and bond energies, heat capacities and heats of reaction, chemical equilibrium and the equilibrium constant, calculation of adiabatic flame temperature and composition of burned gas, free energy and phase equilibrium, classical chemical kinetics, and chain reaction theory.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 706 Combustion Theory II 3.0 Credits

Covers laminar flame propagation in premixed gases, detonation and deflagration, heterogeneous chemical reactions, burning of liquid and solid fuels, and diffusion flames.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 705 [Min Grade: C]

MEM 707 Combustion Theory III 3.0 Credits

Covers advanced topics in combustion, including combustion-generated air pollution, incineration of hazardous wastes, supersonic combustion, propellants and explosives, and fires.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 706 [Min Grade: C]

MEM 711 Computational Fluid Mechanics and Heat Transfer I 3.0 Credits

Covers classification of fluid flow and heat transfer phenomena, including time-dependent multidimensional heat conduction and finite-difference and finite-element formulations; convection and diffusion; upwind, exponential, and hybrid schemes; and boundary-layer-type fluid flow and heat transfer problems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 712 Computational Fluid Mechanics and Heat Transfer II 3.0 Credits

Covers basic computational methods for incompressible Navier-Stokes equations, including vorticity-based methods and primitive variable formulation; computational methods for compressible flows; inviscid and viscous compressible flows; finite-element methods applied to incompressible flows; and turbulent flow models and calculations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 711 [Min Grade: C]

MEM 714 Two-Phase Flow & Heat Transfer 3.0 Credits

Covers selected topics in two-phase flow, with emphasis on two-phase heat transfer problems, basic conservation equations for two-phase flows, nucleation, bubble dynamics, pool boiling, forced convective boiling, condensation heat transfer, two-phase flow equipment design, tube vibration and flow instability in two-phase flows, and fouling in heat transfer equipment.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 717 Heat Transfer in Manufacturing 3.0 Credits

Covers heat conduction fundamentals, including phase change problems (casting, welding, and rapid solidification processes) and cooling controls of rolling, forging, and extrusion processes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 611 [Min Grade: C]

MEM 721 Non-Newtonian Fluid Mechanics and Heat Transfer 3.0 Credits

Covers the stress-strain rate relationship, simple flow, general constitutive and conservation equations, generalized Newtonian models, molecular theories, rheological property measurements, plane Couette flow, hydrodynamic theory of lubrication, helical flow, boundary layer flows, pipe flows, natural convection, thin film analysis, drag reduction phenomenon, and biorheology.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 622 [Min Grade: C]

MEM 722 Hydrodynamic Stability 3.0 Credits

Introduces stability, including discrete and continuous systems. Covers linear theory; instability of shear flows, spiral flows between concentric cylinders and spheres, thermoconductive systems, and viscous flows; global stability and non-linear theories; and time periodic and non-periodic flows, attractors, and bifurcation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 622 [Min Grade: C]

MEM 723 Vortex Interactions and Complex Turbulent Flow 3.0 Credits

Nonlinear vortex motion and interaction; motion of point vortices; generation and interaction of vortex rings and counter-rotating vortex pairs; vortex impulse, energy, pairing, bifurcation, and bursting; study of free and separating turbulent flows: mixing layers, wakes, jets, and buoyant plumes; recirculation behind bluff bodies and backsteps; longitudinal and lateral vortex waves and shear layers; sweeps and bursts in turbulent boundary layers; characteristics of turbulence: entrainment and molecular mixing, effects of buoyancy, rotation, acceleration, and heat release; the 3-D turbulent energy cascade and the 2-D inverse cascade.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 725 Compressible Fluid Dynamics 3.0 Credits

Reviews one-dimensional flows. Covers steady flow of a compressible fluid; two- and three-dimensional subsonic, transonic, supersonic, and hypersonic flow; normal and oblique shock waves; wave reflections; oblique shock wave interactions and generation vorticity; compressible boundary layers; and shock boundary-layer interactions.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 621 [Min Grade: C]

MEM 727 Fluid Dynamics in Manufacturing Processes 3.0 Credits

Covers transport of slurries, molten metals, and polymers; hydrodynamics in forming processes; resin flow model in polymer composites; shaped charge jet technology; separation and filtration; coating; lubrication; and melt-spinning process.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 730 Control of Flexible Space Structures I 3.0 Credits

Covers modeling of FSS including PDE description and finite element modeling, model errors, model reduction, component cost analysis, modal cost analysis, stability of mechanical systems, gyroscopic and non-gyroscopic systems, and rate and position feedback.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 731 Control of Flexible Space Structures II 3.0 Credits

Covers probability theory, stochastic processes, Kalman filter, LQG compensators, controller reduction, CCA theory, balancing reductions, and applications.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 730 [Min Grade: C]

MEM 733 Applied Optimal Control I 3.0 Credits

Covers necessary conditions from calculus of variations, equality and inequality constraints, fixed and free final time problems, linear-quadratic control, bang-bang control, and application to problems in flight mechanics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 734 Applied Optimal Control II 3.0 Credits

Covers neighboring extremals and the second variation, perturbation feedback control, sufficient conditions, numerical solution methods, and application to problems in flight mechanics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 733 [Min Grade: C]

MEM 735 Advanced Topics in Optimal Control 3.0 Credits

Covers singular arc control, model following control, variable structure control, singular perturbation methods, differential games, and applications.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

Prerequisites: MEM 734 [Min Grade: C]

MEM 760 Mechanics of Composite Materials I 3.0 Credits

Covers anisotropic elastic moduli, stress-strain relations of a lamina, failure criteria of a lamina, introduction to micromechanics, laminated plate theory, residual stresses, and strength of laminates.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 660 [Min Grade: C]

MEM 761 Mechanics of Composite Materials II 3.0 Credits

Covers anisotropic plates and shells, boundary value problem in anisotropic heterogeneous elasticity, vibrations and buckling of laminated plates, and testing methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 760 [Min Grade: C]

MEM 762 Mechanical Composite Materials III 3.0 Credits

Covers classical failure criteria for orthotropic materials, fracture in laminates, three-dimensional stress analysis, simulation of delamination and transverse cracks, fatigue damage, and cumulative damage models.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: MEM 761 [Min Grade: C]

MEM 770 Theory of Elastic Stability 3.0 Credits

General stability criteria; beam column; the elastica; energy methods; torsional stability; combined torsion and flexure; lateral buckling of beams in pure bending; buckling of rings; curved bars and arches.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 777 Fracture Mechanics I 3.0 Credits

Covers fundamental mechanics of fracture, including linear elastic crack mechanics, energetics, small-scale yielding, fully plastic crack mechanics, creep crack mechanics, fracture criteria, mixed mode fracture, stable quasi-static crack growth (fatigue crack growth and environmentally induced crack growth), toughness and toughening, and computational fracture mechanics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 782 Impact and Wave Propagation I 3.0 Credits

Governing equations for elastic waves; longitudinal waves in a bar; transverse in a flexible string; flexural waves in a Bernoulli-Euler beam; flexural waves in a Timoshenko beam; Rayleigh surface waves; Pochhammer-Chree waves in circular cylinders; reflection of plane waves at a plane boundary.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 783 Impact and Wave Propagation II 3.0 Credits

Spherical and cylindrical waves in unbounded medium; method of Laplace transform; method of characteristics; flexural waves in a Timoshenko plate; viscoelastic and viscoplastic waves; dispersion and phase velocity; natural frequency in free vibration.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 784 Impact & Wave Propagation III 3.0 Credits

Governing equations for unsteady, nonisentropic fluid flows; shock waves; method of characteristics for nonlinear system; numerical integration along characteristics; impact and vibration of shell topics in wave propagation.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 891 Topics in Advanced Engineering I 2.0 Credits

Linear systems; control theory; vibrations and eigenvalue problems; systems dynamics; Fourier transformation; flight dynamics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 892 Topics in Advanced Engineering II 2.0 Credits

Separation of variables; thermodynamics; heat transfer; fluid mechanics; boundary layer theory; elasticity; finite element methods. Solid mechanics; aeroelasticity.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 893 Topics in Advanced Engineering III 2.0 Credits

Basic probability and statistics; communication theory; sampled data system; digital and optical processing.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 894 Engineering Mathematics 3.0 Credits

Application of matrices, linear algebra, and complex analysis to engineering problems. Ordinary and partial differential equations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM 897 Research 1.0-12.0 Credit

Supervised research in Mechanical Engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MEM 898 Master's Thesis 1.0-20.0 Credit

Master's thesis.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MEM 998 Ph.D. Dissertation 1.0-12.0 Credit

Ph.D. dissertation.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

MEM I599 Independent Study in MEM 0.0-12.0 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 I699 Independent Study in MEM 0.0-12.0 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 I799 Independent Study in MEM 0.0-12.0 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 I899 Independent Study in MEM 0.0-12.0 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 I999 Independent Study in MEM 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

MEM T580 Special Topics in MEM 0.0-12.0 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 T680 Special Topics in MEM 0.0-12.0 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 T780 Special Topics in MEM 0.0-12.0 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 T880 Special Topics in MEM 0.0-12.0 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 T980 Special Topics in MEM 0.0-12.0 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 Family Therapy

Courses

MFTP 518 Medical Family Therapy 3.0 Credits

This course is designed to prepare family therapist and other health professionals to work in a collaborative manner addressing the unique psychosocial problems of individuals, couples, and families with acute and chronic medically related concerns.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

MFTP 537 Multicultural & Family Systems Approach to Healthcare 4.0 Credits

This course builds on Introduction to Family Therapy Theory and Concepts by extending foundation knowledge on serving diverse families who are challenged by particular health and developmental problems.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CFTP 501 [Min Grade: C]

MFTP 538 Issues and Trends in Health Policy for Families 3.0 Credits

This course will provide the clinician with an introduction to the history structure and function of health policy. The overall learner objective for clinicians is to analyze health policies that impact children, families, and aging populations. Students need to learn about how health care policies are developed, implemented, evaluated, and changed by policy makers and interest groups and how such policies affect the lives of clients and their families.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Museum Education

Courses

MUSM 500 Foundations of Informal Education in Museum Settings 3.0 Credits

This course explores the goals and importance of learning in contextual environments and how people learn in museum settings, including history and function of informal education in various types of museum settings.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MUSM 506 Technology in Museum Education 3.0 Credits

Exploration of the socio-technical issues that arise when people, information, and technology interact in museum education activities; and how technologies such as mobile devices, touch-based displays, 3D environments, social networks, videoconferencing, webcasting, educational video and assistive technology can enhance the museum learning experience. This course is designed to address the current and future challenges faced by museum educators. It examines not only applications of new technology used in museum education, but how advances in information science and technology have changed the very nature of learning in a museum setting.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MUSM 507 Current Research and Evaluation in Museum Design and Learning 3.0 Credits

This course provides an overview of the history of research in museum learning. It further looks at current studies that inform museum and exhibit design. It includes the review of a variety of qualitative and quantitative tools, both formative and summative, currently being used to evaluate learning in informal settings. This course examines several program evaluation models with emphasis on the Museum Visitor Experience Model. The evaluation framework includes a study of multiple stakeholders and the social, cultural, and ethical issues involved when conducting evaluation of learning. The students will design and pilot an evaluation tool for a current museum exhibit.

College/Department: School of Education

Repeat Status: Not repeatable for credit

MUSM 508 Meeting the Educational Needs of Diverse Museum Audiences 3.0 Credits

The purpose of this course is to give students a background on the variety of audiences that visit museums and the different techniques that museum professionals use to reach these audiences. You will learn about different theories in museum education and exhibitory, cultural competency, and experience a variety of activities from museums in the Philadelphia area that were specifically developed for unique audiences.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: MUSM 500 [Min Grade: C]

MUSM 510 Designing and Evaluating Museum Tours: A Practicum 3.0 Credits

The purpose of this course is to give students an opportunity to experience the many dimensions of Museum Education and to demonstrate understanding of learning in an informal/museum setting through practical experience. Students will conduct 40 hours of interactive observations in a museum setting and construct a small-scale project, which allows the candidate to create a final product (i.e. curricular piece, new policy draft, conditions report, etc.) depending upon the student's area of interest.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Corequisite: MUSM 508

MUSM I599 Independent Study in MUSM 0.0-12.0 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

MUSM I699 Independent Study in MUSM 0.0-12.0 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

MUSM I799 Independent Study in MUSM 0.0-12.0 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

MUSM I899 Independent Study in MUSM 0.0-12.0 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

MUSM I999 Independent Study in MUSM 0.0-12.0 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

MUSM T580 Special topics in MUSM 0.0-12.0 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

MUSM T680 Special topics in MUSM 0.0-12.0 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

MUSM T780 Special topics in MUSM 0.0-12.0 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

MUSM T880 Special topics in MUSM 0.0-12.0 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

MUSM T980 Special topics in MUSM 0.0-12.0 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

Museum Leadership

Courses

MUSL 500 Museum History and Philosophy 3.0 Credits

Through the examination of readings, case studies, and visits to local institutions, students will develop an understanding of the history and theory of the museum from the 18th century to the present, with special attention paid to major issues surrounding contemporary museum practice.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSL 510 Museum Leadership 3.0 Credits

This course will explore the philosophy and history of leadership in cultural institutions as well as in business, government, and non-profit organizations. Students will examine and understand the value of strategic planning and the core functions of a modern museum including collections management, education, marketing, communications, technology and fundraising.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSL 530 Museum Management 3.0 Credits

This course will cover a variety of roles required to run the contemporary museum including curators, conservators, registrars, educators, programmers, audience development, fundraising and volunteers.

This course will include an examination of how various museum roles collaborate with and interact with each other.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSL 630 Exhibitions and Programming 3.0 Credits

This course focuses on exhibition and program planning—from topic conception, to development and design, to educational programming and marketing.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSL 640 The Museum in the Community 3.0 Credits

This course examines how museums interact with their communities, creating a third place that brings communities together. Museums' roles in the political, economic, educational, social and cultural development of cities, towns and regions will be studied.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSL 500 [Min Grade: C] and MUSL 510 [Min Grade: C]

MUSL 650 Governance for Museums and Non-Profit Organizations 3.0 Credits

Most museums in the United States hold their collections in the public trust—meaning that they are accountable to the public as a result of their tax-exempt status. Similarly the non-profit sector exists to serve a social purpose or need that the public sector or government cannot or does not serve. To manage the public trust and represent the interests of the public at large, museums and non-profit organizations have boards of “trustees.” Trustees are community leaders who, in the non-profit sector, serve as volunteers and contribute wealth, wisdom and work to the organization on whose boards they serve. This class will examine the ethical, legal and strategic implications of governance and examine the interactions between boards and museum staff.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSL 530 [Min Grade: C]

MUSL 660 Museum in the Age of Technology 3.0 Credits

This course will explore the role of technology in the museum, especially the ways that technology is changing or can potentially change the ways that museums provide access to the collections, make knowledge accessible online and in person, and create multiple paths for the public to interact with museums, their exhibits and programs, and their collections.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSL 500 [Min Grade: C]

MUSL 670 Museum Communications and Marketing 3.0 Credits

Provides an in-depth study of the theory and best practices in all areas of strategic communications and marketing in contemporary museums and related organizations.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSL 710 Bricks and Mortar 3.0 Credits

This course will provide an intensive study of all aspects of the planning, designing, and construction of museums. The connection of capital projects to other museum functions such as master planning, strategic planning, and fundraising will be examined.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSL 510 [Min Grade: C]

MUSL 720 Overview of Curatorial Practices 3.0 Credits

This course examines the role of the curator in the contemporary museum field. Collections management, interpretation and exhibition will be addressed, along with current issues facing curators in a contemporary museum setting.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSL 740 Independent Study in Museum Leadership 1.0-4.0 Credit

Course provides an opportunity for students to conduct independent research, either applied or scholarly, under the supervision of a faculty member.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

MUSL 750 Museum Leadership Practicum I 3.0 Credits

This is the first term course of a two term required practicum for all museum leadership students. Students will work in teams at a local museum to complete a practical project that will expose them to contemporary museum practices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSL 500 [Min Grade: C] and MUSL 530 [Min Grade: C]

MUSL 755 Museum Leadership Practicum II 3.0 Credits

This is the second term of a two-term required practicum for all museum leadership students. Students will work in teams at a local museum to complete a practical project that will expose them to contemporary museum practices.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

Prerequisites: MUSL 530 [Min Grade: C] and MUSL 750 [Min Grade: C]

MUSL I599 Independent Study in Museum Leadership 0.0-12.0 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: Not repeatable for credit

MUSL I699 Independent Study in Museum Leadership 0.0-12.0 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: Not repeatable for credit

MUSL I799 Independent Study in Museum Leadership 1.0-4.0 Credit

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

MUSL I899 Independent Study in Museum Leadership 0.0-12.0 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: Not repeatable for credit

MUSL I999 Independent Study in Museum Leadership 0.0-12.0 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: Not repeatable for credit

MUSL T580 Special Topics in Museum Leadership 0.0-12.0 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

MUSL T680 Special Topics in Museum Leadership 0.0-12.0 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

MUSL T780 Special Topics in Museum Leadership 1.0-4.0 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

MUSL T880 Special Topics in Museum Leadership 0.0-12.0 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

MUSL T980 Special Topics in Museum Leadership 0.0-12.0 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

National Security Management

Courses

NSM 710 Applied Project I 3.0 Credits

This course will examine public and private institutional responses to major crises. Students will be introduced to frameworks and methods for designing, developing, implementing and evaluating programs and plans for emergency management and business continuity (EMCP) operations in the public and private sectors.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

NSM 711 Applied Project II 3.0 Credits

This course covers risk assessment (RA) from the national security and emergency management perspectives. Students will explore the vulnerability and risk assessment methodologies for natural disasters and man-made events. This course provides the student with an opportunity to begin to develop a substantive MSNSM project of their own choosing, possibly continuing on research and development initiated in earlier courses.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

NSM 712 Applied Project III 3.0 Credits

A final, individual project intended to integrate material already covered in previous courses, as well as to provide an in-depth exploration of a topic of special interest or career relevance to the participant. Students work closely with a faculty member and are required to submit a comprehensive written report at the completion of the class.

College/Department: College of Computing and Informatics

Repeat Status: Not repeatable for credit

Neuroscience

Courses

NEUR 507 Neuroscience I 3.0 Credits

NEUR 507 is the first of two courses that provide a foundation in the structure and function of the nervous system. Clinical correlations relate the material to effective clinical practice and provide a neurophysiological basis for pathological entities described in the student's clinical neurology courses and commonly encountered in the clinic.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

NEUR 508 Neuroscience II 2.0 Credits

The 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: 1). underscore the necessity for understanding the material for effective clinical practice and 2). provide a neurophysiological basis for various pathological entities described in their clinical neurology courses and commonly encountered in the clinic.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

NEUR 534 Neuroscience 3.0 Credits

This course describes: structure and functions of the human central nervous system; neurons; basic topography of the spinal cord and brain; major sensory and motor pathways; higher cortical functions. Neurological deficits resulting from stroke, brain trauma and other neuropathological processes; as well as implications for rehabilitation and psychotherapy are presented.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CATX.

Nursing

Courses

NURS 500 [WI] Confronting Issues in Contemporary Health Care Environments 3.0 Credits

Confronting Issues in Contemporary Health Care Environments examines Health care policy and politics in terms of contemporary issues relative to nurses in advanced roles, health care access, quality, and cost. The focus of this course is the critical analysis of health policy and global health utilizing advanced nursing roles in relation to the broader health landscape.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

NURS 501 Dimensions of Human Sexuality in Health & Illness 3.0 Credits

This course explores the multiple dimensions of sexual expression as one of the central elements of human experience. Using a developmental framework, students explore physiological, psychological and social facets of human sexuality in the context of health and illness. The course will assist health care clinicians to address sexuality as an aspect of holistic care of clients. Students should be aware that course materials may be sexually explicit and the course may involve topics that are controversial in nature.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

NURS 502 Advanced Ethical Decision Making in Health Care 3.0 Credits

The focus of this course is to develop the student's ability to identify ethical dilemmas, apply moral reasoning, and then take action necessary to resolve the dilemma. Questions of clinical and applied ethics, including basic principles and theories that support and challenge the decision making process will be examined from various perspectives to address the moral difficulties the advance practice nurse is likely to encounter.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

NURS 503 Basic Principles of Nurse Anesthesia 3.0 Credits

This course examines the operational principles of anesthesia equipment, airway anatomy, basic airway management and proper patient positioning. Nurse anesthesia practice issues, cultural competency and the hazards of substance use disorders in the profession are also explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 504 Overview of Nurse Anesthesia 3.0 Credits

This course provides an overview of nurse anesthesia practice and principles. The lecture content is reinforced with simulation in which small student groups practice basic airway management skills and regional anesthesia insertion techniques. Students are also introduced to the process of induction, maintenance, and emergence.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 505 Chemistry and Physics 2.0 Credits

This course examines equipment, measurements, waveforms and gas laws relevant to anesthesia practice. Basic organic chemistry, the chemistry of agents utilized in nurse anesthesia practice is discussed. A focus on anesthesia safety includes electrical safety, prevention of surgical fires, and the hazards of intraoperative hypothermia.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 506 Health Policy 4.0 Credits

The purpose of this course is to enhance the graduate student's ability to examine and evaluate social policy and its impact on health policy, health status and systems, delivery of care and on nursing practice, education and research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 507 Nurse Anesthesia Pharmacology I 3.0 Credits

This course examines general pharmacokinetic, pharmacodynamics, and pharmacogenetic principles. The pharmacology of anesthetic agents including inhalational agents, intravenous induction drugs, sedatives, opioid and non-opioid analgesic agonists-antagonists is emphasized. Perioperative fluid management and blood component therapy is also studied.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 508 Nurse Anesthesia Clinical Practicum I 1.0 Credit

This is the first in a series of six nurse anesthesia clinical practicum courses. Clinical practicum I introduces the student to the anesthesia management of patients undergoing surgical and/or diagnostic procedures. As didactic knowledge and clinical competency increase, students may administer regional anesthesia, insert invasive monitoring lines or participate in the anesthesia management of patients undergoing more complex procedures. This course is complemented by clinical case presentations and simulation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 509 Health Promotion 4.0 Credits

This course addresses the health of individuals and populations from a systems perspective. Students investigate leading causes of illness and injury, develop and evaluate a multi-level intervention model. Focus is on the Health People 2010. Concepts and tools of continuous improvement are utilized.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 510 Advanced Principles of Nurse Anesthesia I 3.0 Credits

This is the first in a series of four principles of nurse anesthesia practice courses. In this course, basic and advanced knowledge of the respiratory system including anatomy, physiology, pathophysiology and pharmacology is examined. Monitoring of neuromuscular blockade and the anesthetic management for the patient with postoperative nausea and vomiting is also incorporated.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 511 Nurse Anesthesia Pharmacology II 3.0 Credits

This course examines the pharmacology of drugs used in anesthesia practice including pertinent cardiovascular agents, neuromuscular blocking agents, anticholinergics, anticholinesterases, cyclodextrins, cholinergic agonists, and local anesthetics.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 512 Nurse Anesthesia Clinical Practicum II 1.0 Credit

This is the second in a series of six nurse anesthesia clinical practicum courses. In clinical practicum II, the student continues to participate in the anesthesia management of patients undergoing surgical and/or diagnostic procedures. As didactic knowledge and clinical competency increases, students may administer regional anesthesia, insert invasive monitoring lines or participate in the anesthesia management of patients with significant co-morbidity undergoing more complex procedures.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 513 Research and Theory I 4.0 Credits

The course is designed to provide professional graduate students with the skills necessary to evaluate the relationship between practice and published research. The course content includes an overview of research concepts, ethics in research, literature reviews, quantitative and qualitative research designs, research methods, and data analysis.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 514 Leadership in Nursing 3.0 Credits

This course addresses key concepts and skills required of nurses in today's health care climate, including the ability to analyze situations from a systems perspective, identify and attend to the context in which information is given and perceived, and to enhance interactions by clarifying communication.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 515 Advanced Principles of Nurse Anesthesia II 3.0 Credits

This is the second in a series of four principles of nurse anesthesia practice courses. In this course, the physiology, pathophysiology, pharmacology, and anesthetic management for the geriatric, obese, obstetrical, and neonatal/pediatric patient population is examined. Regional anesthesia and the unique anesthesia considerations for diagnostic or surgical procedures out of the operating room are also presented. The didactic content is enhanced with a cadaver lab, ultrasound guided peripheral nerve block workshop, and pediatric simulation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 516 Nurse Anesthesia Clinical Practicum III 2.0 Credits

This is the third in a series of six nurse anesthesia clinical practicum courses. In Clinical Practicum III, students have the opportunity to administer anesthesia to patients scheduled for more complex surgical procedures or to care for patients with significant co-morbidities. Students may also administer regional anesthesia and insert invasive monitoring lines. Subspecialty anesthesia rotations foster the application of theory to clinical practice and the development of competencies to safely anesthetize the pediatric patient.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 517 Nurse Anesthesia Clinical Practicum IV 3.0 Credits

This is the fourth in a series of six nurse anesthesia clinical practicum courses. In Clinical Practicum IV, students have the opportunity to administer anesthesia to patients scheduled for more complex surgical procedures or to care for patients with significant co-morbidities. Students may also administer regional anesthesia and insert invasive monitoring lines. Subspecialty anesthesia rotations foster the application of theory to clinical practice and the development of competencies to safely anesthetize the obstetrical and pediatric patient.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 518 Advanced Principles of Nurse Anesthesia III 3.0 Credits

This is the third in a series of four principles of nurse anesthesia practice courses. In this course, the physiology, pathophysiology, pharmacology and anesthetic management for the cardiac, thoracic, renal and genitourinary patient population is presented. The didactic content is enhanced with a cadaver lab and ultrasound guided central line insertion workshop.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 519 Forensic Science Foundations 3.0 Credits

This course examines the defining characteristics of offender behavior including the importance of obtaining complete victim histories, investigation of a motive and suspects as it relates to healthcare and practice. Investigative and therapeutic factors and approaches including examination of environment, place, time and crime scene indicators will be explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 520 Advanced Physiology 3.0 Credits

This course presents the essentials of organ system function in humans, with an emphasis on the integration of neural and hormonal mechanisms in the control of organ system function. This course is limited to students in the Nursing Anesthesia Program of the College of Nursing and Health Professions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 521 Advanced Pathophysiology I 3.0 Credits

A detailed discussion of the disturbances of normal function and basic mechanisms involved in the diseases of the major organ systems and the general aspects of the common human pathophysiological conditions and syndromes. This course includes general pathological processes that are specific to the cardiovascular system.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 520 [Min Grade: C]

NURS 522 Advanced Pathophysiology II 3.0 Credits

A detailed discussion of the disturbances of normal function and basic mechanisms involved in diseases of the major organ systems and the general aspects of the common human pathophysiological conditions and syndromes. This course includes respiratory, renal, digestive, hepatobiliary and pancreatic pathophysiology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 521 [Min Grade: C]

NURS 523 Advanced Pathophysiology III 3.0 Credits

A detailed discussion of the disturbances of normal function and basic mechanisms involved in diseases of the major organ systems and the general aspects of the common human pathophysiological conditions and syndromes. This course includes the endocrine, reproductive, sensory/motor pathways, pain pathways, neuromuscular, neurological, and skeletal pathophysiology.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 522 [Min Grade: C]

NURS 524 Analysis and Application of Forensic Trends and Issues 3.0 Credits

This course requires synthesis of information gathered from previous core courses with application to actual forensic case studies from a healthcare perspective. Students will analyze characteristics of offender behavior, victim histories and trajectories, investigative factors and related approaches are based on integration of theory and research with translation and application to forensic practice within their discipline.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 6 credits

Prerequisites: NURS 519 [Min Grade: B] and NURS 528 [Min Grade: B] and NURS 533 [Min Grade: B]

NURS 526 Information, Innovation & Technology in Advanced Nursing Practice 3.0 Credits

This course is designed to provide an in-depth introduction to information systems and technologies that support practice and improve patient care and outcomes. Students develop an understanding of relationships between patient care and information and data issues involved in clinical practice in addition to examining informatics issues within complex healthcare systems.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

NURS 527 Evidence Based Approaches to Practice 3.0 Credits

This course focuses on using research to guide evidence-based practice. Communication, collaboration, and decision making skills from a multidisciplinary approach essential to collect, evaluate, and apply research to practice will be emphasized. During this course the student will learn to (1) conduct efficient, thorough searches of the research literature; (2) evaluate the quality of a body of research through an appraisal of design, methodology, and data analysis; (3) summarize the findings from an overall body of research; and (4) apply research evidence to issues of current nursing practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 519 [Min Grade: C] and RSCH 523 [Min Grade: C]

NURS 528 Victimology – Contemporary Trend 3.0 Credits

This course examines the wide range of victimization experiences from the perspective of the crime victim, the offender, families, and the healthcare community. Basic tenets of assessment and intervention with victims and survivors are explored. Emphasis will focus on understanding the etiologic and motivation issues as well as response patterns to victimization and perpetration dynamics from a healthcare provider perspective.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 529 Foundations of Complementary and Integrative Therapies 3.0 Credits

This course provides an overview of the history of medicine, and reviews the theoretical foundation of selected CIT areas including: botanical medicine, clinical aromatherapy, homeopathy, mind-body therapy, energy therapy, and humor and healthcare. It compares the CIT world-view with the conventional medical model.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 530 Anesthesia Seminar 1.0 Credit

This course fosters dissemination of evidence based practice findings with peers and other scholars. Students work independently with a faculty advisor to create a poster for visual and oral presentation based on the evidence based practice paper developed in the RSCH 504 course. Students will submit an abstract of the poster for Drexel University's College of Nursing and Health Professions Evidence Based Practice (EBP) Graduate Student Colloquium.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 531 Epidemiology in Action: Tracking Health & Disease 3.0 Credits

Assists students to examine and actualize the processes for development and measurement of outcomes in health care in the context of evidence-based practice. Explores epidemiologic theories and models to promote understanding of risks and disease pathogenesis. Examines the dynamic balance between health and illness. Understanding of health assessment, risk identification and outcomes measurement is emphasized.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 503 [Min Grade: B]

NURS 532 Evaluation of Health Outcomes 3.0 Credits

Examines standard models for evaluation of health outcomes for clients. Clinical interventions and outcomes for specific populations will be explored from the client, provider, and payer perspective, using selected methodological and evaluative approaches. The impact of health care, disease management and outcomes will be examined in relation to public policy and legislation. Key steps in measuring clinical outcomes are explored in developing an analysis plan for a selected clinical population.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HI or major is NURS.

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 533 Forensic Mental Health 3.0 Credits

This course examines the various foundations of offender behavior including theory, research and motivational models. Basic tenets of assessment and intervention with offenders will be examined from a healthcare perspective.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 534 FNP I: Primary Care of the Emerging Family 5.0 Credits

This is the first course in a series of five clinical courses for the graduate student studying to become a family nurse practitioner. This course introduces the FNP student to the health care needs and dynamics of the emerging family throughout the lifecycle. Clinical practicum of 160 hours occurs concurrently.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 535 FNP II: Primary and Episodic Care of Infants, Children and Adolescents 5.0 Credits

This is the second course in a series of five clinical courses for the graduate student who is studying to become a family nurse practitioner. This course is designed to introduce the FNP student to primary and episodic care of infants, children, adolescents, and their families. Clinical practicum of 160 hours occurs concurrently.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 534 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 536 FNP III: Primary Care of Adults and Older Adults Across the Adult Age Spectrum I 5.0 Credits

This is the third in a series of five clinical courses for the graduate student who is studying to become a family nurse practitioner. The course is designed to introduce the FNP student to primary care of the adult-older adult population across the age spectrum. Clinical practicum of 160 hours occurs concurrently.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 534 [Min Grade: B] and NURS 535 [Min Grade: B]

NURS 537 FNP IV: Primary Care of Adults and Older Adults Across the Adult Age Spectrum II 5.0 Credits

This is the fourth in a series of five clinical courses for the graduate student who is studying to become a family nurse practitioner. The course is designed to build on topics from FNP III, Primary Care of the Adult-Older Adult I, with a focus on care of the adult-older adult with multisystem and chronic illness that impacts quality of life. Clinical practicum of 160 hours occurs concurrently.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 534 [Min Grade: B] and NURS 535 [Min Grade: B] and NURS 536 [Min Grade: B]

NURS 538 FNP V: Integrative Practicum in Family Practice Across the Lifespan 4.0 Credits

This is the final clinical courses for the graduate student studying to become a family nurse practitioner. This course is designed to assist the student to apply knowledge from all previous clinical courses to guide them in the transition from student to practitioner. Clinical practicum of 80 hours occurs concurrently.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 534 [Min Grade: B] and NURS 535 [Min Grade: B] and NURS 536 [Min Grade: B] and NURS 537 [Min Grade: B]

NURS 539 Holistic Living for the Caregiver 3.0 Credits

This course is designed to take the student on an experiential journey toward a holistic way of living that emphasizes a mind-body-spirit approach. Emphasizes development of healthy, nutritious eating, effective exercise, and guidelines for incorporating basic supplementation. Students stress reduction and management techniques including breathing, walking and music. Integrates spiritual concepts.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 540 ASD I: Introduction to Autism Spectrum Disorder 3.0 Credits

This course will provide an overview of the public health problem of autism spectrum disorder, including natural history, etiology, rising prevalence, risk factors, and core features of ASD. The student will be introduced to the important and evolving role of nurses in the life-long care of people with ASD.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 541 ASD II: Health and Behavioral Care Planning and Intervention for Children and Adolescents 3.0 Credits

This course will provide an overview of the range of treatments for ASD and pharmacotherapy for symptom managements of the pediatric population across the lifespan. A family-centered approach to care is emphasized, developing understanding of the medical, nursing and behavioral management of the range of functional problems and core features across the lifespan.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 542 ASD III: Health and Behavioral Care Planning and Intervention for Adults with ASD 3.0 Credits

Students acquire in-depth knowledge of the various treatment approaches to ASD and learn strategies for managing acute and chronic health and behavioral problems experienced by adults with ASD. Core features manifest differently based on age, environmental stressors, therefore the students learn how to predict and prevent problems in a variety of health care settings and circumstances as individuals with ASD require treatment for other health conditions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 543 ASD IV: Nursing Leadership and Advocacy for ASD 3.0 Credits

Students will examine the role of nursing in the life-long care of people with ASD and identify ways to expand the scope of nursing care for this vulnerable population. Practical issues of collaboration and reimbursement for services will be explored. Students will explore the availability of services in the community and discuss approaches to patient advocacy. Students will identify and implement an independent project.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 544 Quality and Safety in Healthcare 3.0 Credits

This course provides a broad introduction to the essential competencies required by nurses to improve practice and health care delivery. Based upon the Quality and Safety Education for Nurses (QSEN) project, class activities will be designed to prepare nurses who will have the knowledge, skills and attitudes necessary to serve in leadership roles to drive quality improvement and safety within healthcare systems.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 546 Graduate Nursing Seminar 1.0 Credit

This course fosters the writing and dissemination of evidence based practice findings with both peers and other scholars. Students work independently with faculty advisors to create a presentation based upon the evidence based paper developed in RSCH 504. Students will submit this abstract and presentation to the Drexel University's College of Nursing and Health Professions Evidence Based Practice (EBP) Graduate Student Colloquium, Drexel University's Graduate Research Day or a Regional/National Specialty Conference for potential presentation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is MSN.

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 547 Communication and Self-Awareness for Leading and Managing in Healthcare 3.0 Credits

This course focuses on the central role that self plays in leadership and communication skills. By performing self-observations and analyses, students will analyze the role of self in leadership and gain appreciation of the complexities of interpersonal communication. Enhanced communication skills will also be explored in teams and organizational settings.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 557 [Min Grade: B]

NURS 548 Advanced Pathophysiology 3.0 Credits

Building on a foundation of normal physiology, students are exposed to the major disturbances of normal function and the basic mechanisms involved in disease of the major organ systems. The course includes discussion 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

NURS 549 Advanced Pharmacology 3.0 Credits

This course is designed to build on prior pharmacologic study of actions and effects of drugs on the human system across the life span. Students will study pharmacologic mechanisms of action, effects on organ systems, routes of administration, pharmacokinetics, therapeutic uses, considerations related to age and physiologic state, adverse reactions, contraindications, and drug interactions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 550 Advanced Health Assessment & Diagnostic Reasoning 4.0 Credits

This course is designed to introduce the experienced clinical nurse to advanced health assessment techniques and diagnostic reasoning. The content of this course focuses on advanced clinical history taking, and physical and psychosocial assessment of individuals/families across the lifespan. Differentiation of normal variations and pathophysiologic changes are emphasized integrating advanced clinical reasoning within the scope of advanced practice nursing.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 551 Foundations of Phytotherapy: Clinical Applications of Herbal Therapy 3.0 Credits

This course serves as a foundation for the safe, effective and rational approach to using some of the most commonly known herbs in clinical practice. Includes a review of the primary uses, active constituents, pharmacological actions, known contraindications, drug interactions and potential side effects, as well as a review of the clinical research and historical significance of each herb.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 552 Integrative Advanced Relaxation Techniques 3.0 Credits

This course presents evidence-based integrative mind-body-spirit healthcare strategies that are indicative of specific complementary and integrative therapies. These therapies include modified mindfulness meditation, progressive muscle relaxation, and yoga that are being employed by a growing number of healthcare providers and healthcare organizations across the country (e.g. Veterans Administrative Health Systems) to help address PTSD, anxiety, depression and insomnia.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 553 Data Analysis for Decision-Making in HC Management 3.0 Credits

Healthcare management is increasingly a data-dependent and data-driven process. The focus of this course is on skill development in use of data analysis to understand organizational issues, address key human resource challenges, and achieve organizational objectives. Students will utilize a healthcare organization simulation and spreadsheet application to organize and analyze data and draw conclusions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 557 [Min Grade: B] and NURS 547 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 562 [Min Grade: B] and NURS 558 [Min Grade: B]

NURS 554 Pharmacology for Adult-Gerontology Acute Care Nurse Practitioners 3.0 Credits

This course is designed to prepare the Adult-Gerontology Acute Care Nurse Practitioner student for the safe prescribing and monitoring of therapeutic agents across the spectrum of adult-older adult patient population in acute and critical illness.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 555 Psychopharmacology Across the Lifespan 3.0 Credits

This course provides scientific knowledge of psychopharmacology and its application to treatment of clients with psychiatric disorders across the lifespan. The course focuses on advanced concepts in neuroscience, pharmacokinetics and pharmacodynamics of psychotropic drugs in the management of targeted symptoms of psychiatric disorders.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 556 Pharmacology for Family Nurse Practitioners 3.0 Credits

This course is designed to prepare the FNP students for the safe managing and prescribing of therapeutics. Students will study pharmacologic mechanisms of action, effects on organ systems, routes of administration, pharmacokinetics, therapeutic uses, considerations related to physiologic state, adverse reactions, contraindications and drug interactions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 557 Leadership and Stewardship in the Health Professions 3.0 Credits

Changes in the health care system are demanding practitioners with well-honed leadership skills and with a sense of stewardship. This course explores the concepts of leadership and stewardship from a historical and contemporary perspective with particular application to the health professions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HI or major is NURS.

NURS 558 Economics of Healthcare Management & Policy 3.0 Credits

This course will address the fundamentals of economics as they relate to healthcare services, quality improvement, management measures, and cost containment strategies. The student will explore the issues of market supply and demand, the economics of nursing, the impact of managed care and the role of information technology in the delivery of healthcare services.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

NURS 559 Operations Management in Contemporary Healthcare Organizations 3.0 Credits

The rapidly changing healthcare environment and ongoing demands for increased productivity, quality, and service excellence have resulted in a renewed emphasis on operational efficiency in the delivery of health care services and nursing care. This course will examine critical issues related to structuring patient care delivery models and clinical practice for quality and efficiency. Pertinent legal and ethical considerations will be threaded through the content.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 557 [Min Grade: B]

NURS 560 Wicked Problems in Health Care 3.0 Credits

The term "wicked problem" originated in designing and planning literature and crept into healthcare, capturing problems such as access to care, healthcare errors, etc. this course offers a perspective on wicked healthcare problems and a framework to understand their complexity, and explores what happens in attempts to solve them.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 561 Spirituality, Health and Healing 3.0 Credits

Spirituality is an essential aspect of one's identity. For some, spirituality is expressed in terms of religious concepts while for others it is less formalized yet no less significant in contributing meaning and purpose to their lives. Health, illness, and healing are three major life experiences impacted upon by one's spirituality.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 562 Workforce Management in Healthcare Organizations 3.0 Credits

This course provides a comprehensive study of topics related to workforce management issues and strategic human resources management for nurses in a leadership role. Students examine recruitment, selection and retention, employee appraisal and development, as well as compensation and labor relations. Implications of generational and cultural dimensions, legal and global environments as well as current issues such as diversity training, sexual harassment policies are explored and balanced with organizational pressures related to cost-benefit priorities supporting financial goals and operational efficiency.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 557 [Min Grade: B]

NURS 564 The Business of Healthcare 3.0 Credits

This course provides a forum for the exploration and evaluation of financial management and the financial environment of the healthcare industry. The student will develop an understanding of the budgeting and accounting process and how a fiscally responsible budget works in a climate of decreased government funding, shared cost mechanisms and decreased personnel resources in addition to basic financial management principles and tools.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HI or major is NURS.

NURS 565 Body Movement Therapies 3.0 Credits

This course is an overview of the history and theory of the following movement therapies: Dance Movement Therapy, Feldenkrais, Qigong, Yoga, and Pilates. The clinical application of these movement therapies to specific patient populations will be explored. Students will have the opportunity to "experience" an episode of each of the movement therapies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 566 Yoga for the Enlightened Practitioner 3.0 Credits

This course provides a framework for understanding and experiencing the holistic practice of yoga. It addresses yoga's ancient philosophy of universal wisdom and this philosophy's increasing relevance to humankind today. The eight limbs of yoga are incorporated for study throughout the course content modules to promote self awareness and conscious action in daily life experience. Holistic yoga application as a medical modality is reviewed based on evidence based practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 567 Strategic Management: Power, Politics and Influence in Healthcare Systems 3.0 Credits

Nursing leaders are increasingly recognized as vital to the success of health care initiatives and organizations. Strategic management provides clarity and direction in an environment of rapid change and uncertainty. This course will utilize a systematic approach to analyze the "fit" and "position" of nursing within organizations. Power, politics and influence, management systems and processes, and organizational dynamics will be examined within the context of structure and function of current and emergent healthcare delivery systems.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 558 [Min Grade: B] and NURS 557 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 562 [Min Grade: B] and NURS 564 [Min Grade: B]

NURS 568 Practicum and Symposium in Healthcare Operations Management 3.0 Credits

This practicum provides the student an opportunity to operationalize the leadership role in appropriate agencies and facilities in conjunction with an expert nursing leader. A course project involving a project of value to both the student and the organization will be completed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 557 [Min Grade: B] and NURS 558 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 564 [Min Grade: B] and NURS 567 [Min Grade: B] and NURS 562 [Min Grade: B]

NURS 569 Practicum and Symposium in Technology and Management of Information in Healthcare Organizations 3.0 Credits

The focus of the practicum will be on exposure to the management of information to support decision-making, communication, and strategic planning. These include systems for managing human resources, improving quality of care and tracking organizational metrics. A course project involving a project of value to both the student and the organization will be completed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 557 [Min Grade: B] and NURS 558 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 564 [Min Grade: B] and NURS 567 [Min Grade: B] and NURS 562 [Min Grade: B]

NURS 570 Adult Gerontology Acute Care NP I: Introduction to Adult Gerontology Acute Care Medicine 5.0 Credits

This is the first course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to introduce the student to the role of the Adult-Gerontology Acute Care Nurse Practitioner in adult acute/critical and chronic healthcare settings.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 571 Adult Gerontology Acute Care Nurse Practitioner II: Mgmt/ Care of Patients in Acute/Crit Care Med Set 5.0 Credits

This is the second course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to foster development of clinical competency and role transition in the setting of acute medicine.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 570 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 572 Adult Gerontology Acute Care Nurse Practitioner III: Mgmt/ Care of Patients in Acute Surgical Setting 5.0 Credits

This is the third course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to foster ongoing development of clinical competency and role transition in the setting of acute surgical patients.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 570 [Min Grade: B] and NURS 571 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 573 Adult Gerontology Acute Care NP IV: Management of Care of Patients in Critical Care Settings 5.0 Credits

This is the fourth course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to foster ongoing development of clinical competency and role transition in the setting of critically ill patients.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 570 [Min Grade: B] and NURS 571 [Min Grade: B] and NURS 572 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 575 Family Nurse Practitioner I: Primary Care of Infants, Children & Adolescents 5.0 Credits

This course is designed to introduce the FNP student to primary care of children and their family. The student will begin the critical analysis of clinical strategies and interventions in health promotion, health maintenance, disease prevention and common health problems seen primarily in pediatric populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 519 [Min Grade: C] and RSCH 523 [Min Grade: C] and NURS 500 [Min Grade: C] and NURS 502 [Min Grade: C] and NURS 526 [Min Grade: C] and NURS 527 [Min Grade: C] and NURS 548 [Min Grade: C] and NURS 549 [Min Grade: C] and NURS 550 [Min Grade: C] and NURS 556 [Min Grade: C]

NURS 576 Family Nurse Practitioner I: Primary Care of Adults 5.0 Credits

This course is designed to introduce the students to primary care of the adult population with a focus on well adult care and the management of acute illness. Critical analysis of clinical strategies and interventions in health promotion, health maintenance, disease prevention and common health problems seen primarily in adult populations are studied.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 519 [Min Grade: C] and RSCH 523 [Min Grade: C] and NURS 500 [Min Grade: C] and NURS 502 [Min Grade: C] and NURS 526 [Min Grade: C] and NURS 527 [Min Grade: C] and NURS 548 [Min Grade: C] and NURS 549 [Min Grade: C] and NURS 550 [Min Grade: C] and NURS 556 [Min Grade: C] and NURS 575 [Min Grade: C] and NURS 578 [Min Grade: C]

NURS 577 Family Nurse Practitioner IV: Primary Geriatric Care 5.0 Credits

This course is designed to introduce the NP student to primary care of the adult population with a focus on well adult care of the older adult with multisystem and chronic illnesses. Critical analysis of clinical strategies and interventions in health promotion, health maintenance, disease prevention and common chronic health problems seen primarily in older adult populations are studied.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 519 [Min Grade: C] and RSCH 523 [Min Grade: C] and NURS 500 [Min Grade: C] and NURS 502 [Min Grade: C] and NURS 526 [Min Grade: C] and NURS 527 [Min Grade: C] and NURS 548 [Min Grade: C] and NURS 549 [Min Grade: C] and NURS 550 [Min Grade: C] and NURS 556 [Min Grade: C] and NURS 575 [Min Grade: C] and NURS 576 [Min Grade: C] and NURS 578 [Min Grade: C]

NURS 578 Family Nurse Practitioner III: Primary Care of Women 5.0 Credits

This course is designed to introduce the FNP student to the health care of women. Critical analysis of clinical strategies and interventions in health promotion, health maintenance, disease prevention and common health problems seen primarily in female populations is studied. Emphasis is on the care of women from menarche through menopause, including the care of pregnant women.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 519 [Min Grade: C] and RSCH 523 [Min Grade: C] and NURS 500 [Min Grade: C] and NURS 502 [Min Grade: C] and NURS 526 [Min Grade: C] and NURS 527 [Min Grade: C] and NURS 548 [Min Grade: C] and NURS 549 [Min Grade: C] and NURS 550 [Min Grade: C] and NURS 556 [Min Grade: C] and NURS 575 [Min Grade: C]

Corequisite: NURS 579

NURS 579 Family Nurse Practitioner V: Integrative Practicum in Family Practice 4.0 Credits

This course is designed to assist the student to apply knowledge from all of the previous clinical courses to guide them in the transition from student to practitioner. Content will include extensive use of case management of complex problems seen in Family Practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 519 [Min Grade: C] and RSCH 523 [Min Grade: C] and NURS 500 [Min Grade: C] and NURS 502 [Min Grade: C] and NURS 526 [Min Grade: C] and NURS 527 [Min Grade: C] and NURS 548 [Min Grade: C] and NURS 549 [Min Grade: C] and NURS 550 [Min Grade: C] and NURS 556 [Min Grade: C] and NURS 575 [Min Grade: C] and NURS 576 [Min Grade: C] and NURS 577 [Min Grade: C] and NURS 578 [Min Grade: C]

NURS 580 Adult Gero Acute Care NP V: Mgmt/Care of Clients in Acute, Critical Care, Med or Surg Settings 5.0 Credits

This is the fifth course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to foster independent and interprofessional practice in the role of the Adult-Gerontology Acute Care Nurse Practitioner.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ACNP.

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 570 [Min Grade: B] and NURS 571 [Min Grade: B] and NURS 572 [Min Grade: B] and NURS 573 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 581 Intra/Entrepreneurism, The Process of Innovation 3.0 Credits

The course is designed for the student who desires to understand the entrepreneurial process and how it can be used to creatively build new structures within health care, potentially discovering intra/entrepreneurial potential within themselves. Through an analysis of contemporary theories on change, the theoretical framework of intra/entrepreneurism will be analyzed and applied to innovative products and processes within health care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 582 Foundation of Good Clinical Practice in Clinical Trials Mngmt 3.0 Credits

This foundation course in clinical research provides a comprehensive review of the fundamentals of human clinical research. It includes the principles of Good Clinical Practice (GCP?s), regulatory requirements and guidelines, and ethical requirements for human drug and device development in the United States.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 583 Operational Leadership in Clinical Trials Management 3.0 Credits

This course focuses intensely on the integration and application of Good Clinical Practices (GCPs) and regulatory requirements in clinical trials management, including the development of an informed consent and responsibilities of an institutional review board (IRB). There is a strong focus on the financial aspects of study management including developments of study budgets.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 582 [Min Grade: B]

NURS 584 Current Topics in Clinical Trials 3.0 Credits

This third course in clinical research builds on the regulatory knowledge and skills learned in the foundation courses and offers an opportunity for the student to explore current topics in clinical trials management. It focuses on the challenges of running a clinical trial including fraud, adverse event reporting and patient recruitment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 582 [Min Grade: B] and NURS 583 [Min Grade: B]

NURS 585 Clinical Trials Research Practicum 5.0 Credits

The practicum/project provides an opportunity for the student to operationalize the clinical trials role in appropriate agencies and facilities in conjunction with an expert clinical trials researcher. Emphasis is placed on practical experience in the clinical trials research process. A capstone project will be completed in conjunction with the practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 582 [Min Grade: B] and NURS 583 [Min Grade: B] and NURS 584 [Min Grade: B]

NURS 586 Innovation in Advanced Nursing Practice: Theory and Application 3.0 Credits

Explores the theoretical literature from diverse disciplines on how innovations are conceived and implemented, particularly in nursing practice, and how such innovations run their course and spawn other innovations. Professional issues, practice issues, legislative issues, certification issues, insurance issues, legal issues and ethical conflict resolution in advanced nursing practice are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CUIE or major is NURS.

NURS 587 Case Studies in Intra/Entrepreneurship and Innovation in Nursing 3.0 Credits

Using a case study model of great and bad ideas in nursing practice, education, and administration, students will explore some of the intra/entrepreneurial experiments, innovations and creative ventures in nursing, including both successes and failures. Professional issues, practice issues, legislative issues, certification issues, insurance issues, legal issues and ethical conflict resolution in advanced nursing practice are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CUIE or major is NURS.

Prerequisites: NURS 586 [Min Grade: B]

NURS 588 The Nurse as Intra/Entrepreneur and Consultant 3.0 Credits

Using a business development model, each individual will create a business plan from vision, through action plan, to opening day. Researcher, expert and leader are presented and explored. Interpretation and application, professional issues, practice issues, legislative issues, certification issues, insurance issues, legal issues and ethical conflict resolution in advanced nursing practice are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CUIE or major is NURS.

Prerequisites: NURS 586 [Min Grade: B] and NURS 587 [Min Grade: B]

NURS 589 Witches, Wise Women and Women Healers 3.0 Credits

This course provides an intriguing chronicle of women healers throughout history from ancient to modern times, those who have served as priestesses, witches, wise women, and ultimately the healers who have helped to shape and form healthcare, as we know it today. It examines the influence of religion, misogyny, science, politics, economics, and sexuality on the creation of the female archetype and the lasting impression that has influenced her role in healing practices. Finally, students will look at the role of modern healers and the evolving model of integrative healthcare in healing practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 591 Foundations of Nursing Education 3.0 Credits

This course prepares the prospective nurse educator with the foundational principles necessary for teaching in various settings: classroom, clinical and college laboratories, and health care agencies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 544 [Min Grade: B]

NURS 592 PMHNP I: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology I 5.0 Credits

This course introduces conceptual models and theories of advanced psychiatric mental health nursing practice. The course integrates assessment, diagnosis and treatment of the adult and older adult clients with major mental health disorders, incorporating eclectic content and evidenced based practices from the sciences. Students integrate and apply theory and practice of PMHNP both in the classroom and in a supervised clinical practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 502 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 555 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 593 PMHNP II: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology II 5.0 Credits

This course expands upon conceptual models and theories of advanced psychiatric mental health nursing practice. Students apply knowledge of foundational concepts and clinical skills to special populations. Integrative medical care of the psychiatric patient is emphasized in this course with consideration to common comorbidities and differential diagnoses. Students integrate and apply theory and practice of PMHNP both in the classroom and in a supervised clinical practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 555 [Min Grade: B] and NURS 592 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 594 PMHNP III: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology III 5.0 Credits

This course discusses conceptual models and theories of advanced psychiatric mental health nursing practice with application to the child and adolescent population and their families. The course integrates assessment, diagnosis and treatment of psychiatric disorders of children and adolescents. Students integrate and apply theory and practice of PMHNP both in the classroom and in a supervised clinical practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 555 [Min Grade: B] and NURS 592 [Min Grade: B] and NURS 593 [Min Grade: B]

NURS 595 PMHNP IV: Adv Mental Hlth NP Management and Care of Clients in Diverse Pop Across the Lifespan 5.0 Credits

This course focuses on the conceptual theories and applied modalities of individual, family, and group psychotherapy within advanced psychiatric mental health nursing practice. Students apply knowledge of psychotherapeutic concepts and strategies in the care of psychiatric patients both in the classroom and in the supervised clinical practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 555 [Min Grade: B] and NURS 592 [Min Grade: B] and NURS 593 [Min Grade: B] and NURS 594 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 597 Clinical & Didactic Teaching Methods 3.0 Credits

The purpose of this course is to prepare the prospective nurse faculty with the foundational principles and skills necessary for didactic teaching in the classroom and for supervision in clinical settings. Educational theories and instructional methods will be explored to enhance learning among traditional and non-traditional student populations in differing types of programs within the higher education environment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 598 Teaching Critical Thinking & Clinical Decision-Making in Nursing 3.0 Credits

This course is designed to prepare the prospective nurse faculty with theoretical principles, processes, and instructional skills to promote critical thinking that results in appropriate clinical decision-making when interacting with student nurses in the classroom and clinical settings. Techniques for the facilitation of learning will be emphasized.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 597 [Min Grade: B] (Can be taken Concurrently)

NURS 599 Curriculum Design in Nursing Education 3.0 Credits

This course offers the student practical applications in curriculum design, including the development of a teaching/learning philosophy, mission statement, programmatic goals, learning objectives, individual courses, and teaching plans.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 597 [Min Grade: B], NURS 598 [Min Grade: B] (Can be taken Concurrently)

NURS 600 Measurement & Evaluation in Nursing Education 3.0 Credits

This course offers the student practical applications in assessment of learning outcomes, systematic test construction using multiple-choice format and alternative formats, and basic test statistics. Participants will explore advantages and limitations of a wide variety of classroom and clinical testing modalities.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 597 [Min Grade: B], NURS 598 [Min Grade: B] (Can be taken Concurrently)

NURS 602 Foundations for Clinical Nurse Leader 4.0 Credits

First of 3 CNL clinical courses in the track. Students experience point of care management of cohorts of clients with an interdisciplinary team model and from a Microsystems perspective. Integrates core and support course content into assessment, diagnosis and of health and illness conditions of adult clients. Concepts, theories, & research related to health promotion, illness management, risk identification and reduction to improve client safety are addressed. Emphasizes collaboration and interdisciplinary approach.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 531 [Min Grade: B] and NURS 532 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 544 [Min Grade: B]

NURS 603 Clinical Nurse Leader Capstone Immersion I 5.0 Credits

Second of 3 CNL clinical courses in the track. Students apply concepts, theories and evidence to the care of cohorts of clients with chronic illness. Emphasis is placed on utilization of technology at the point of care. Students will collaborate with other health care providers to develop and interdisciplinary approach to epidemiologically significant problems and to design, coordinate and evaluate plans of care using evidence and outcome data. Capstone project design begins in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 602 [Min Grade: B]

NURS 604 Clinical Nurse Leader Capstone Immersion II 5.0 Credits

Third course of 3 CNL clinical courses in the track. Students complete and present the capstone project to health care administrators and other stakeholders. Emphasis is on utilization of technology at the point of care. Students will collaborate, negotiate and articulate evidence based approaches to develop an interdisciplinary plan for significant epidemiologically significant problems and potential problems in diverse populations. Students develop in-depth understanding and skills in care of chronically ill client cohorts.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 602 [Min Grade: B]

NURS 605 Pharmacology for Acute Care Nurse Practitioner 3.0 Credits

This course is designed to prepare the Adult Acute Care Nurse Practitioner student for the safe managing and prescribing of therapeutics. Students will study pharmacologic mechanisms of action, effects on organ systems, routes of administration, pharmacokinetics, therapeutic uses, considerations related to physiologic state, adverse reactions, contraindications, and drug interactions. Case studies will be used to aid students in the transition from course work to clinical practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 548 [Min Grade: C] and NURS 549 [Min Grade: C]

NURS 606 Curriculum Design for Higher Level Cognition 3.0 Credits

The purpose of this course is to offer the student applications in nursing curriculum design, including the development of a teaching/learning philosophy, mission statement, programmatic goals, learning objectives, teaching plans, and individual courses.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 591 [Min Grade: B]

NURS 608 Foundations of Good Clinical Practice in Clinical Research 4.0 Credits

This course describes the evolution of Good Clinical Practice (GCP) for clinical trials, focusing on investigational drugs, biologics, medical devices, and behavioral health. The science, regulations, and ethical principles for developing and approving these interventions are emphasized. The advanced role specialty of clinical research nursing is introduced.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B]

NURS 610 Foundations in Clinical Aromatherapy 3.0 Credits

This course provides a strong foundation for the safe and effective use of 20 therapeutic essential oils. Includes the clinical application of each essential oil, basic essential oil organic chemistry, safety, dosages and known contraindications. Reviews essential oil biosynthesis, specific plant morphological structures, extraction methodologies, primary avenues of absorption, and an overview of the history of aromatherapy, and quality of essential oils. This course adheres to the educational standards (level one) set forth by the National Association for Holistic Aromatherapy (NAHA).

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 612 Women's Integrative Health 3.0 Credits

This course presents an Integrative Mind-Body approach for supporting various states of health imbalance specific to women's health. Applied integrative strategies highlight the use of dietary and lifestyle changes, nutritional supplementation, botanical medicines and other specific healing modalities. Takes into account the eastern philosophy of anatomy energetics, the integration of the physical and the spiritual, psyche and soma, into a harmonious whole for addressing specific women's health conditions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CIT 501 [Min Grade: C] or CIT 502 [Min Grade: C] or CIT 503 [Min Grade: C]

NURS 613 The Role and Responsibility of the Nursing Professor 3.0 Credits

Academic policies, protocols, and legal aspects of education will be explored. Campus relationships, prospective and current student issues, as well as laws affecting students will be examined. Situational events that occur in the classroom and clinical settings will be highlighted for students to research, discuss and develop a format for applying case law to student faculty issues.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 591 [Min Grade: B] and NURS 606 [Min Grade: B]

NURS 614 Technology for Nursing Education & Practice 3.0 Credits

The purpose of this course is to expand on technology skills that support the nurse educator in the virtual learning environment. This course prepares the student educator with the skills to utilize available technology for the development of on-line course work for the academic setting and program development for staff and patient education and the preparation community outreach programs.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 615 Assessment, Measurement and Evaluation 3.0 Credits

This course explores the theories, principles and practices that underpin the measurement and evaluation of educational settings. This course includes content on approaches to giving feedback, test construction and psychometrics evaluation, development and grading of written assignments, evaluation of clinical performance and self-evaluation for personal teaching effectiveness.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 591 [Min Grade: B] and NURS 606 [Min Grade: B] and NURS 613 [Min Grade: B]

NURS 616 Teaching Methods in Nursing Education 3.0 Credits

This course provides an overview of teaching methods utilized within nursing education to support student learning in clinical, didactic and online learning environments. Students will examine various teaching/learning technologies, including simulation, and integrate these technologies with select teaching methods in the design of coursework to support learning.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 591 [Min Grade: B] and NURS 606 [Min Grade: B] and NURS 613 [Min Grade: B]

NURS 617 Qigong: Bio-energy Therapy 3.0 Credits

This course teaches Qigong in the context of traditional Oriental medicine, and includes body movement and energy medicine for health and healing. The course provides students with principles of bio-energy (Qi) and practical ways of using them for healing. The key component of the course includes lectures, slow relaxing exercises, Qi meditations, and self-healing treatment techniques for specific symptoms. Lectures cover principles, history of bio-energy therapy, self-healing and treatment for special symptoms, case studies, and effects.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 618 Principles of Holistic Nursing 3.0 Credits

This course provides a foundation of holistic nursing knowledge, understanding and insight, including holistic nursing theories, ethics, and beliefs. The course will focus on the American Holistic Nurses Association's Scope and Standards of practice, as well as the Holistic Nursing Core Values. Students will explore the concept of healing, evaluate current local and national trends and environmental conditions that affect health, and identify ways to incorporate the concepts of holistic nursing into professional practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 619 Principles of Bioenergy Therapies 3.0 Credits

Principles of Bioenergy Therapies examines the concept of human bioenergy fields and the healing modalities known as energy therapies that rebalance the bioenergy field to promote healing. The history and research into energy therapies is covered as students explore the paradigm shift in treatment of individuals in Western medicine.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 621 Spirituality in Hospice and Palliative Care 3.0 Credits

This course offers health care professionals the guidelines and tools necessary to provide compassionate spiritual care to patients and their families at the end of life, by examining spiritual beliefs, rituals and opportunities through the combined effort of patient, family and a multidisciplinary health care team. Techniques will be explored that acknowledge and support individual goals, values, wishes, through discovery, reverence, and tending of the spirit. This course will examine the ancient texts of death and dying, the use of scripture, and the unique energy of the ancient hospices in Europe.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 622 Holistic Therapies in Hospice and Palliative Care 3.0 Credits

This course introduces health care professionals to the use of complementary and integrative therapies (CIT) used during the end of life. Methods for assessment, the influence of the environment in healing, and therapeutic interventions for various stages of patient concerns will be explored. The current use of proven modalities in end of life care will be discussed, as well as the potential for expanding current practice. Care of the dying will be viewed from many disciplines, clinical and domestic.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 623 Cultural Perspectives in Hospice and Palliative Care 3.0 Credits

Culture plays an important role in an individual's view of death and in a health care provider's provision of care at the end of life. This course will explore culture--the learned behaviors, beliefs, and values that define an individual's experience--and how it affects views of health, illness, dying, and life after death. The health care provider will develop skills necessary to recognize, assess, and address psychological, social/religious perspectives, and cultural taboos, realizing that different cultures may require significantly different approaches in order to provide a meaningful context for dying.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 624 Foundations of Integrative Addiction Therapy 3.0 Credits

This course introduces the health care professionals to the foundational principles of integrative healthcare. It provides the student with an understanding of complementary and integrative therapies (CIT) which can be used during the recovery phase of addiction treatment. Care of the recovering client will be viewed from many disciplines, allowing practitioners the perspective needed to enhance the physical, emotional/mental and spiritual aspects of healing throughout the recovery process.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 625 Spirituality, Empowerment, and Transformation 3.0 Credits

Advanced recovery from addiction requires the development of an expanded sense of self that is communal and spiritual in awareness. This course serves as an introduction to the significance of spiritual development using the 12-steps as spiritual practice and the wisdom of the great spiritual leaders, philosophers, and psychologists of our time. This course offers insight and practices that can energize the spirit, increase inner peace and work at the deepest root of the addiction process, providing students with the tools necessary to promote successful long-term recovery of those suffering from addictions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 629 Independent Study in Nursing 1.0-3.0 Credit

The Master's nursing student works under the guidance of a faculty member to study in depth a topic related to their Program of Study. Independent study courses can be undertaken when there is no specific formal coursework available to support the student's program of study. Specific objectives and requirements are negotiated individually and students will sign an Independent Study Contract. This course may be repeated three times for credit as topics vary from term to term.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 9 credits

NURS 630 Principles of Nurse Anesthesia Practice VI 3.0 Credits

This course focuses on gastrointestinal and hepatic dysfunction related to anesthesia planning and intervention in the advanced practice role as a CRNA. Specific attention is given to mechanisms and management of coagulopathies and administration of blood and blood products. Blood borne diseases associated with blood product administration is addressed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 631 Introduction to Nutritional Neuroscience 3.0 Credits

This course explores the emerging interdisciplinary field of nutritional neuroscience that relates directly to many healthcare and quality-of-life issues at the forefront of modern society, in particular to addictions. Students will review the foundational neuroscience of addiction and the neuronutritional model of addiction. This course examines specific neuronutritional agents that are now used for their effects on behavior or brain function as it relates to addictions, the primary focus of the field of nutritional neuroscience.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 632 Nurse Educator and Faculty Role Practicum 6.0 Credits

This course focuses the student on the role of the nurse educator in either academic or agency settings. Students will have the opportunity to apply all of the content from prior course work in a precepted situation and a required residency.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: NURS 591 [Min Grade: B] and NURS 606 [Min Grade: B] and NURS 613 [Min Grade: B] and NURS 615 [Min Grade: B] and NURS 616 [Min Grade: B]

NURS 635 Spirituality in Hospice and Palliative Care 3.0 Credits

This course offers health care professionals the guidelines and tools necessary to provide compassionate spiritual care to patients and their families at the end of life, by examining spiritual beliefs, rituals and opportunities through the combined effort of patient, family and a multidisciplinary health care team. Techniques will be explored that acknowledge and support individual goals, values, wishes, through discovery, reverence, and tending of the spirit. This course will examine the ancient texts of death and dying, the use of scripture, and the unique energy of the ancient hospices in Europe.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 636 Capstone Project I 3.0 Credits

The first of a 3-course sequence where under the direction of a nursing faculty mentor with direct expertise in the student's planned project, students will spend three quarters developing and producing a capstone project. Researcher, expert and leader are presented and explored. Interpretation and application, professional issues, practice issues, legislative issues, certification issues, insurance issues, legal and ethical conflict resolution in advanced nursing practice are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CUIE or major is NURS.

Prerequisites: NURS 586 [Min Grade: B] and NURS 587 [Min Grade: B] and NURS 588 [Min Grade: B]

NURS 637 Capstone Project II 3.0 Credits

The second of a 3-course sequence where under the direction of a nursing faculty mentor with direct expertise in the student's planned project, students will spend three quarters developing and producing a capstone project. Researcher, expert and leader are presented and explored. Interpretation and application, professional issues, practice issues, legislative issues, certification issues, insurance issues, legal and ethical conflict resolution in advanced nursing practice are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CUIE or major is NURS.

Prerequisites: NURS 636 [Min Grade: B]

NURS 638 Capstone Project III 3.0 Credits

The third and final course sequence where under the direction of a nursing faculty mentor with direct expertise in the student's planned project, students will spend three quarters developing and producing a capstone project. Researcher, expert and leader are presented and explored. Interpretation and application, professional issues, practice issues, legislative issues, certification issues, insurance issues, legal and ethical conflict resolution in advanced nursing practice are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CUIE or major is NURS.

Prerequisites: NURS 636 [Min Grade: B] and NURS 637 [Min Grade: B]

NURS 640 Women's Integrative Health 3.0 Credits

This course presents an Integrative Mind-Body approach for supporting various states of health imbalance specific to women's health. Applied integrative strategies highlight the use of dietary and lifestyle changes, nutritional supplementation, botanical medicines and other specific healing modalities. Takes into account the eastern philosophy of anatomy energetics, the integration of the physical and the spiritual, psyche and soma, into a harmonious whole for addressing specific women's health conditions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: CIT 501 [Min Grade: C] or CIT 502 [Min Grade: C] or CIT 503 [Min Grade: C]

NURS 641 Advanced Pharmacology for Adult-Gerontology Primary Care Nurse Practitioners 3.0 Credits

This course is designed to prepare the Adult-Gerontology Primary Care Nurse Practitioner (AGNP) student for the safe managing and appropriate use of drug therapy in the management of various disease states.

Students will study pharmacologic mechanisms of action, effects on organ systems, routes of administration, pharmacokinetics, therapeutic uses, the considerations related to physiologic state, adverse reactions, contraindications, and drug interactions. Students will analyze the scope of legal and professional responsibilities related to prescribing and the AGNP role.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 6 credits

Prerequisites: NURS 500 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 642 PNP I: Primary Care of Infants, Children and Adolescents 5.0 Credits

This course provides the pediatric primary care nurse practitioner student with an introduction to the conceptual basis for meeting the health needs of diverse pediatric populations. Course content and clinical experiences prepare the student to assume the role of primary care provider for children from birth through adolescence.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 643 PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care 5.0 Credits

This course focuses on the diagnosis and management of common pediatric episodic and emergency issues. Course content and clinical experiences prepare the student to assume the role of primary care provider for children from birth through adolescence.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 645 Concepts of Clinical Research Management I 4.5 Credits

This course focuses on the engagement, protection, safety, and care of research subjects. Students examine the ethical principles and regulatory requirements that support these activities. Clinical research nursing (CRN) practice resources are applied. The capstone project, introduced in NURS 644, expands in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 644 [Min Grade: B]

NURS 646 Pharmacology for the Pediatric Nurse Practitioner 3.0 Credits

This course focuses on the appropriate medication regimens utilized in pediatric health care. The action, therapeutic effect and rationale for selection of each drug class will be examined. Toxicity and complications of each drug class will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 544 [Min Grade: B]

NURS 647 PNP III: Management and Care of Adolescents in the Primary Care Setting 5.0 Credits

This course focuses on the assessment, diagnosis and management of common health issues of adolescence. Reproductive health management and anticipatory guidance unique to the adolescent population will be discussed. Course content and clinical experiences prepare the student to assume the role of primary care provider to adolescents.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 648 PNP IV: Primary Care of Children with Special Health Care Needs 5.0 Credits

This course focuses on the management of children with special health care needs in the primary care setting. Course content and clinical experiences emphasize the complex issues of chronicity, behavioral and developmental disabilities and common health problems seen in primary care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 647 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 649 Ped Nurse Pract AC I: Acute-Chronic Care of Infants, Children and Adolescents Management 5.0 Credits

This clinical course will provide the novice acute- chronic PNP student with higher appreciation of the pathophysiological basis and management of acute-chronic health disorders with children and their families.

Emphasis is placed on critical assessment stratagems, pharmacological treatments, current research, and treatment of children with complex acute-chronic health conditions with a multicultural perspective.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 650 Ped Nurse Pract AC II: Acute-Chronic Care of Infants, Children and Adolescents Management 5.0 Credits

The course builds upon preceding acute- chronic course content and prepares students to perform critical assessment, diagnosis and management of emerging crisis and organ system dysfunction in children with acute- chronic health conditions. The course emphasizes stabilizing patients, reducing complications, restoring optimal health, providing psychosocial support to pediatric patients and their families.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 649 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 651 PNP Management of the Medically Fragile and Technology Dependent Child in the Community 5.0 Credits

This course will provide students with higher appreciation of the role of the Acute-Chronic Pediatric Nurse Practitioner managing children with chronic health disorders and specialized needs transitioning into different sites of care. Students will focus on the strategies within the community, home based interventions, coordination of services, and, collaboration of care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 649 [Min Grade: B] and NURS 650 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 652 Innovation Capstone Project 6.0 Credits

This course, under the direction of a nursing faculty mentor with direct expertise in the student's planned project, provides students the opportunity to develop and produce a capstone project. During this two quarter period, students will attend class online, both synchronously and asynchronously, to discuss the progress of their projects – both pitfalls and successes, and provide support to each other during this period of creative, but independent work.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUIE.

Prerequisites: NURS 500 [Min Grade: B] and NURS 564 [Min Grade: B] and NURS 586 [Min Grade: B] and NURS 587 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 653 Concepts of Clinical Research Management II 4.5 Credits

This course focuses on clinical research operations including documentation, data management and informatics, and quality assurance activities. Students examine supporting regulations, guidelines, and clinical research nursing (CRN) resources. This course also addresses study contracts and budgets. The roles for CRNs managing studies are presented. Students continue to develop their capstone.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 645 [Min Grade: B]

NURS 654 Pre-Practicum 1.0 Credit

In this 40-hour practicum, the student previews the clinical research nurse (CRN) role with a qualified preceptor. This course is required for students with less than one year of full-time CRN practice. It is optional for experienced CRN students who want expanded learning in a new role or setting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 653 [Min Grade: B] (Can be taken Concurrently)

NURS 655 Writing for Publication: Introduction Capstone 3.0 Credits

This course prepares students in the clinical research track for their capstone project, that of writing an article with potential for publication. Emphasis is on topic selection, types of articles, search tools, citation management programs, and writing strategies. The rules of APA Style® are examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 608 [Min Grade: B]

NURS 656 Traditional Healing Systems 3.0 Credits

This course provides a survey of the fundamentals of traditional healing systems that form an integrated framework of thought and practice, followed by an in depth examination of their relevant worldviews. The traditional healing systems examined include Chinese medicine, Tibetan medicine, Ayurveda, as well as Unani, Native North American healing and Latin American Curanderismo, among others.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CIT.

Prerequisites: CIT 502 [Min Grade: B] or NURS 539 [Min Grade: B]

NURS 657 Functional Approach to Clinical Nutrition 3.0 Credits

This course introduces an evidence-based, functional medicine model of clinical nutrition, a science-based field of healthcare that examines core clinical imbalances that underpin specific conditions and associated symptoms. A functional approach to nutrition analyzes the multiple roles of various nutrients and focuses on how these key life-sustaining substances support health throughout the different systems of the body, as well as providing a broader perspective on deficiency symptoms and how to ameliorate them.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CIT.

NURS 658 Advanced Women's Integrative Health 3.0 Credits

This course continues in the presentation of women's integrative health strategies that incorporate a holistic Mind-Body-Spirit approach for addressing specific women's health conditions. Applied integrative health protocols will focus on the use of dietary and lifestyle changes, nutritional supplementation, botanical medicines and other specific healing modalities for supporting various states of health imbalance.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 659 Advanced Principles of Nurse Anesthesia IV 3.0 Credits

This is the fourth in a series of four principles of nurse anesthesia practice courses. In this course, the physiology, pathophysiology, pharmacology and anesthesia management for the neurosurgical, robotic, hematologic, trauma and burn patient is examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 660 Adult-Gero Primary Care I: Introduction to Adult-Gero Primary Care and Care of the Young-Adult 5.0 Credits

This is the first course in a series of four clinical courses for the graduate student studying to become an Adult-Gerontology Primary Care (AGPC) Nurse Practitioner. This course will introduce the student to the role while focusing on the young-adult to young-old adult across the wellness-illness continuum.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 10 credits

Prerequisites: NURS 500 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 641 [Min Grade: B] and NURS 550 [Min Grade: B]

NURS 661 Adult-Gerontology Primary Care II: Management and Care of Adult Patients in Primary Care 5.0 Credits

This is the second course in a series of four clinical courses for the graduate student studying to become an Adult-Gerontology Primary Care (AGPC) Nurse Practitioner. This course is designed to foster development of clinical competency and role transition in the setting of primary medicine for the young-old and older-adult patient population.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 10 credits

Prerequisites: NURS 500 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 641 [Min Grade: B] and NURS 660 [Min Grade: B]

NURS 662 Adult-Gerontology Primary Care III: Management of the Older-Adult Patient in Primary Care 5.0 Credits

This is the third course in a series of four clinical courses for the graduate student studying to become an Adult-Gerontology Primary Care (AGPC) Nurse Practitioner. This course is designed to further develop clinical competency to provide a multidisciplinary, comprehensive approach to the older-adult in the primary and long-term care setting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 661 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 641 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 660 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 663 Adult-Gerontology Primary Care IV: Gerontology Management and Care 5.0 Credits

This is the fourth course in a series of four clinical courses for the graduate student studying to become an Adult-Gerontology Primary Care (AGPC) Nurse Practitioner. This course will build upon the knowledge and skills acquired in previous AGPC courses to guide them in the transition from student to safe and effective practitioner.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 10 credits

Prerequisites: NURS 662 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 641 [Min Grade: B] and NURS 660 [Min Grade: B] and NURS 661 [Min Grade: B]

NURS 664 Professional Issues for Nurse Practitioners 1.0 Credit

This required course is the application and integration of the role and competencies of the nurse practitioner. The roles of the nurse practitioner as clinician, educator, researcher, expert, and leader are presented and explored. Interpretation and application of professional issues, practice issues, legislative issues, certification issues, insurance issues, legal issues and ethical conflict resolution in advanced nursing practice are explored and integrated into a model of interdisciplinary collaborative practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

NURS 666 Leadership in Health Systems Management Practicum 6.0 Credits

This practicum, individually tailored to meet each student's career goals. The course provides an opportunity for the Student to operationalize the leadership role in appropriate agencies and facilities in conjunction with an expert nursing leader as well as develop an understanding of information systems and technology used in contemporary health care organizations. The setting will vary dependent on the student's interests, goals and objectives as discussed with faculty.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 553 [Min Grade: B] and NURS 557 [Min Grade: B] and NURS 558 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 567 [Min Grade: B] and NURS 564 [Min Grade: B] and NURS 562 [Min Grade: B]

NURS 668 Practicum, Leadership and Career Development 5.0 Credits

In this 80-hour practicum, the student experiences a new or expanded role as a clinical research nurse (CRN). The practicum is analyzed using Good Clinical Practice (GCP) standards and CRN competencies. CRN leadership roles and career options are addressed. The capstone is completed in this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 653 [Min Grade: B]

NURS 670 Interdisciplinary Perspectives of Health Law 3.0 Credits

This course introduces students to areas of law and legal theory that serve as the basis for the U.S. health care system. Students will examine statutes, regulations, and case law that regulate health care practice. Students will observe a courtroom proceeding, integrate professional knowledge with health law principles, and analyze testimony of a clinical expert witness. Some of the areas to be studied include: torts, administrative law, provider liability, defenses, health policy access to care, federal regulations and the Patient Safety Movement, distinction between criminal and civil action with an emphasis on domestic violence (DV) law and interpersonal violence (IPV) case studies.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 673 Emergency/Trauma Care Across the Lifespan I 5.0 Credits

This is the first course in a series of three specialized clinical courses for the post-graduate FNP or AGPCNP studying to be an emergency nurse practitioner (ENP). This course introduces the ENP student to the specialized care of the patient in the emergency care setting (ECS) including clinical decision making skills necessary to manage common illness and injury across the lifespan. Students are taught the skills of assessment, interpretation of diagnostic studies, interventions, and treatments unique to the ECS.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 674 Emergency/Trauma Care Across the Lifespan II 5.0 Credits

This is the second course in a series of three specialized clinical courses for the post-graduate FNP or AGPCNP studying to be an emergency nurse practitioner (ENP). This course continues to prepare the ENP student to the specialized care of the patient in the emergency care setting (ECS). Student are taught the skills of assessment, interpretation of diagnostic studies, interventions, and treatments unique to the ECS at an advanced level, thereby enhancing clinical decision making for common illness and injury across the lifespan.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 673 [Min Grade: B]

NURS 675 Emergency/Trauma Caring for Trauma and Critically Ill Patient 5.0 Credits

This is the final specialized clinical courses for the post-graduate FNP or AGPCNP studying to be an emergency nurse practitioner (ENP). Building upon prior clinical ENP experiences, this course teaches the student how to care for patients of the highest acuity levels. Topics of pre-hospital care, initiation of care to the trauma and critically ill patient, and transport of patients to a higher level of care. The culmination of the ENP education and transition into the ENP role is also be covered.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 673 [Min Grade: B] and NURS 674 [Min Grade: B]

NURS 678 Health, Wellness, and Primary Care for WHNP I 3.0 Credits

This course focuses on primary care of women throughout the life cycle. Within the framework of a multicultural viewpoint, students begin by examining strategies for preventive interventions as well as health screening and immunization schedules as women progress from adolescence to maturity.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 519 [Min Grade: C] and RSCH 523 [Min Grade: C] and NURS 500 [Min Grade: C] and NURS 502 [Min Grade: C] and NURS 526 [Min Grade: C] and NURS 527 [Min Grade: C] and NURS 548 [Min Grade: C] and NURS 549 [Min Grade: C] and NURS 550 [Min Grade: C] and NURS 682 [Min Grade: C]

NURS 679 Health, Wellness, and Primary Care for WHNP II 3.0 Credits

This course follows NURS 678 Health, Wellness, and Primary Care for WHNP I. Students build upon the introductory framework presented in WHNP I with emphasis on disorders which are likely to be encountered in a women's health care setting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 519 [Min Grade: C] and RSCH 523 [Min Grade: C] and NURS 500 [Min Grade: C] and NURS 502 [Min Grade: C] and NURS 526 [Min Grade: C] and NURS 527 [Min Grade: C] and NURS 548 [Min Grade: C] and NURS 549 [Min Grade: C] and NURS 550 [Min Grade: C] and NURS 682 [Min Grade: C] and NURS 678 [Min Grade: C]

NURS 680 Primary Care for Women's Health 3.0 Credits

This course focuses on primary health care needs of women throughout the lifecycle concentrating on prevention, screening, risk factor assessment, health maintenance as well as signs and symptoms, assessment, management.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 682 Pharmacology for the Women's Health Nurse Practitioner 3.0 Credits

This course is designed to prepare the Women's Health Nurse Practitioner student for the safe managing and prescribing of therapeutic agents used in Obstetrics/Gynecology and primary care settings for women's health care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B]

NURS 683 Nurse Anesthesia Clinical Practicum V 3.0 Credits

This is the fifth in a series of six nurse anesthesia clinical practicum courses. Clinical practicum V affords the opportunity to administer anesthesia for patients undergoing complex surgical procedures or those with significant co-morbidities who may require invasive monitoring. Subspecialty rotations foster the development of competencies to safely anesthetize the cardiac, neurosurgical, obstetrical and pediatric patient.

This course also engages the student in critical incident simulations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 684 Nurse Anesthesia Clinical Practicum VI 3.0 Credits

This is the last in a series of six nurse anesthesia clinical practicum courses. In clinical practicum VI, students administer anesthesia for patients undergoing complex surgical procedures or to those with significant co-morbidities. Subspecialty rotations foster the application of theory to clinical practice and the development of competencies to safely anesthetize the cardiac, neurosurgical, obstetrical and pediatric patient. This course is complemented by didactic lectures and critical incident simulation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 687 Clinical Residency I 6.0 Credits

The Clinical Practicums and Residencies provide opportunities for students to continue their development of critical thinking skills and anesthesia techniques when providing care for all types of surgical patients. Under the guidance of CRNAs and Staff Anesthesiologists, students work more autonomously and collaborate with others when providing comprehensive anesthesia care. Didactic content will address management of the patient with orthopedic or neoplastic comorbidities.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 688 Clinical Correlative Seminars 3.0 Credits

Under the guidance of a faculty member, students discuss an anesthesia topic to clarify concepts and review prior content. Review questions are discussed, with students completing weekly quizzes to assess understanding.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 689 Clinical Residency II 6.0 Credits

Clinical Residency II afford students increased autonomy to administer anesthesia for patients undergoing complex surgical procedures or those with significant co-morbidities who may require invasive monitoring. Subspecialty rotations foster the development of competencies to safely anesthetize the cardiac, neurosurgical, obstetrical and pediatric patient. This course is complemented by critical incident simulation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NUAN.

NURS 690 WHNP I: Mngmnt & Care of the Common Gyn and Gender Related Issues throughout the Lifespan 5.0 Credits

This is the first course in a series of four clinical courses for the graduate student who is studying to become a (WHNP). This course is designed to introduce the WHNP student to the gynecological needs of women and their partners from puberty throughout the post reproductive years. Clinical practicum of 160 hours in Women's Health occurs concurrently.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 680 [Min Grade: B] and NURS 682 [Min Grade: B]

NURS 691 WHNP II: Mngmnt & Care of the Complex Gyn and Gender Related Issues of Women throughout the Lifespan 5.0 Credits

This is the second women's health course in a series of four clinical courses for the graduate student who is studying to become a WHNP. This course is designed to build upon the didactic and clinical content presented in N690 by addressing more complex gender related issues throughout the lifespan. Clinical practicum of 160 hours in Women's Health occurs concurrently.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 680 [Min Grade: B] and NURS 682 [Min Grade: B] and NURS 690 [Min Grade: B]

NURS 692 WHNP III: Management & Care of the Low Risk Obstetrical and Post Partum Needs of Women and Families 5.0 Credits

This is the third course in a series of four clinical courses for the graduate student who is studying to become a WHNP. This course is designed to introduce the WHNP student to low risk obstetrics. Clinical practicum of 160 hours in Women's Health Low Risk Obstetrical Care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 680 [Min Grade: B] and NURS 682 [Min Grade: B] and NURS 690 [Min Grade: B] and NURS 691 [Min Grade: B]

NURS 693 WHNP IV: Mngmnt & Care of the High Risk Obstetrical and Post Partum Needs of Women and Families 5.0 Credits

This is the fourth course in a series of four clinical courses for the graduate student w studying to become a WHNP. The course is designed to introduce the WHNP student to the assessment of high-risk obstetrical care of the pregnant woman, the fetus, and the family unit. Clinical practicum of 160 hours in high risk obstetrics occurs concurrently.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

Prerequisites: RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 680 [Min Grade: B] and NURS 682 [Min Grade: B] and NURS 690 [Min Grade: B] and NURS 691 [Min Grade: B] and NURS 692 [Min Grade: B]

NURS 703 Health Policy and Economics 3.0 Credits

This course bridges the chasm between politics, economics, public policy making, and the U.S. health care system, by examining and critiquing the components of each. Students analyze foreign and domestic health care policies that provide the framework that drives regulation and delivery of health care. Critical analysis of global factors, national allocation of healthcare resources and current healthcare policy debates prepares the doctor of nursing practice student to organize, advocate, and implement health policy initiatives at multiple levels.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 706 Applied Epidemiology 3.0 Credits

This is an applied course on methods of population-based epidemiologic research that includes a discourse on statistical analysis and causal inference. This course follows a prerequisite introductory biostatistics/epidemiology course, and is designed for nursing and health sciences doctoral students who are expected to integrate statistical reasoning into the decisions they make in the health care setting. A combination of Excel-based, SPSS, and hand calculated assignments will be used to supplement the content.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 519 [Min Grade: B]

NURS 710 Human Responses - Physiologic 3.0 Credits

The student explores the critical and seminal health research conducted by nurse scientists that has examined such human responses to altered physiologic function as urinary incontinence, impaired sleep, altered thermoregulation, pain, fatigue, and other physiological nursing phenomena.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 703 [Min Grade: C]

Corequisite: NURS 715

NURS 713 Human Responses to Altered Function in Health and Illness 3.0 Credits

This course will explore critical and seminal health research studies that examined human responses to health and illness. A bio-behavioral model will be used to discuss interactions among physiological, psychological, social, behavioral, environmental, and biological factors in health and illness. Health concepts relevant in the study and evaluation of nursing will be addressed. Students will critically explore health concepts in the application of evidence in nursing practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 519 [Min Grade: B] and NURS 716 [Min Grade: B]

NURS 714 Introduction to Qualitative Methods in Nursing Inquiry 3.0 Credits

This introductory course focuses on developing skills fundamental to qualitative inquiry. This includes reflexivity as a qualitative strategy, which addresses subjectivity in qualitative methods and explores the positioning of self as influential in all stages of the process. The process of bracketing presuppositions will be examined including its phenomenological origins and tensions, such as: who brackets, methods of bracketing, and timing in the process of qualitative inquiry. Practical approaches to qualitative data collection and analysis will be examined including: interviewing techniques, focus groups, and thematic analysis.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 715 Human Responses - Psychologic 3.0 Credits

Psychosocial concepts relevant in the study and evaluation of nursing practice such as stress, anxiety, depression, grief, coping, addiction, impulse control, uncertainty, violence, spirituality, social support, and self-transcendence are discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 703 [Min Grade: C]

Corequisite: NURS 710

NURS 716 Scientific Foundation of Nursing Knowledge Development 3.0 Credits

This course is designed to help students explore the development of nursing knowledge that is generated from clinical practice. A critical analysis of historical and contemporary views of nursing science knowledge development and the evolution of nursing inquiry will be addressed. Concept analysis will be an integral part of this course. Students will examine relationships between the components of theory and the role that theory plays in research and clinical nursing practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 718 Quantitative Methods for Practice-based Nursing Inquiry 3.0 Credits

This quantitative methods course focuses on understanding and evaluating the scientific rigor of published quantitative research. Practical approaches to applying quantitative methods to address practice-based nursing problems will be examined including: project design, sampling, measurement, data collection, data analysis, and human subject protection. Emphasis is placed on scientific principles and techniques used to minimize bias and maximize internal and external validity in quantitative inquiry.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 519 [Min Grade: B] and NURS 716 [Min Grade: B]

NURS 720 Health Information Technology and Information Systems 3.0 Credits

This course prepares a doctoral student to be proficient in the use of health information technology and information systems to assume a leadership role to improve practice and health care delivery. This course will provide students with skills in the selection, use and evaluation of technologies for care; development and implementation of a plan for data extraction from databases containing practice information. The use of appropriate software to generate statistics and accurately interpreting statistical results will be addressed. The student is expected to use these technologies in translation of evidence to clinical practice to improve health care, health care systems and patient outcomes. Additionally, the concept of interprofessional collaboration to improve patient outcomes will be addressed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 519 [Min Grade: B] and NURS 716 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 718 [Min Grade: B]

NURS 722 Organizations and Systems Leadership: Innovative Strategies 3.0 Credits

This course is designed to broaden and enhance the leadership skills and expertise of the Doctor of Nursing Practice student. Current topics affecting the health care delivery system will be explored, i.e. decreased revenue sources; unionization; health care reform; staffing models; magnet organization status; informatics; the aging population and its effect on the health care delivery system; strategic management, succession planning, and facilitation of clinical interdisciplinary relationships to improve clinical outcomes and research opportunities. DNP graduates must be prepared in leadership roles secondary to complex health care delivery systems, the focus on patient outcomes and decreased revenue streams.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 703 [Min Grade: B] and NURS 720 [Min Grade: B] and NURS 830 [Min Grade: B] and NURS 835 [Min Grade: B]

NURS 731 Human Responses to Altered Function in Health and Illness 3.0 Credits

This course will explore critical and seminal health research studies that examined human responses to health and illness. A bio-behavioral model will be used to discuss interactions among physiological, psychological, social, behavioral, environmental, and biological factors in health and illness. Health concepts relevant in the study and evaluation of nursing will be addressed. Students will critically explore health concepts in the application of evidence in nursing practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 800 Theoretical Foundations of Nursing Inquiry 1 3.0 Credits

This course engages students to study habits of mind that underlie all forms of inquiry; historical roots of nursing science from positivism to constructivism; and approaches to critical appraisal of the products of inquiry. Students will develop expertise in argumentation as it relates to the development of a research proposal and larger research agenda.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 801 Theoretical Foundations of Nursing Inquiry II 3.0 Credits

This course focuses on grand and middle-range theories and provides in-depth analysis of the role of theoretical models and conceptual frameworks in the development of nursing science. Students will apply theories to asking and answering questions, and integrate the components of a theory with personal perspectives on "being, knowing and doing."

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 803 Doctoral Seminar: Scientific Integrity 1.0 Credit

The course focuses on developing scientific integrity in the responsible conduct of research. Ethical issues, including the protection of subjects, national and clinical trials, scientific fraud, and ethical treatment of data, related to the responsible conduct of research will be explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 804 Doctoral Seminar: Creating Intellectual Community 1.0 Credit

This seminar on the formation of scientists focuses on developing skill in preparing manuscripts for publication, crafting scientific abstracts and developing podium and poster presentations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 805 Doctoral Seminar: Grantsmanship 1.0 Credit

This course on the formation of scientists focuses on the organization, development and preparation of a grant application. Students are expected to prepare components of their grant application under the direction of their mentor using the guidelines for an appropriate funding organization.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 806 Scientific Appraisal and Knowledge Development 3.0 Credits

This course examines approaches for knowledge development in nursing and scientific appraisal of phenomenon of interest to nursing. The conceptual foundations of nursing science and the contextual factors (e.g. age, gender) that impact nursing science are explored. Concept analysis and integrative reviews provide opportunities for students to further develop a phenomenon of interest for study.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 810 DNP Project: Analysis & Evaluation 1.0 Credit

This DNP seminar course is offered as an independent study under the direction of the doctoral student's assigned DNP Project Chairperson.

This course focuses on DNP Project completion, including the DNP Project paper, with particular attention to the analysis, evaluation and dissemination of the project. The course end-product is a completed paper that satisfies DNP Project expectations and meets iDEA repository requirements. Demonstrable DNP Project progression is a course requirement.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 3 credits

Prerequisites: NURS 842 [Min Grade: B] and NURS 843 [Min Grade: B]

NURS 819 Qualitative Research Methods in Nursing Inquiry 3.0 Credits

Clinical nursing and phenomena using qualitative research methods will be examined to elucidate health and human behavior within context. The history, language and epistemology of qualitative research traditions are explored and studied as interpreted by qualitative nurses researchers in advancing the science of nursing. Qualitative strategies will be explored, compared, contrasted and analyzed. These can include but are not limited to: ethnographic, phenomenological, grounded theory, narrative, mixed methods and participatory action research approaches. The course culminates in the development of a qualitative research proposal within qualitative nursing research frameworks.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 820 The Science of Therapeutics 3.0 Credits

This course focuses on advanced strategies to evaluate the short- and long-term outcomes of clinical therapeutics with special emphasis on feasibility, pilot studies, and randomized control trials. The course includes analysis of completed studies as well as the design of a randomized control trial used in non-pharmacologic or clinical therapeutic.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 830 Doctoral Nursing Practice Clinical Practicum 3.0 Credits

This course is designed to enhance the clinical knowledge development of the clinical nursing scholar. Doctoral students, under the direction of their DNP advisor and course faculty, will select an area of clinical nursing practice that will be driven by their capstone project. Models of the reflective practitioner, interdisciplinary novice-to-expert theories, use of evidence-based data bases to drive interventions, and cost effectiveness evaluation of clinical interventions derived from students' Clinical Practica will be addressed. The Clinical Practicum will consist of 125 hours of practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 519 [Min Grade: B] and NURS 716 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 718 [Min Grade: B] and NURS 720 [Min Grade: B] and NURS 703 [Min Grade: B]

NURS 835 Doctoral Nursing Practice Role Practicum 3.0 Credits

This course is designed to broaden and enhance the role development knowledge and skills of the clinical nursing scholar. Students, under the direction of faculty advisor, will select an area of role development as a practitioner, or nurse executive. This course will address content relevant to various role careers of the clinical nursing scholar such as role negotiation theory, lifelong mentorship; leadership abilities and professional development trajectory; and stress management and role strain. The Role Practicum will consist of 125 practice hours.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 830 [Min Grade: B]

NURS 836 Clinical and Applied Nursing Ethics 3.0 Credits

The course is designed to enhance ethical reasoning and decision-making among nursing scholars in their role as clinicians, and/or executives.

The course will focus on the practical application of ethical theories and principles to practice. Students will discuss the relevance and application of various theoretical perspectives such as deontology, teleology (utilitarianism), virtue ethics, and relational ethics. The application of principles to practice will take a life-span approach, and include issues of resource allocation and cross-cultural influences.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 703 [Min Grade: B] and NURS 716 [Min Grade: B] and NURS 718 [Min Grade: B] and NURS 830 [Min Grade: B] and RSCH 519 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 720 [Min Grade: B]

NURS 837 Translating Evidence into Clinical Practice 3.0 Credits

This course explores the process on how to translate research evidence into practice that includes assessing the need for change in practice, linking the clinical problem with nursing interventions and patient outcomes, synthesizing the best evidence, designing practice change, and integrating and maintaining the change in practice. Various critical analyses for assessing the quality of research evidence will be investigated. The PICOT format for translating research evidence into practice will be utilized.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 519 [Min Grade: B] and NURS 718 [Min Grade: B]

NURS 838 Global Leadership Perspectives 3.0 Credits

This course is designed to broaden and enhance leadership skills for the Doctor of Nursing Practice (DNP) student through a global experience in another country aligned with the DNP Essentials. Cultivating an understanding of global health offers a unique opportunity to enrich and prepare future doctoral nursing leaders for responding to current and future global health care needs in diverse settings. Fostering intercultural relationships, while comparing and contrasting society and health care systems in another country, will deepen an intercultural perspective. Delivery of the course will occur at a host university in the global country visited and is integrated in the Clinical Practicum requirement for the course. Clinical Practicum requirements for this course consist of 50-hours of practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 519 [Min Grade: B] and NURS 703 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 718 [Min Grade: B] and NURS 720 [Min Grade: B] and NURS 830 [Min Grade: B] and NURS 835 [Min Grade: B] and NURS 836 [Min Grade: B] and NURS 837 [Min Grade: B] and NURS 714 [Min Grade: B]

NURS 842 DNP Project Seminar I 3.0 Credits

This seminar course is focused on planning and designing a proposed DNP project in response to a data-driven or factually supported practice problem. The proposed project uses evidence-based practice methodologies to improve processes and/or outcomes or to broaden understanding of a nursing practice phenomenon. This proposed project may be devised in various forms using diverse approaches, including but not limited to: program evaluation, quality improvement, evidence-based practice improvement, systematic review, or other project modalities consistent with the recommendations of the American Association of Colleges of Nursing. Clinical Practicum requirements for this course consist of 75-hours of practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 519 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 716 [Min Grade: B] and NURS 837 [Min Grade: B]

NURS 843 DNP Project Seminar II 3.0 Credits

This seminar course is focused on implementing, evaluating, and disseminating an approved DNP project. The required course end-product is negotiated between the doctoral student and faculty to ultimately lead to a completed, fully written paper that satisfies DNP Project expectations. Students may elect one of two DNP project completion tracks; full product by course-end or partial product completion by course-end. Students will explore and engage in opportunities for dissemination of professional work. Clinical Practicum requirements for this course consist of 125-hours of practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NURS 714 [Min Grade: B] and NURS 718 [Min Grade: B] and NURS 835 [Min Grade: B] and NURS 842 [Min Grade: B] and NURS 830 [Min Grade: B]

NURS 850 Research Apprenticeship 1.0-3.0 Credit

This course is designed to engage students in an intensive research apprenticeship in the conduct of research. Students will work directly with faculty researchers and their research teams to acquire experiential learning and be closely supervised by an experienced researcher, thereby gaining knowledge and skills in the real conduct of research. This experience will allow the student to gain entry into the research project and identify their feasible contributions that will span the three quarters.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

NURS 860 Integration of Genetics/Genomics in a Research Agenda 3.0 Credits

This course provides the students with opportunities to explore how genetics and genomics can be integrated with their research interests and long term scholarship. Course content includes discussion of the evolving role of genetics and genomics in clinical and theoretical research, approaches to studying genetic and genomic issues, accessing and using multiple genetics databases, approaches to identifying collaborators, and evaluation of opportunities for funding and publication. Students will examine the ways genetics/genomics has been included in nursing scholarship through critical analysis of scientific publications. Learners will develop expertise in navigating publically available databases with genetics-related content.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 861 Interdisciplinary Approaches in Aging Research 3.0 Credits

This course uses an interdisciplinary lens to examine special topics in aging research. The state-of-the science, research methodology, and measurement issues related to each topic are explored. Phenomena of interest to aging researchers measured in large data sets on aging (e.g. Cardiovascular Health Study, Baltimore Longitudinal Study on Aging, National Retirement Survey, etc.) are examined.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 862 Reproductive Epidemiology 3.0 Credits

Through this course, students will learn key principles and methods for the study of reproductive epidemiology. Approaches to study critical health challenges women face nationally and worldwide will be addressed. Reproductive mortality and morbidity burdens will be examined in the context of health disparities by race and ethnicity among various populations of women.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 863 Mixed-Methods Research 3.0 Credits

This course uses an interdisciplinary lens in examining mixed methods research. Multiple perspectives and multiple methods, including both qualitative and quantitative designs, are often needed to explore complex clinical problems and health behaviors. This course focuses on mixed methods design selection, data collection, analyses, discussion of findings and research dissemination.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NURS 891 Doctoral Nursing Special Topics for the Nurse Executive 3.0 Credits

This course is designed to broaden and enhance leadership skills for the Doctor of Nursing Practice Student enrolled in the Clinical Nurse Executive Track. Current topics affecting the health care delivery system will be explored, i.e. decreased revenue sources; unionization; health care reform; staffing models; magnet organization status; informatics; the aging population and its effect on the health care delivery system; strategic management and succession planning.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 519 [Min Grade: C]

NURS 989 Dissertation 1.0-9.0 Credit

Through this course the student will conduct original research with the goal of producing a contribution to the knowledge of the discipline. The quality of the original research must conform to that needed for submission of a manuscript to a peer-reviewed scientific journal in the student's area of research. This course includes writing and defending the proposal, conducting pilot study, getting IRB approval, implementation of the study, data analysis, interpretation of results, writing the dissertation report, defense, and dissemination of results through publications and presentations.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

NURS 996 Dissertation Advisement I 2.0 Credits

The student conducts a research study under the guidance of a dissertation chair and dissertation committee. The focus of advisement is the completion of the dissertation proposal and its successful defense. Afterward, advisement is directed toward the successful submission of all IRB materials. May be repeated three times for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 6 credits

Prerequisites: NURS 900 [Min Grade: C]

NURS 997 Dissertation Advisement II 2.0 Credits

The focus of this course is the completion of all data collection for the proposed dissertation study. May be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Prerequisites: NURS 996 [Min Grade: CR]

NURS 998 Dissertation Advisement III 2.0 Credits

The focus of this course is for the student to analyze their data, write and revise drafts as directed by the dissertation committee, and successfully defend the dissertation. Students must register for at least one quarter of this course. May be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Prerequisites: NURS 997 [Min Grade: CR]

NURS 999 Continued Dissertation Advisement 1.0 Credit

Students who have not submitted and defended their dissertation after two quarters of NURS 998 register for this course in perpetua until they have defended their dissertation. May be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

Prerequisites: NURS 998 [Min Grade: CR]

NURS I899 Independent Study in Nursing 1.0-3.0 Credit

The doctoral student works under the guidance of a faculty member to study in depth a topic related to their program of study. Independent study courses can be undertaken when there is no specific formal coursework available to support either the student's dissertation topic, or area of interest. Specific objectives and requirements are negotiated individually and the student will sign an Independent Study Contract. The course may be repeated more than once provided different faculty members supervise the learning experience.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 9999 credits

NURS T580 Special Topics in Nursing 0.0-3.0 Credits

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor. May be repeated up to 3 times for credit if topics vary.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 12 credits

NURS T680 Special Topics in Nursing 0.0-3.0 Credits

This course covers special topics of relevance and significance to the discipline of nursing at the graduate level. May be repeated three times for credit with varying topics.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 12 credits

NURS T780 Special Topics in Nursing 0.0-3.0 Credits

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor. May be repeated up to 3 times for credit if topics vary.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 12 credits

NURS T880 Special Topics in Nursing 0.0-3.0 Credits

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor. May be repeated up to 3 times for credit if topics vary.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

NURS T980 Special Topics in Nursing 0.0-3.0 Credits

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor. May be repeated up to 3 times for credit if topics vary.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

Nursing and Health Professions

Courses

NHP 680 Informatics in the Health Professions 3.0 Credits

This course introduces the concepts of informatics in the health professions and how data, information and knowledge, through technology, can be applied to healthcare administration, education, practice and research. The goal of the course is to understand the role of health professional informatics in improving patient care outcomes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NHP 760 Academia for Health Professionals 1.0 Credit

Students will be introduced to the organizational structures and functions commonly found in universities and colleges. Internal and external environmental issues of higher education and professional development will be discussed. Familiarity with the context of academic environments will enable to student to understand their roles and responsibilities as faculty members.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NHP 762 Health Professional Education 3.0 Credits

This course is an introduction to teaching methods used in educating health professional students. Foundational aspects of teaching methodology, including theories of teaching, learning and student assessment, will be reviewed.

College/Department: College of Nursing Health Professions
Repeat Status: Not repeatable for credit

NHP 766 Health Promotion, Fitness and Wellness 3.0 Credits

This online course is required in the DHSc program. It provides students with an introduction to concepts and education and behavioral intervention strategies to promote health, fitness and wellness in individuals with and without disabilities across the lifespan. Course content includes strategies and tactics to promote healthy behaviors (physical activity and nutrition) and address facilitators and barriers to healthy lifestyles.

College/Department: College of Nursing Health Professions
Repeat Status: Not repeatable for credit

NHP 767 Leadership & Professional Issues 3.0 Credits

This course is an exploration of two areas of leadership development and practice: 1) the art and science of leadership in the health professions including theory, skills and applications; and 2) critical issues facing the health professions.

College/Department: College of Nursing Health Professions
Repeat Status: Not repeatable for credit

NHP 810 Biostatistical Applications 2.0 Credits

As a follow-up to univariate analyses presented in introductory courses, concepts of multivariate analysis are presented to facilitate understanding of these analyses in current literature and to introduce their use and interpretation. Course includes laboratory application of selected statistical analyses relevant to individual research needs using the SPSS software tool.

College/Department: College of Nursing Health Professions
Repeat Status: Not repeatable for credit
Prerequisites: RSCH 519 [Min Grade: B] and RSCH 770 [Min Grade: B]

NHP 818 Scholarship Question Development 1.0 Credit

This course consists of identifying the research question or project for scholarship, developing a timeline for completion, and reviewing the relevant literature.

College/Department: College of Nursing Health Professions
Repeat Status: Can be repeated 4 times for 5 credits
Prerequisites: RSCH 758 [Min Grade: B]

NHP 819 Advanced Clinical Practicum 1.0-3.0 Credit

This course is designed to provide an individualized advanced-level mentored experience to integrate didactic knowledge and enhance clinical skills in a specialty practice area. Students are expected to develop a learning contract with specific objectives, and work with their faculty advisor to identify resources needed to successfully complete this practicum.

College/Department: College of Nursing Health Professions
Repeat Status: Can be repeated 3 times for 12 credits

NHP 822 Teaching Practicum 1.0-3.0 Credit

This course consists of activities culminating in meeting minimal competencies for teaching in higher education institutions. Individually identified competencies include tasks such as responsibility for planning, preparing, presenting and evaluating a course with supervision. Student, instructor and advisor develop a contract reflecting current abilities and development needs in teaching.

College/Department: College of Nursing Health Professions
Repeat Status: Can be repeated 4 times for 15 credits

NHP 824 Teaching Practicum I 1.0 Credit

The student has the opportunity to apply teaching methodologies, including writing objectives, preparing and presenting content, and assessing student learning in a selected unit, or units, of instruction under the supervision of the course instructor. The student, instructor and advisor develop a contract reflecting current abilities and development needs in teaching.

College/Department: College of Nursing Health Professions
Repeat Status: Not repeatable for credit
Prerequisites: NHP 762 [Min Grade: B]

NHP 825 Teaching Practicum II 2.0 Credits

Course consists of application of selected aspects of teaching in higher education. The student, instructor and advisor develop a contract reflecting current abilities and development needs in teaching. Individually identified competencies include assisting with planning, preparing, presenting and evaluating a course with instructor's supervision.

College/Department: College of Nursing Health Professions
Repeat Status: Not repeatable for credit
Prerequisites: NHP 762

NHP 826 Teaching Practicum III 3.0 Credits

Course consists of activities culminating in meeting minimal competencies for teaching in institutions of higher learning. The student, instructor and advisor develop a contract reflecting current abilities and development needs in teaching. Individually identified competencies include tasks such as responsibility for planning, preparing, presenting and evaluating a course with supervision.

College/Department: College of Nursing Health Professions
Repeat Status: Not repeatable for credit
Prerequisites: NHP 762 [Min Grade: B]

NHP 827 Scholarship I 1.0-2.0 Credit

Through scholarship a student produces an original contribution of knowledge. Scholarship I consists of developing the proposal, completing any pilot projects that may be required and defending the proposal.

College/Department: College of Nursing Health Professions
Repeat Status: Can be repeated 4 times for 10 credits
Prerequisites: NHP 818 [Min Grade: B] and RSCH 813 [Min Grade: B] and RSCH 770 [Min Grade: B] and NHP 810 [Min Grade: B] and RSCH 519 [Min Grade: B]

NHP 828 Scholarship II 1.0-2.0 Credit

Through scholarship a student produces an original contribution of knowledge. Scholarship II consists of obtaining IRB approval, as needed, and implementing the proposed project. This may include data collection and analysis.

College/Department: College of Nursing Health Professions
Repeat Status: Can be repeated 4 times for 10 credits
Prerequisites: NHP 827 [Min Grade: CR]

NHP 829 Scholarship III 1.0-2.0 Credit

Through scholarship a student produces an original contribution of knowledge. Scholarship III consists of developing the dissemination product, defending the scholarship and disseminating the project.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 4 times for 10 credits

Prerequisites: NHP 828 [Min Grade: CR]

NHP 832 Leadership Practicum 1.0-4.0 Credit

This course is designed for students interested in an administration and leadership mentored practicum to assist them in meeting their future career goals. Students are expected to develop a learning contract with specific objectives, and work with their faculty advisor to identify the resources needed to successfully complete this practicum.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 4 times for 20 credits

NHP I899 Independent Study in Nursing and Health Professions 1.0-4.0 Credit

Independent study is offered to graduate students to afford them the opportunity to develop various components of their research or for content related to their interests. The course is structured with a contract and is designed to allow students access to avenues and resources (personnel, mentorship, institutional) to enrich their learning.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NHP T880 Special Topics in Nursing and Health Professions 1.0-4.0 Credit

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 16 credits

Nutrition & Food Science

Courses

NFS 510 Profession of Dietetics 3.0 Credits

This course will introduce the learner to the profession of dietetics. Topics covered will include: educational preparation and credentialing of registered dietitians and the organizational units responsible for these functions; professional roles and practice areas of dietitians; professional responsibilities of the credentialed dietitian; the Academy of Nutrition and Dietetics and other professional organizations; and, trends affecting the dietetics profession.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 525 Nutritional Assessment Through the Life Cycle 3.0 Credits

This course is designed to introduce students to and provide hands-on experience with the four primary methods of nutritional assessment: dietary, anthropometric, laboratory, and clinical assessment. Assessment methodology appropriate to each stage of the life cycle, including infants, children, adolescents, adults and elderly, will be used.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 526 Lifecycle Nutrition 3.0 Credits

This course will provide advanced study related to nutritional needs and concerns throughout the human lifecycle. We will discuss the biological basis of energy and nutrient needs, identify energy and nutrient needs, discuss selected methods of nutritional assessment, and examine the consequences of failing to meet certain needs throughout the life-course.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 6 credits

NFS 530 Macronutrient Metabolism 3.0 Credits

Covers absorption, utilization, digestion, storage, and excretion of carbohydrates, lipids, and proteins.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 531 Micronutrient Metabolism 3.0 Credits

Covers absorption, utilization, digestion, storage, and excretion of vitamins, macrominerals, and microminerals.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 543 Medical Nutrition Therapy I 3.0 Credits

In-depth coverage of nutrition assessment and the Nutrition Care Process. Pathophysiology of selected acute & chronic disease states and their associated medical problems, with focus on using the Nutrition Care Process to meet the medical nutrition needs of patients.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 525 [Min Grade: C]

NFS 544 Medical Nutrition Therapy II 3.0 Credits

Pathophysiology of selected acute & chronic disease states and their associated medical problems, with focus on using the Nutrition Care Process to meet the medical nutrition needs of patients.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 543 [Min Grade: C]

NFS 545 Nutrition in Critical Care 3.0 Credits

Pathophysiology of selected critical care conditions and their associated medical problems, and the use of the Nutrition Care Process to meet the medical nutrition needs of patients. Also covers nutrition support including use of enteral and parenteral nutrition.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 544 [Min Grade: C]

NFS 546 World Nutrition 3.0 Credits

Discusses the nutritional status of peoples in various parts of the world, the incidence and treatment of deficiency diseases, problems of the food supply and efforts to improve it, and other timely aspects of this comprehensive problem.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 550 Foodservice Systems Management 3.0 Credits

In-depth treatment 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: Can enroll if major is HNUT.

NFS 601 Research Methods 3.0 Credits

Covers current techniques and evaluation methods for human nutrition research. Focuses on human subject aspects and critique of the literature.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 602 Methods of Nutrition Research 3.0 Credits

Laboratory methods current in nutrition research techniques. The emphasis will be on methods of instrumental analysis.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 609 Individualized Supervised Practice Pathway 1.0-3.0 Credit

The Individualized Supervised Practice Pathway is designed to prepare competent, entry-level dietitians for positions in medical nutrition therapy, outpatient nutrition counseling, food service management and community nutrition. The program will provide a curriculum for the student to experience and practice the many roles of the dietitian under the supervision of the preceptor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 12 times for 39 credits

NFS 625 Nutrition and Exercise Physiology 3.0 Credits

The principles of exercise science and their interaction with nutrition are explored in-depth. The physiological and biochemical effects of training are examined in relation to sports performance and prevention of chronic diseases prevalent in developed countries.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 629 Readings in Nutrition Science 3.0 Credits

Covers advanced nutritional aspects of selected subjects in metabolism via an in-depth survey of current research literature in the field.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 630 Nutrition Counseling 0.0-3.0 Credits

Emphasizes nutrition counseling techniques for use with individuals and small groups, including 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

NFS 634 Women's Issues in Nutrition 3.0 Credits

Deals with the interface between nutrition, medicine, psychology, sociology, and anthropology as it relates to the female life cycle. Emphasizes pregnancy, lactation, maternal obesity, eating disorders, menopause, and society's roles for women in relation to food.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 640 Nutrition of the Schoolchild 3.0 Credits

Covers normal growth patterns and nutrition requirements for children of school age (K to 12). Stresses nutritional problems of schoolchildren, attitudes toward food, the role of the school lunch in nutrition, and evaluation of school lunches in relation to total nutritive needs.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 641 Nutrition in Later Maturity 3.0 Credits

Considers physiologic changes and nutritional requirements in later maturity and applications to dietary planning in the home and in the institution. Stresses economic, management, and community resources for meeting dietary needs and special nutrition problems of the elderly.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 690 Community Nutrition 3.0 Credits

Surveys nutrition services of city, state, and national organizations. Develops suggestions for the development of a community program with appropriate educational methods and illustrative materials.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 695 Nutrition Education in K-12 3.0 Credits

Curriculum development for nutrition and food study in elementary and secondary schools; instructional materials; methods of teaching.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 696 Methods of Teaching Dietetics 3.0 Credits

Analyzes teaching situations in dietetics, including development of educational programs and instructional methods and materials for implementation in a clinical or management dietetics setting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 732 Weight Management and Eating Disorders 3.0 Credits

Investigate current aspects of the treatment of obesity and eating disorders through nutrition therapy by studying research from medical science, nutrition knowledge, and dietary modalities.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 801 Techniques in Nutrition Sciences Research 3.0 Credits

This course will examine the techniques used in the various Department of Nutrition Sciences laboratories, spanning the subspecialties of metabolism and physiology, behavioral nutrition, medical nutrition, food safety and community nutrition. The purpose of this rotation course in laboratory techniques is to provide the student with a basic understanding and terminology needed to interact with faculty in the conduct of research in the Department of Nutrition Sciences. It will also serve to prepare the student to develop his/her own dissertation proposal and interact with nutrition researchers in the larger scientific community.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HNUT and classification is PhD.

NFS 810 Topics in Metabolic Nutrition 3.0 Credits

This course will examine current issues in nutrition health promotion and disease prevention from the perspective of metabolism, physiology, and behavioral nutrition.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 6 credits

NFS 811 Topics in Community Nutrition 3.0 Credits

This course will examine current issues in health promotion and disease prevention from the perspective of community based nutrition and food security.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if major is HNUT and classification is PhD.

NFS 812 Integrative Nutrition Practicum 3.0 Credits

This course will provide the nutrition science PhD student with the theory and experience of nutrition science as practiced outside of the academic research setting. The course will cover elements of practice in three settings: Nutrition/Food Industry, Public Policy, and Clinical Consultation. Students will choose one setting in which to focus for the term. This course can be repeated once as an elective by choosing a different practice setting.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if classification is PhD.

Prerequisites: NFS 801 [Min Grade: B] and NFS 810 [Min Grade: B] and NFS 811 [Min Grade: B]

NFS 849 Readings in Therapeutic Nutrition 3.0 Credits

Covers current literature pertaining to nutrition in various conditions such as malabsorption, inborn errors of metabolism, diabetes mellitus, diseases of the gastrointestinal tract, diseases of the liver, and surgical conditions. Discusses nutrition assessment and parenteral and enteral nutrition.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: NFS 510 [Min Grade: C]

NFS 997 Research 1.0-12.0 Credit

Requires students, in consultation with an appropriate faculty adviser, to identify a specific food and/or nutrition problem area of mutual interest, carefully document its background, and present research reports for study. All thesis students use this number. May be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS 999 Dissertation Research 1.0-9.0 Credit

Through this course the student will conduct original research with the goal of producing an original contribution of knowledge and defend that research in an oral dissertation defense. The quality of the original research must conform to that needed for submission of a manuscript to a peer-reviewed scientific journal in the student's area of research.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

NFS I599 Independent Study in NFS 0.5-9.0 Credits

Provides an independent study in human nutrition.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS I699 Independent Study in NFS 0.5-9.0 Credits

Provides an independent study in human nutrition.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS I799 Independent Study in NFS 0.5-9.0 Credits

Provides an independent study in human nutrition.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS I899 Independent Study in NFS 0.5-9.0 Credits

Provides an independent study in human nutrition.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS I999 Independent Study in NFS 0.5-9.0 Credits

Provides an independent study in human nutrition.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS T580 Special Topics in NFS 0.5-9.0 Credits

Covers selected topics of study in the field of nutrition and food.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS T680 Special Topics in NFS 0.5-9.0 Credits

Covers selected topics of study in the field of nutrition and food.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated multiple times for credit

NFS T780 Special Topics in NFS 0.5-9.0 Credits

Covers selected topics of study in the field of nutrition and food.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS T880 Special Topics in NFS 0.5-9.0 Credits

Covers selected topics of study in the field of nutrition and food.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

NFS T980 Special Topics in NFS 0.5-9.0 Credits

Covers selected topics of study in the field of nutrition and food.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Operations Management

Courses

OPM 998 Dissertation Research in Operations Management 1.0-12.0 Credit

Dissertation Research.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 12 times for 24 credits

Operations Research

Courses

OPR 601 Managerial Decision Models and Simulation 3.0 Credits

Introduces students to the basic modeling tools and techniques for making managerial decisions in a complex and dynamic business environment. Topics include linear, discrete, and nonlinear optimization, multicriteria decision making, decision analysis under uncertainty, and simulation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPR 620 Operations Research I 3.0 Credits

Covers theory and applications of linear programming, including the simplex method, sensitivity analysis and duality, formulation and solution of transportation and network optimization problems. Extensions include game theory, quadratic programming, financial optimization, and emerging solution techniques such as interior-point methods.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPR 622 Operations Research II 3.0 Credits

This course covers modeling and solving optimization problems under uncertainty. Topics will include stochastic processes, queueing systems and dynamic programming.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPR 624 Advanced Mathematical Program 3.0 Credits

This course covers algorithms and software development for nonlinear programming, integer programming, and global optimization. Special emphasis is placed on solution methods for constrained and unconstrained nonlinear optimization, a survey of methods for integer linear and nonlinear optimization, and search techniques for global optimization.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPR 626 System Simulation 3.0 Credits

This course focuses on the application of simulation in analyzing complex systems. The corresponding theory is also covered.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C]

OPR 640 Decision Models for the Public Sector 3.0 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 601 [Min Grade: C-]

OPR 660 OR Models in Finance 3.0 Credits

This course focuses on quantitative methods for financial planning such as optimal investment strategy, currency conversion, portfolio optimization, etc. Topics include fundamental concepts in (quantitative) finance, convexity theory, general theory of linear programming (duality, Farkas' Theorem on linear inequalities, von Neumann's Theorem on two-person zero-sum game), basics of probability and stochastic optimization models in finance. Furthermore, some recent advances in the theory of risk measurement, such as VaR (Value-at-Risk), CVaR (Conditional Value-at-Risk), and their multivariate counterpart; MVaR and MCVaR, etc., are also covered.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPR 922 Operations Research Methods I 3.0 Credits

Covers theory and applications of linear programming, including the simplex method, sensitivity analysis and duality, formulation and solution of transportation, and network optimization problems. Extensions include integer programming, quadratic programming, and emerging solution techniques such as interior-point methods.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPR 924 Operations Research Methods II 3.0 Credits

This course covers modeling and solving optimization problems under uncertainty. Topics will include stochastic optimization, queueing systems, and dynamic programming.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPR 926 Operations Research Models in Finance I 3.0 Credits

This course will present a survey of modeling and optimization techniques arising in quantitative finance.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 2 times for 6 credits

Prerequisites: STAT 920 [Min Grade: C] and OPR 922 [Min Grade: C]

OPR 991 Simulation Theory and Applications 3.0 Credits

This course focuses on the application of simulation in analyzing complex systems. The corresponding theory is also covered.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C]

OPR 992 Applied Math Programming 3.0 Credits

This course covers algorithms and software development for nonlinear programming, integer programming, and global optimization. Special emphasis is placed on solution methods for constrained and unconstrained nonlinear optimization, a survey of methods for integer linear and nonlinear optimization, and search techniques for global optimization.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

OPR 998 Dissertation Research in Operations Research 1.0-12.0 Credit

Dissertation Research.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 12 times for 24 credits

OPR I599 Independent Study in OPR 0.0-12.0 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 I699 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 I799 Independent Study in OPR 0.0-12.0 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 I899 Independent Study in OPR 0.0-12.0 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 I999 Independent Study in OPR 3.0 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 9 credits

OPR T580 Special Topics in OPR 0.0-12.0 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 T680 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

OPR T780 Special Topics in OPR 0.0-12.0 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 T880 Special Topics in OPR 0.0-12.0 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 T980 Special Topics in OPR 0.5-9.0 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 510 Leading in Dynamic Environments 2.0 Credits

To effectively influence others, individuals must understand themselves and how their actions, personality traits, and values affect those around them. As leaders, individuals must also interact well with others and have a foundation of knowledge to draw upon to determine appropriate actions. This course helps students enhance their self-awareness, strengthen their social awareness, and boost their capacity to analyze critical events, make informed decisions, and take appropriate actions as leaders.

This course takes a strategic perspective of leadership, examining how leaders at all organizational levels can help promote a sustainable competitive advantage. Topics such as individual differences, building social networks, motivating employees, responding in crisis situations, and ethics are discussed.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ORGB 511 Leading in Dynamic Environments: A Personal, Relational, and Strategic Approach 3.0 Credits

To effectively influence oneself and others, individuals must understand themselves and how their actions, personality traits, and values affect their careers and those around them. As leaders, individuals must also interact well with others and have a foundation of knowledge to draw upon to determine appropriate actions in dynamically changing environments. This course helps students enhance their self-awareness and professional development, strengthen their social awareness, and boost their capacity to analyze critical events, make informed decisions, and take appropriate actions as leaders in a variety of contexts and situations. This course takes a strategic perspective of leadership, examining how leaders at all organizational levels can help promote a sustainable competitive advantage.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ORGB 520 Leading High-Performance Teams 1.0 Credit

Teams are a fundamental structure and building block in organizations. Given the trend towards flatter and matrix types of business structures, teamwork and interpersonal relationships are becoming increasingly important. As a result, in order to be successful in a team based environment, individuals must be able to understand core drivers of team effectiveness as well as how to influence in these types of settings. This course examines these skillsets in terms of team structure, leadership, interpersonal relationships, knowledge exchange, processes, and outcomes. The learning method is experiential whereby individuals will participate in team based activities and then debrief them in order to learn how to effectively engage in and facilitate positive team dynamics in organizations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ORGB 510 [Min Grade: C]

ORGB 530 Career and Professional Development 1.0 Credit

To be an effective leader and to develop professionally, individuals must understand themselves, exercise self-leadership, and manage their careers and lives effectively. This course helps students develop knowledge and skills in these areas to enhance their professional development and to become effective managers of their careers. Using readings, cases, self-assessments, and discussions, the objective of the course is to provide students with opportunities to understand trends in contemporary organizations and careers, enhance their self-awareness, develop career self-management skills, and apply these skills and perspectives to further their professional development.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: ORGB 510 [Min Grade: C] and ORGB 520 [Min Grade: C]

ORGB 625 Leadership and Professional Development 3.0 Credits

This course helps students develop knowledge and skills to enhance their professional development and to become effective leaders. Students will understand trends in contemporary organizations, enhance their self-awareness, and refine their interpersonal skills, and apply these skills to improve their work effectiveness.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ORGB 631 Leading Effective Organizations 3.0 Credits

This course prepares students to make informed decisions as leaders in common institutional and environmental contexts. The focus of the contingency-based perspective of this course is to help leaders understand how best to motivate and coordinate employees and to control outcomes in a manner that ensures they fulfill strategic objectives.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ORGB 640 Negotiations for Leaders 3.0 Credits

This course is designed specifically for leaders to enhance their leadership negotiation style. The material is geared toward developing leaders as they deal with the art and science of securing agreements and resolving disputes. The course combines a theoretical understanding of the central concepts of negotiations with learned analytical skills to discover optimal solutions to problems (the science) and good negotiation skills to get these solutions accepted and implemented (the art).

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

ORGB I599 Independent Study in ORGB 0.0-12.0 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 I699 Independent Study in ORGB 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

ORGB I799 Independent Study in ORGB 0.0-12.0 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 I899 Independent Study in ORGB 0.0-12.0 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 I999 Independent Study in ORGB 3.0 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 9 credits

ORGB T580 Special Topics in ORGB 0.0-12.0 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 T680 Special Topics in ORGB 0.5-9.0 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 T780 Special Topics in ORGB 0.0-12.0 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 T880 Special Topics in ORGB 0.0-12.0 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 T980 Special Topics in ORGB 0.5-9.0 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

Physical Therapy Rehab Science

Courses

PTRS 501 Introduction to Research 4.0 Credits

The course is designed to provide professional graduate students with the skills necessary to evaluate the relationship between practice and published research using an interdisciplinary approach. The content includes an overview of research concepts, research ethics, literature reviews, quantitative and qualitative research methods, including sampling, data collection, and analysis.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 530 Kinesiology I 4.0 Credits

This course is part one of a two-part series designed to provide students with basic knowledge of biomechanics and functional aspects of the musculoskeletal system. It involves the study of the anatomical, biomechanical, and physiological fundamentals of human motion as it pertains to the upper extremity.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 531 Kinesiology II 3.0 Credits

This course is part two of a two-part series designed to provide students with basic knowledge of biomechanics and functional aspects of the musculoskeletal system. It involves the study of the anatomical, biomechanical, and physiological fundamentals of human motion as it pertains to the spine and lower extremity.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 532 Human Gross Anatomy I 4.0 Credits

This course is part one of a two-part series designed to introduce students to the structure and function of the back, neck, face, and upper extremity with particular emphasis on the nervous and musculoskeletal systems. Special emphasis is placed on clinical relevance and functional interrelationships of the anatomic structures.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 533 Human Gross Anatomy II 4.0 Credits

This course is part two of a two-part series designed to introduce students to the structure and function of the cranium, thorax, abdomen, and lower extremity with particular emphasis on the nervous and musculoskeletal systems. Special emphasis is placed on clinical relevance and functional interrelationships of the anatomic structures.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 534 Physical Therapy Exam & Intervention I 3.0 Credits

This course prepares a student to perform a basic musculoskeletal examination of the cervical spine and upper extremity. The entire patient management process from history taking to prescription of interventions is introduced and applied. Basic skills needed in the examination are described and practiced.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 535 Physical Therapy Exam & Intervention II 3.0 Credits

This course prepares a student to perform a basic musculoskeletal examination of the lumbar spine and lower extremities. The entire patient management process from history taking to prescription of interventions is applied. Basic skills needed in the examination are described and practiced.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 539 Topics in Pathophysiology I 2.0 Credits

Topics in Pathophysiology I is the first of two lecture-format courses that introduce physiology of organ systems, disease states and conditions. Differential diagnosis, medical screening, the impact of pathology and medical management in physical therapy practice will be investigated.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 540 Topics in Pathophysiology II 4.0 Credits

Topics in Pathophysiology II is the second of two lecture-format courses that introduce physiology of organ systems, disease states and conditions. Differential diagnosis, medical screening, the impact of pathology and medical management in physical therapy practice will be investigated.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 590 Advanced Musculoskeletal Anatomy 3.0 Credits

Exposes clinicians to the structure and function of the body with particular emphasis on the nervous and musculoskeletal systems. The format consists of onsite seminars that will include cadaveric dissections. Special emphasis is placed on clinical relevance and functional interrelationships of the anatomic structures.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 600 Clinical Reasoning 4.0 Credits

Utilizing a case-based format, this course assists students with clinical reasoning strategies as outlined in the Guide to Physical Therapist Practice. Additionally, students will have opportunities to enhance self-awareness and begin to develop the professional skills inherent in physical therapy practice. Students apply concepts of patient-client management including examination, evaluation, diagnosis, prognosis, and intervention. Through small group discussion, students develop their group skills and are introduced to the team approach.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 12 credits

PTRS 604 Induction Inquiry Integration 3.0 Credits

This course provides an introduction to the learning philosophy of the program, introducing models of adult learning, learning styles and experiential learning. Different forms of knowledge are explored. Methods of creating knowledge from experimentation, observation and experience are studied.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 609 Experiential Accreditation 6.0 Credits

Provides an opportunity for bachelors prepared students to gain credit for their professional experiential learning. With guidance from the course director, students compile a portfolio, reflecting on evidence that demonstrates their ability to perform higher-level academic functions in a clinical context: analysis and decision making.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 610 Issues in Pharmacotherapy 3.0 Credits

Issues in Pharmacotherapy is a lecture-format course that focuses on providing foundational information about pharmacotherapy, pharmacokinetics, and pharmacodynamics that is applicable in physical therapy. Drug classifications are described. Examples are provided of various drug categories.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 612 Pharmacotherapeutics 3.0 Credits

Pharmacotherapeutics is a lecture-format course that focuses on providing foundational information about pharmacotherapeutics, pharmacology, pharmacokinetics, and pharmacodynamics that is applicable in physical therapy. Drug classifications are described. Examples are provided of various drug categories.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 613 Integrated Clinical Experience I 0.5 Credits

Integrated Clinical Experience I is the first in a series of four clinical practice courses. It is an opportunity for students to practice physical therapy skills learned in the curriculum to date. Students will have the opportunity to practice and refine their skills under the direct supervision of a licensed physical therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 614 Integrated Clinical Experience II 0.5 Credits

Integrated Clinical Experience II is the second in a series of four clinical practice courses. It is an opportunity for students to practice physical therapy skills learned in the curriculum to date. Students will have the opportunity to practice and refine their skills under the direct supervision of a licensed physical therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 615 Integrated Clinical Experience III 0.5 Credits

Integrated Clinical Experience III is the third in a series of four clinical practice courses. It is an opportunity for students to practice physical therapy skills learned in the curriculum to date. Students will have the opportunity to practice and refine their skills under the direct supervision of a licensed physical therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 616 Integrated Clinical Experience IV 0.5 Credits

Integrated Clinical Experience IV is the third in a series of four clinical practice courses. It is an opportunity for students to practice physical therapy skills learned in the curriculum to date. Students will have the opportunity to practice and refine their skills under the direct supervision of a licensed physical therapist.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 620 Orthopedic Physical Therapy: Upper Extremity 4.0 Credits

This is the first in a series of three courses on orthopedic physical therapy. This course emphasizes differential diagnosis, clinical decision making, and development and implementation of a plan of care for conservative and post-operative management of patients demonstrating musculoskeletal dysfunction of the upper extremity.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 621 Orthopedic Physical Therapy: Lower Extremity 4.0 Credits

This is the second in a series of three courses on Orthopedic Physical Therapy. This course emphasizes differential diagnosis, clinical decision making, and development and implementation of a plan of care for conservative and post-operative management of patients demonstrating musculoskeletal dysfunction of the lower extremity.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 622 Orthopedic Physical Therapy: Spine 0.0-4.0 Credits

This course is one of three courses in orthopedic physical therapy. Emphasis is on examination, differential diagnosis, clinical decision making, and development and implementation of a plan of care for conservative management (including joint manipulation) and post operative interventions for patients with musculoskeletal dysfunction.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 623 Physical Agents 3.0 Credits

Physical Agents discusses the equipment used and the general application of thermal agents, electrotherapy, compression devices and massage. The clinical decision making when using all of these modalities in the management of clinical conditions including pain, edema, inflammation, decreased range of motion, and muscle weakness will be discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 624 Functional Mobility 3.5 Credits

This course addresses the functional management of patients with limited mobility and their equipment needs, emphasizing functional training and clinical decision making for therapeutic intervention as well as prescription of durable medical equipment. Patient/caregiver/healthcare provider safety for injury prevention is stressed, as well as effective instructional approaches for all audiences.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 627 Cardiopulmonary Physical Therapy I 4.0 Credits

This is the first of two courses designed to provide exposure to the normal and abnormal anatomy, physiology and function of the cardiac, vascular and pulmonary systems. Physiology and pathophysiology are explored in relation to functional performance, compensation for disease process and implications for management. Clinical decision making is emphasized.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 630 Cardiopulmonary Physical Therapy II 3.0 Credits

Cardiopulmonary Physical Therapy II is the second of two courses designed to provide students with exposure to the normal and abnormal anatomy, physiology and function of the cardiac, vascular and pulmonary systems. Primary and secondary cardiopulmonary diseases/dysfunction are discussed as they relate to functional ability.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

PTRS 639 Motor Learning 2.5 Credits

This course examines topics in movement science at different points in the life span, traces the evolution of skill acquisition, and critically reviews current theories of motor learning and control. Emphasis will be placed on basic concepts of motor learning and control in populations with typical development.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 641 Neurological Exam and Intervention I 4.0 Credits

This course introduces the student to examination, evaluation, diagnosis and comprehensive interventions for the adult with neurological dysfunction. It focuses on examination skills and common interventions used with this patient population. Clinical decision making will be utilized to develop appropriate intervention strategies, application techniques, and neuromuscular strengthening and conditioning principles.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 642 Neurological Exam and Intervention II 5.0 Credits

This course focuses on adults with central nervous system dysfunction where vestibular, sensory, perceptual, cognitive, and communication deficits result in more complex movement dysfunction and limited capacity for learning. Students will learn to integrate neuromuscular, sensory-perceptual, cognitive, behavioral and functional mobility strategies into a comprehensive plan of care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 643 Applied Biomechanics 3.0 Credits

This course provides content essential for understanding and evaluating research literature related to the effects of aging, pathology, immobilization, and therapeutic procedures on biological tissues and human movement. Methods for quantifying and evaluating tissue properties and human neuromuscular control are included. Application to practice will come from discussion of current literature.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 644 Integumentary Physical Therapy 1.5 Credit

The focus of this course is on wound assessment and management techniques used in the clinical setting as outlined in the Guide to Physical Therapy Practice. The use of evidence-based practice to guide clinical decision making will be emphasized.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 648 Prosthetics and Orthotics 3.0 Credits

This lecture/laboratory course provides students with knowledge of the components and biomechanical principles used in upper and lower extremity prostheses and lower limb and spinal orthoses. The basic principles and processes of prosthetic and orthotic prescription, checkout and functional training are presented. Pre-prosthetic medical and physical therapy management of persons with amputation is also discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 649 Health Professional Roles 2.5 Credits

The focus of this course is to examine professional issues and behaviors that are necessary to prepare physical therapy students for their clinical experiences and roles as future physical therapists.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 15 credits

PTRS 650 Motor Control and Learning Rehabilitation 3.0 Credits

Students examine topics in movement science in motor control and motor learning throughout the lifespan and the application of these principles to varied patient populations. This course also allows students to review the movement science literature as it applies to select patient populations.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 651 Applied Tissue Biomechanics 3.0 Credits

This course is designed to provide the information necessary for the understanding and evaluation of the effects of immobilization, increased stress and strain, injury, disease, healing and aging on biological tissues. Emphasis is placed upon the integration of tissue biomechanics into the rationale and basis for therapeutic interventions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 654 Topics in Health Policy & Services 3.0 Credits

This course provides information on health policy and health services specific to physical therapy. Students are exposed to health legislation, social determinants of health, issues in health disparities and development of advocacy skills.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 655 Health Administration 2.5 Credits

This is the last in a series of four professional development courses. The focus of the course is on the organizational, fiscal and administrative workings of the health care environment and the responsibilities of individual physical therapists in these areas.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 656 Motor Control and Rehabilitation 2.0 Credits

This course examines contemporary insights for the application of motor control and learning in physical therapy for children and adults with movement dysfunctions. Emphasis is placed on critical review of current evidence applied to patient populations. Practice paradigms for patient scenarios for evaluations and intervention will be critically discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 660 The Human Experience in Healthcare 3.0 Credits

This course explores the human experience of healthcare. Students will engage in an in-depth assessment of how the interaction between human relationships and other complex challenges influence health outcomes. Some of these challenges include social and psychological determinants of health, values, beliefs, and institutional culture. Students will gain insight and appreciation of the lived experience of patient and provider.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 664 Pediatric Physical Therapy 4.5 Credits

This course takes a systems approach to understanding the basis for pediatric disabilities. Examination and intervention planning are discussed both broadly and in terms of specific disabilities in the context of current evidence for client management models. Lab component provides opportunity to work with a child with a disability in a community setting.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 15 credits

PTRS 675 Life Span Development I: Birth to Adolescence 4.0 Credits

Life Span Development I addresses the physical, cognitive, emotional, and social-cultural characteristics of development. Changes throughout prenatal, infancy, childhood and adolescence are highlighted and red flags are identified. Pediatric examination will be discussed. This course will provide foundational knowledge for Pediatric Physical Therapy evaluation, examination and intervention.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 676 Life Span Development II: Young Adulthood to Older Adulthood 3.0 Credits

Life Span Development II is a required course for all entry-level Doctor of Physical Therapy students. This course addresses the physical, cognitive, emotional, and social-cultural aspects of aging, and the changes that occur throughout adulthood. Course content will provide foundational knowledge for concurrent and subsequent courses for physical therapy examination and intervention.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

PTRS 720 Rehabilitation Management 3.0 Credits

This course focuses the student on the organization and administrative aspects of health care delivery. Students knowledge of managerial and service-related business concepts are enhanced in order to increase the efficiency and effectiveness of their and others' practice in today's health care environment.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 721 Teaching Concepts in Rehabilitation 3.0 Credits

The course provides information on the means of teaching/learning theory, teaching and learning styles, planning of learning experiences, clinical teaching tools and strategies, teaching objectives, effective feedback, and performance evaluation, all within the context of adult education and with the acknowledgment of the clinical experience of the participants.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 733 Advanced Clinical Reasoning 2.0 Credits

This course emphasizes decision-making strategies for patients with multiple co-morbidities. Meta-cognitive strategies are used during clinical decision making to assist with student transitions from novice to entry-level clinicians.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 740 Issues in Pediatric Health & Rehabilitation 4.0 Credits

The course addresses issues within health, prevention and rehabilitation, services and outcomes for children, youth and families. Key themes are participation, self-determination and advocacy. Materials addressing intervention, service delivery models and care across the lifespan, leadership, innovation and knowledge translation will be integrated.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 750 Differential Diagnosis 1.0 Credit

This course uses published evidence to explore the process of differential diagnosis and explain how it is an essential piece of all physical therapy examinations. The recognition of significant medical conditions that fall out of the scope of physical therapy practice is emphasized.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 751 Evidence-Based Practice 3.0 Credits

The objective of this course is development of skills for finding, analyzing, communicating and applying knowledge and research to physical therapy practice. Students will develop competencies in evidence-based clinical decision making.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 752 Research and Measurement in Physical Therapy 2.0 Credits

This course introduces stages of research processes including research theory, formulating the research question, literature review, sampling, and experimental controls. Areas of psychometric measurement theory including reliability and validity issues will be examined. This information is applied to common clinical and research tests and measurements related to physical therapy.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 755 Evaluation of Research In Physical Therapy 3.0 Credits

This course builds upon courses in evidence-based practice and measurement. Emphasis is on understanding the research designs and statistical analyses most often used in biomedical and rehabilitation research; interpretation of statistics; methods of clinical inquiry including case reports, single subject research, and program evaluation; and dissemination of research and scholarship.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 9 credits

PTRS 758 Evidence-Based Rehabilitation 4.0 Credits

The focus of this web-based course is on analysis of the evidence for physical (occupational) therapy practice including models and guidelines for practice. Participants development competencies in transfer of knowledge and research into practice, clinical reasoning, and evidence based decision making.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 760 Pediatric Decision Making 4.0 Credits

The course focuses on evidence-based examination and intervention of children with disabilities within the context of child, family, and environmental factors. The course highlights the role of therapists in promoting the status of the neuromuscular and musculoskeletal systems. The importance of family-centered care, parent-child interactions, and play are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 761 Pediatric Clinical Application 4.0 Credits

Pediatric Clinical Application is a primary course in the post-professional pediatric concentration area. Through a problem-based case study format, the course facilitates transfer of knowledge into the specialty practice area of pediatrics and promotes independent learning.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 762 Women's Health in Physical Therapy 4.0 Credits

Provides a review of female anatomy and physiology. Emphasis on aspects of examination, evaluation and intervention for selected topics related to women's health across the lifespan, especially during reproductive and menopausal years. Students are encouraged to explore the unique niche physical therapists have in providing health care services for women.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 763 Decision Making in Rehabilitation 4.0 Credits

This course is designed to provide students with the opportunity to integrate basic and clinical science research in the design of intervention paradigms for patients being served in rehabilitation settings.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 764 Geriatric Rehabilitation 4.0 Credits

This course examines the implications of an aging population, effects of age on physiological, kinesiological, social, and psychological function, using evidence as a framework for examination, intervention and clinical decision making, advocacy for patients and caregivers, health promotion and wellness, the impact of Medicare, and pharmacological issues in the elderly.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 765 Spinal Rehabilitation 4.0 Credits

This course applies an evidence-based approach to answering clinical questions about examination, diagnosis, prevention, and management of spinal and pelvic disorders. Goals are to foster independent, critical thinking based on interpretation of scientific literature and its integration into PT theory and practice and to enhance clinical examination and intervention skills.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 766 Extremity Rehabilitation 4.0 Credits

This elective, on-line course explores advanced examination and intervention strategies for the upper and lower extremities. Clinical examination procedures (including clinical imaging), outcome measures, prevention and treatment interventions will be critically analyzed using an evidence-based approach.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 767 Foundations in Hand Therapy 4.0 Credits

This course introduces the student to the specialized field of hand therapy. The principles of hand therapy included are musculoskeletal tissues and pathology, clinical reasoning, hand examination, splinting principles, physical agents, and therapeutic exercise. Common elbow, wrist, and hand disorders are discussed to integrate the foundation topics into clinical practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 768 Upper Quarter Joint Pathology 4.0 Credits

This course reviews the common pathologies that effect the articulations and surrounding soft tissues, especially tendons and ligaments. Anatomy, biomechanics, and examination principles for each region, shoulder, elbow, wrist, and hand are discussed. Conservative and post-operative therapeutic management for fractures, dislocations, tendon repairs, ligament injuries, and degenerative disorders are presented.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: PTRS 767 [Min Grade: C]

PTRS 769 Nerve Injuries of the Upper Quarter 4.0 Credits

This course emphasizes the anatomy and basic science principles for the cervical spine and major peripheral nerves of the upper quarter. Age-related changes and pathophysiology of nerve lacerations and entrapment neuropathies are discussed. Advanced examination skills and interventions, conservative and post-operative, for the peripheral nervous system are presented.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: PTRS 767 [Min Grade: C]

PTRS 770 Diseases That Affect the Hand 4.0 Credits

Course content emphasizes the impact of disease on hand function, especially with activities of daily living, vocational activities, and recreational activities. The overview includes pathology, clinical presentation, examination techniques and clinical interventions specific to the hand. Additionally, multisystem involvement associated with mutilated hand injuries and pain syndromes is discussed.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: PTRS 767 [Min Grade: C]

PTRS 772 Selected Topics in Pediatrics 1.0-4.0 Credit

This course is designed to provide the opportunity for advanced content and discussion regarding issues facing the pediatric practitioner. This course is designed to address current issues related to practice in various pediatric settings. Topics are introduced and content delivered, but the emphasis will be on student/instructor interaction and discussion.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 4 times for 16 credits

PTRS 779 Independent Project 1.0-3.0 Credit

Independent Project provides the student an exposure to physical therapy scholarship and research through participation in a faculty research project or self-directed study.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

PTRS 780 Foundations of School-based Practice 2.0 Credits

This web-based course is designed to enhance knowledge and competencies of physical therapists in school-based practice. Emphasis on the roles and responsibilities of the physical therapist in educational settings. Participants will develop competencies to support students, families and educational teams.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 781 Advanced Competencies in School-based Practice 2.0 Credits

This web-based course builds on Foundations of School-base Practice. The focus is on advanced competencies for physical therapists in school-based practice. Emphasis is on innovation in practice, solutions to challenges, and leadership roles as a member of the education team.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PTRS 786 MHS Final Project I 1.0-2.0 Credit

Students develop a final project to demonstrate the ability to use current best evidence to evaluate methods of service delivery or interventions at individual or program levels. Completion of an in-depth literature review associated with the project approved by the student's advisory committee is the focus of this course.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 6 credits

Restrictions: Can enroll if major is PT or major is RHAB and program is MHS.

Prerequisites: PTRS 501 [Min Grade: C] and RHAB 759 [Min Grade: C] and PTRS 758 [Min Grade: C] and PTRS 721 [Min Grade: C] and PTRS 650 [Min Grade: C] and PTRS 651 [Min Grade: C]

PTRS 787 MHS Final Project II 1.0-2.0 Credit

Students conduct a well designed and executed study that addresses service delivery at the individual or program level. The results of the study are presented in manuscript format suitable for dissemination at a professional meeting, in a relevant peer-reviewed journal, or other educational resources used by rehabilitation specialists.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 6 credits

Restrictions: Can enroll if major is PT or major is RHAB and program is MHS.

Prerequisites: PTRS 786 [Min Grade: C]

PTRS 794 Clinical Experience I 1.5 Credit

This course is the first of three required full-time supervised clinical education experiences. This course is the student's opportunity to begin to apply classroom knowledge and laboratory skills with patients and clients. The student also begins to develop as a professional through role modeling by the clinical instructor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 15 credits

PTRS 795 Terminal Clinical Experience II 2.0 Credits

This course is the second of three required full-time supervised clinical education experiences. The student continues to apply classroom knowledge and laboratory skills and will be involved in all aspects of patient-client management (examination, evaluation, diagnosis, prognosis, intervention, discharge, and outcomes management).

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 6 credits

PTRS 796 Terminal Clinical Experience III 4.5 Credits

This course is a final, full-time, supervised clinical education experience. The student attains mastery of knowledge, skills, and attitudes to effectively and safely practice in today's healthcare environment. The student will experience the multiple roles of the physical therapist, such as those related to administration and health promotion.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 15 credits

PTRS 797 Clinical Internship I 2.0 Credits

This course is the first portion of an extended full time clinical internship. Clinical Internship I includes the first 12 weeks of full-time supervised clinical education. Clinical Internship II will continue this sequence for an additional 11 weeks and is required for completion of the clinical education sequence. The student will apply classroom knowledge and laboratory skills and will be involved in all aspects of patient-client management (examination, evaluation, diagnosis, prognosis, intervention, discharge, and outcomes management).

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 6 credits

PTRS 798 Clinical Internship II 4.5 Credits

This course is the continuation of Clinical Internship I. In this course, the student is expected to demonstrate competence in the comprehensive management of the simple patient and occasional guidance in managing the complex patient.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 15 credits

PTRS 799 Essentials of Physical Therapy 0.5-3.0 Credits

Designed to remediate students who require intensive instruction to achieve acceptable performance in the Doctor of Physical Therapy Program. Addresses students' individual performance deficiencies. Credits assigned based on extent of remediation required. Specific requirements are outlined in a learning contract.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 9 credits

Physician Assistant

Courses

PA 540 Clinical Anatomy 5.0 Credits

This five (5) credit lecture and laboratory course is tailored to the specific needs of physician assistant students. It reviews the fundamentals of gross anatomy, and discusses the relationships between structure and function in a regional anatomy approach and major clinical applications of anatomic relationships. Material is coordinated with the PA 544 Clinical Assessment course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: PA 542 [Min Grade: B] (Can be taken Concurrently)

Corequisite: PA 544

PA 542 Patient Communication 2.0 Credits

This lecture and seminar course provides instruction in communication skills for the effective exchange of information with patients. Addressed in the course are patient-provider collaboration, health literacy, and communication techniques for patients across cultural and generational groups, and counseling techniques for patient education, treatment adherence, and health promotion.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 543 Ethical Issues in Physician Assistant Practice 2.0 Credits

This is a lecture and seminar course addressing ethical and professional issues in Physician Assistant practice. Topics include medical ethics, ethical decision-making, professional responsibility, and commitment to patients' welfare. The link between health as a human right and medical ethics is explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 544 Clinical Assessment 5.0 Credits

This course provides the PA student with the knowledge, demeanor, and motor skills required to professional and proficiently elicit thorough medical histories and perform precise physical examination techniques for each body system. Accurate, organized recordings of clinical findings from patient encounters in the hospital setting are required.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Corequisite: PA 540

PA 545 Physician Assistant Practice 1.0 Credit

Physician Assistant Practice is a one (1) credit lecture course that introduces the concept, history, and future directions of the PA profession, and discusses professional practice issues and theories of leadership applicable to PA practice. Stewardship and strategies for effecting change as a leader are discussed in the context of cases applicable to PA professional settings.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 546 Health Policy for Physician Assistant Practice 2.0 Credits

This course explores the UD health care system and health policy issues related to the costs of health care, inequities in quality and access to care, and current US policies. The role of Physician Assistants in the health care system is examined along with issues related to malpractice, reimbursement, and quality assurance.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 547 Evidence Based Medicine for Physician Assistants 3.0 Credits

This is a three (3) quarter credit course designed to introduce PA students to evidence-based medicine, epidemiologic principles and research methodologies for application to primary care clinical practice. The course content includes an overview of epidemiologic and research concepts, ethics and the roles of politics and culture in research, quantitative and qualitative research methods and designs; and levels of scientific evidence for clinical practice. Through evaluation of published research and national practice guidelines, the skills of evidence-based practice are introduced. The course is lecture-based and utilizes cooperative learning strategies to engage students in individual and group inquiry learning outside the classroom.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 548 Principles of Medical Science I 2.0 Credits

This course is the first of three courses which provide the physiologic foundation for clinical courses. Emphasizing the complex nature of bodily functions, the course reviews normal physiology and provides a bridge to the concepts of pathophysiology that underlie dysfunction and disease. Clinical applications enhance understanding and introduce the skill of clinical reasoning.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 540 [Min Grade: B]

Corequisites: PA 551, PA 556, PA 559

PA 549 Principles of Medical Science II 2.0 Credits

This course is the second of three courses which provide the physiologic foundation for clinical courses. Emphasizing the complex nature of bodily functions, the course reviews normal physiology and provides a bridge to the concepts of pathophysiology that underlie dysfunction and disease. Clinical applications enhance understanding and introduce the skill of clinical reasoning.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 548 [Min Grade: B]

Corequisites: PA 552, PA 557, PA 560

PA 550 Principles of Medical Science III 2.0 Credits

This course is the last of three courses which provide the physiologic foundation for clinical courses. Emphasizing the complex nature of bodily functions, the course reviews normal physiology and provides a bridge to the concepts of pathophysiology that underlie dysfunction and disease in geriatrics, women's health, pediatrics, emergency medicine, and surgery while refining clinical reasoning skills.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 548 [Min Grade: B] and PA 549 [Min Grade: B]

Corequisites: PA 553, PA 558, PA 561

PA 551 Pharmacology and Therapeutics I 3.0 Credits

This is the first in a series of three courses to provide Physician Assistant students with basic knowledge in pharmacology and therapeutics. Principles of pharmacodynamics, pharmacokinetics, and clinical therapeutics are discussed for applications to primary care practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Corequisites: PA 548, PA 556, PA 559

PA 552 Pharmacology and Therapeutics II 2.0 Credits

This is the second in a series of three courses to provide Physician Assistant students with basic knowledge in pharmacology and therapeutics. Principles of pharmacodynamics, pharmacokinetics, and clinical therapeutics are discussed for applications to primary care practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 551 [Min Grade: B]

Corequisites: PA 549, PA 557, PA 560

PA 553 Pharmacology and Therapeutics III 2.0 Credits

The third in a series of three courses, this course provides Physician Assistant students with basic knowledge in pharmacology and therapeutics for specific patient populations. Principles of pharmacodynamics, pharmacokinetics, and clinical therapeutics across the lifespan are discussed for applications to primary care practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 551 [Min Grade: B] and PA 552 [Min Grade: B]

Corequisites: PA 550, PA 558, PA 561

PA 554 Biopsychosocial Issues in Patient Care 5.0 Credits

This course introduces the PA student to the biopsychosocial model of patient care. Covering topics ranging from normal psychological development and human sexuality across the lifespan to responses to stress, injury, illness, and death, the course also introduces psychiatric disorders common to primary care practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 556 Clinical Medicine I 5.0 Credits

This is the first of two courses designed to prepare the PA student with a body-system, problem-oriented approach to diseases encountered in primary care. Discussion of the etiology, epidemiology, pathophysiology, clinical manifestations, and diagnostic studies for common disorders allows the PA student to problem solve through clinical reasoning.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Corequisites: PA 548, PA 551, PA 559

PA 557 Clinical Medicine II 5.0 Credits

This is the second of two courses designed to prepare the PA student with a body-system, problem-oriented approach to diseases encountered in primary care. Discussion of the etiology, epidemiology, pathophysiology, clinical manifestations, and diagnostic studies for common disorders allows the PA student to problem solve through clinical reasoning.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 556 [Min Grade: B]

Corequisites: PA 549, PA 552, PA 560

PA 558 Topics in Clinical Practice 5.0 Credits

The course prepares the PA student for clinical rotations through lecture and a problem-oriented approach to disorders in geriatrics, women's health, pediatrics, emergency medicine, and surgery.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 556 [Min Grade: B] and PA 557 [Min Grade: B]

Corequisites: PA 550, PA 553, PA 561

PA 559 Clinical Skills I 2.0 Credits

This is the first of three courses designed to prepare the PA student with a problem-oriented, clinical approach to the evaluation, diagnosis, and management of common primary care disorders. The course uses clinical reasoning and clinical skills application laboratories based on clinical scenarios to facilitate skill development.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 544 [Min Grade: B]

Corequisites: PA 548, PA 551, PA 556

PA 560 Clinical Skills II 2.0 Credits

This is the second in a series of three courses designed to prepare the PA student with a problem-oriented, clinical approach to the evaluation, diagnosis, and management of common primary care disorders. The course uses clinical reasoning and clinical skills application laboratories based on clinical scenarios to facilitate skill development.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 559 [Min Grade: B]

Corequisites: PA 549, PA 552, PA 557

PA 561 Clinical Skills III 4.0 Credits

This is the third in series of three courses designed to prepare the PA student with a problem oriented, clinical approach to the evaluation, diagnosis, and management of common primary care disorders. The course uses clinical reasoning and clinical skills laboratories based on clinical scenarios to facilitate skill development.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 559 [Min Grade: B] and PA 560 [Min Grade: B]

Corequisites: PA 550, PA 553, PA 558

PA 570 Clinical Assessment Competency 1.0 Credit

Clinical Assessment Competency is a required course for any PA student who experiences an interruption in the usual sequence of didactic and clinical training. The course provides the forum for the student to demonstrate competencies in knowledge and skills germane to clinical assessment requisite to patient evaluation and clinical practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 544 [Min Grade: B]

PA 571 Competency for Clinical Training 1.0 Credit

Competency for Clinical Training is a one-credit pass/fail course required for any physician assistant student who experiences an interruption in the usual sequence of didactic or clinical training in the program after the second quarter. The course provides the forum for the student to demonstrate competencies requisite for continued didactic and/or clinical training. The PA student undertakes supervised, independent study guided by identified areas of individual need to meet the course competencies.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 2 credits

Restrictions: Can enroll if major is PA.

PA 581 Research Methods and Designs 5.0 Credits

The course introduces the knowledge and skills necessary to evaluate published research for clinical practice. Topics in this web-based course are research concepts, hypotheses and questions; literature searches and reviews; ethics in research; qualitative and quantitative research methods and designs including sampling, data collection and interpretation; and levels of scientific evidence.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 582 Principles of Evidence-Based Practice 5.0 Credits

With an emphasis on developing skills for clinicians to critically appraise the validity of medical literature, this online course offers a critical analysis of several types of research studies for use in clinical practice. The course requires knowledge and application of basic research and statistical concepts, and online searching skills.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 581 [Min Grade: C]

PA 583 Clinical Application of Epidemiology 5.0 Credits

This online course introduces basic terminology and concepts in epidemiology and develops knowledge for application of evidence-based health promotion strategies to clinical practice. The leading causes of morbidity and mortality in the United States are discussed in conjunction with recommendations for health promotion across the lifespan and population groups.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 584 Health Policy 5.0 Credits

This web-based course explores health policy issues relating to the cost of health care and disparities in access and quality of care, and strategies to address the deficiencies in the US health care system. Each student critiques a health policy imperative and proposes solutions to remedy the issues identified in the critique.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 585 Leadership and Stewardship 5.0 Credits

Key concepts of leadership with a focus on servant and visionary leadership are discussed in this online course. Stewardship and strategies for effecting change as a leader are explored through cases applicable to professional settings. Synthesis of course content is evidenced in the compilation of a professional leadership portfolio.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

PA 629 Internal Medicine Rotation 5.0 Credits

The Internal Medicine Rotation is a clinical course that provides the PA student with adult patient care experience under the supervision of a licensed medical practitioner. Students apply knowledge and skills learned in the didactic year to patient evaluation, and begin to apply patient management strategies to patients in an assigned clinical setting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]

PA 630 Pediatrics Rotation 5.0 Credits

The Pediatrics Rotation is a clinical course that provides the PA student with pediatric patient care experience under the supervision of a licensed medical practitioner. Students apply knowledge and skills learned in the didactic year to patient evaluation, and begin to apply patient management strategies to patients in an assigned clinical setting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]

PA 631 Women's Health Rotation 5.0 Credits

The Women's Health rotation is a clinical course that provides the student with prenatal and gynecological patient care experience under the supervision of a licensed medical provider. Students apply knowledge and skills learned in the didactic year to patient evaluation and begin to apply patient management strategies to patients in an assigned clinical setting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]

PA 632 Behavioral Medicine Rotation 5.0 Credits

The Behavioral Medicine Rotation is a clinical course that provides the PA student with psychiatric/behavioral health patient care experience under the supervision of a licensed medical practitioner. Students apply knowledge and skills learned in the didactic year to patient evaluation, and begin to apply patient management strategies to patients in an assigned clinical setting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]

PA 633 Surgery Rotation 5.0 Credits

The Surgery Rotation is a clinical course that provides the PA student with surgical patient care experience under the supervision of a licensed medical practitioner. Students apply knowledge and skills learned in the didactic year to patient evaluation, and begin to apply patient management strategies to patients in an assigned clinical setting.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]

PA 634 Emergency Medicine Rotation 5.0 Credits

The Emergency Medicine Rotation for the clinical phase PA student provides experiential learning opportunities to a wide variety of emergency health care problems in an emergency department setting and to understand the principles of emergency medicine. Students are introduced to medical and surgical problems commonly encountered in the emergency department setting. The emphasis is on gaining outpatient procedural skills, triage patients, and learning to recognize and begin treatment of emergent medical and surgical problems.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]

PA 635 Primary Care Practicum I 10.0 Credits

The Primary Care Practicum I is a clinical course that provides the PA student with patient care experience in an ambulatory medicine setting under the supervision of a licensed medical practitioner. Students refine clinical skills learned in preparation for practice and increase knowledge of disease mechanisms and patient management for common primary care disorders.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 629 [Min Grade: B] and PA 630 [Min Grade: B] and PA 631 [Min Grade: B] and PA 632 [Min Grade: B] and PA 633 [Min Grade: B] and PA 634 [Min Grade: B]

PA 636 Graduate Project I 3.0 Credits

Graduate Project I is a three (3) credit course intended to prepare the graduate candidate for the development of a project that is related to the candidate's research interests. The Graduate Project provides students with the opportunity to creatively address a proven deficiency in the realms of clinical medicine, educational medicine (patient or medical provider material), or any other area that will further the student's and the profession's knowledge and/or resource base.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 547 [Min Grade: B] (Can be taken Concurrently)

PA 637 Primary Care Practicum II 10.0 Credits

The Primary Care Practicum II is a clinical course in which PA students continue to progress to higher levels of clinical responsibility for patient evaluation and management as clinical skills, medical knowledge, and professional confidence coalesce under the supervision of licensed medical providers. This course is the final clinical experience in the PA professional training program.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 635 [Min Grade: B]

PA 638 Graduate Project II 3.0 Credits

Graduate Project II is a three (3) credit course sequenced after the Graduate Project I course in which the graduate student further develops and implements the project proposed in the Graduate Project I course. Continued review and critique of the literature related to the topic area are required to expound the project. The student works with a faculty advisor who will provide guidance and feedback.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 636 [Min Grade: B]

PA 640 Clinical Practicum 5.0-10.0 Credits

Clinical Practicum is an elective clinical course that provides a forum for a PA student to acquire knowledge and clinical experience in a clinical specialty after completion of the required entry-level Physician Assistant Program curriculum. Through supervised clinical practice and review of current related literature, the PA student will develop foundational clinical skills and knowledge in the subspecialty studied.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 20 credits

Prerequisites: PA 637 [Min Grade: C] and PA 638 [Min Grade: C]

PA 641 Clinical Update 5.0 Credits

This web-based course explores recent advances in clinical knowledge and recommendations for clinical practice, and develops the student's lifelong learning skills. The student undertakes a broad review of clinical medicine and identifies areas for enhancement of clinical knowledge and skills through the use of reputable electronic information sources.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 582 [Min Grade: C]

PA 642 Clinical Colloquium 5.0 Credits

In this online didactic course the student explores a clinical specialty through use of current, reputable information sources. The student identifies a clinical topic for in-depth study, and with faculty guidance uses critical appraisal of current literature for enhancement of knowledge in the topic, and application to the capstone project.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 641 [Min Grade: C]

PA 643 Clinical Practice Project Research 5.0 Credits

Working with an assigned advisor, the student reviews and catalogues the published literature related to the clinical practice project topic. The student composes a literature review and gap analysis, and critically appraises articles as the foundation for the design and outline of the capstone project proposal within this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 642 [Min Grade: C]

PA 661 Tenets of Health Promotion 5.0 Credits

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 583 [Min Grade: C]

PA 662 Health Promotion Materials 5.0 Credits

In this online course, knowledge from the Health Promotion course is applied to the review of national health promotion campaigns, and the design of a theory-driven, audience-centered health promotion proposal. Topics essential to the design of effective health promotion campaigns such as health literacy, cultural competency, and the challenges presented by special population groups are explored.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 661 [Min Grade: C]

PA 663 Health Promotion Project Research 5.0 Credits

Working with an assigned advisor, the student reviews and catalogues the published literature related to the health promotion project topic. The student composes a literature review and gap analysis, and critically appraises articles as the foundation for the design and outline of the capstone project proposal within this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 582 [Min Grade: C] and PA 662 [Min Grade: C]

PA 680 Summative Remediation 1.0 Credit

Summative Remediation is one credit course which provides an intensive review of major topics covered in the didactic and clinical phases of the PA program for any PA student who has not achieved minimum passing grades on two administrations of the Summative Examination /OSCE.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 637 [Min Grade: C]

PA 695 Portfolio Preparation 1.0 Credit

Working with an assigned advisor, this course assists the student document significant professional experience as a clinician, researcher, leader, and/or advocate in the preparation of a professional portfolio. Approval of the Program Director is required for course registration.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 581 [Min Grade: C] and PA 582 [Min Grade: C] and PA 583 [Min Grade: C] and PA 584 [Min Grade: C] and PA 585 [Min Grade: C]

Corequisite: PA 696

PA 696 Portfolio Review 5.0-10.0 Credits

The Portfolio Review is conducted by a multi-disciplinary Portfolio Review Committee to award 5-10 academic credits for learning substantiated in the professional portfolio and matched to the educational competencies and outcomes of the Program. The portfolio must demonstrate analysis, synthesis, and interpretation of the professional experiential learning and be substantiated by documentation.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Corequisite: PA 695

PA 697 Independent Study 3.0-6.0 Credits

Independent Study is a variable (3-6) credit course in which the student works with in assigned advisor to review and catalogue the published literature related to the cognate topic of interest. The student composes a literature review and gap analysis, and critically appraises articles as the basis for the design and outline of the capstone project proposal within this course.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 582 [Min Grade: C]

PA 698 Capstone Project 5.0 Credits

Working with an assigned advisor, the student develops, implements, and evaluates the literature-based capstone project designed within the cognate courses. Continued critical analysis of the literature related to the project is required to fulfill the goals of the project to advance dissemination of medical knowledge and quality of care.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PA.

Prerequisites: PA 643 [Min Grade: C] or PA 663 [Min Grade: C] or PA 697 [Min Grade: C]

PA 810 Clinical Applications of Geriatric Physiology 5.0 Credits

Using a body systems approach, this course reviews normal physiology and evaluates age-related changes in physiology with applications to disease presentations, clinical pharmacotherapeutics, and disease management.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

PA 811 Geriatrics I 5.0 Credits

This is the first of two courses designed to prepare the PA for clinical care of geriatric patients using a problem-oriented approach to common geriatric problems. The course utilizes clinical cases for clinical reasoning and problem solving via individual research and faculty-guided collaborative critical analysis.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: PA 810 [Min Grade: B]

PA 812 Geriatrics II 5.0 Credits

This is the second of two courses designed to prepare the PA for clinical care of geriatric patients using a problem-oriented approach to common geriatric problems. The course utilizes clinical cases for clinical reasoning and problem solving via individual research and faculty-guided collaborative critical analysis.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: PA 811 [Min Grade: B]

PA 819 Geriatrics Clinical Practicum 3.0-10.0 Credits

Geriatrics clinical practicum provides a forum for PAs to apply and enhance clinical knowledge and skills in both inpatient and outpatient geriatric settings through supervised clinical practice and use of current, evidence-based practice literature.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 30 credits

Prerequisites: PA 812 [Min Grade: B]

Physics

Courses

PHYS 501 Mathematical Physics I 3.0 Credits

Covers various topics in mathematical physics and their numerical implementations, including calculus of residues and further applications of complex variables; vector spaces, Fourier series, and generalized functions; integral transforms; theory and application of ordinary and partial differential equations; special functions; boundary value and initial value problems; Green's function theory and applications; and integral equations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 502 Mathematical Physics II 3.0 Credits

Continues PHYS 501.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 506 Dynamics I 3.0 Credits

Covers Lagrangian-Hamiltonian formulations, variational principles, particle kinematics and dynamics, and small oscillations and normal modes.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 511 Electromagnetic Theory I 3.0 Credits

Covers electrostatics, magnetostatics, electromagnetic waves, boundary value problems of electromagnetic theory, theory of Fresnel and Fraunhofer diffraction, classical electrodynamics, special relativity, waveguides, and radiation theory.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 512 Electromagnetic Theory II 3.0 Credits

Continues PHYS 511.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 516 Quantum Mechanics I 3.0 Credits

Covers axioms of quantum mechanics and the basic mathematical tools, one-dimensional Schrodinger equation, spin and general two-level systems, harmonic oscillator, general theory of angular momentum, hydrogen atom, elements of atomic spectroscopy, quantum theory of scattering, electron spin, addition of angular momenta, stationary and time-dependent perturbation theory, fine and hyperfine structure of the hydrogen atom, interaction of light and matter, and Dirac Equation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 517 Quantum Mechanics II 3.0 Credits

Continues PHYS 516.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 518 Quantum Mechanics III 3.0 Credits

Continues PHYS 517.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 521 Statistical Mechanics I 3.0 Credits

Covers thermodynamics; probability theory; Gibbs-Boltzmann formulation; relation between density of states and entropy; partition functions; ensembles; Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac, phonon, photon, and electron systems; and phase transitions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 522 Statistical Mechanics II 3.0 Credits

Continues PHYS 521.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 531 Galactic Astrophysics 3.0 Credits

The goal of this course is to present 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 the properties of these magnificent objects, near and far. For the most part, these tools will be based on familiar concepts in classical mechanics and thermodynamics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 532 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

PHYS 553 Nanoscience 3.0 Credits

Physical basis of nanoscale materials and systems including discussion 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

PHYS 561 Biophysics 3.0 Credits

A one-course introduction to Biophysics. Topics may include structure of biomolecules, protein stability, electron transfer, protein folding, protein substrates, allostery, and self-assembly. No biological background is assumed.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 562 Computational Biophysics 3.0 Credits

Covers 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

PHYS 571 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

PHYS 576 Introduction to Particle Physics 3.0 Credits

This course provides an introduction to the physics of fundamental particles. Topics include 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

PHYS 601 Advanced Quantum Mechanics I 3.0 Credits

Relativistic one-particle quantum mechanics; Dirac theory radiation theory; free fields; interactions; quantum electrodynamics; introduction to elementary particle theory; quantum chromodynamics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 626 Solid State Physics I 3.0 Credits

Crystal lattices; Bloch theorem; classical and quantum theory of lattice vibrations; phonons, electron states in solids; calculation of energy bands and Fermi surfaces; dynamics of electrons in metals; electron-electron interactions; plasmons; electron-phonon interactions; polarons; semiconductor and insulator crystals; transport properties of solids; thermal properties; optical properties; magnetism; magnons; superconductivity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 627 Solid State Physics II 3.0 Credits

Crystal lattices; Bloch theorem; classical and quantum theory of lattice vibrations; phonons, electron states in solids; calculation of energy bands and Fermi surfaces; dynamics of electrons in metals; electron-electron interactions; plasmons; electron-phonon interactions; polarons; semiconductor and insulator crystals; transport properties of solids; thermal properties; optical properties; magnetism; magnons; superconductivity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 631 Relativity Theory I 3.0 Credits

Covers particle and field dynamics in special relativity, tensor calculus for Riemannian space-time manifolds, Einstein's gravitational field equations and their principal solutions in general relativity, black holes, general relativistic variational principles, big bang cosmology, and quantization of general relativity.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 676 Nuclear Physics I 3.0 Credits

Review of systematics of experimental phenomena; nuclear structure theory, including shell model, interacting-boson model, Hartree-Fock approaches, and collective models; intermediate energy theory and experiment, including electron, nucleon, and pion scattering and reactions; group theoretical approaches; interfaces of quark-meson-nucleon coexistence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 677 Nuclear Physics II 3.0 Credits

Review of systematics of experimental phenomena; nuclear structure theory, including shell model, interacting-boson model, Hartree-Fock approaches, and collective models; intermediate energy theory and experiment, including electron, nucleon, and pion scattering and reactions; group theoretical approaches; interfaces of quark-meson-nucleon coexistence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 679 The Standard Model 3.0 Credits

This class will focus on classical fields in general, as well as the relationship between classical and quantum fields. It will include discussions of special relativity, group theory, and simple lie groups, as well as the theoretical development of electromagnetism, the weak, and strong forces. The course will develop electroweak unification in particular, and unified theories in general. It will conclude with a discussion of Grand Unified Theories.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 898 Master's Thesis 0.5-20.0 Credits

Master's thesis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PHYS 997 Research 1.0-12.0 Credit

Research.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS 998 Ph.D. Dissertation 1.0-12.0 Credit

Ph.D. dissertation.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS I599 Independent Study in PHYS 0.0-12.0 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 I699 Independent Study in PHYS 1.0-6.0 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 4 times for 12 credits

PHYS I799 Independent Study in PHYS 0.0-12.0 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 I899 Independent Study in PHYS 0.0-12.0 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 I999 Independent Study in PHYS 0.0-12.0 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 T580 Special Topics in Physics 0.0-9.0 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

PHYS T680 Special Topics in Physics 0.0-9.0 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

PHYS T780 Special Topics in Physics 0.0-9.0 Credits

Assignment of readings and study in current topics of experimental and theoretical interest.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PHYS T880 Special Topics in Physics 0.0-9.0 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

PHYS T980 Special Topics in Physics 0.0-9.0 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

Physics - Environmental Science

Courses

Political Science

Courses

PSCI 510 Civilians in Armed Conflict 4.0 Credits

This course considers questions relating to civilians, and civilian protection, during armed conflict. We examine the definition and causes of armed conflict, before turning to key issues such as civilian coping strategies during armed conflict, common patterns of violence against civilians, legal and policy remedies for human rights violations, and the politics of human rights advocacy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSCI 553 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 560 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 I599 Independent Study in PSCI 0.0-12.0 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 I699 Independent Study in PSCI 0.0-12.0 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 I799 Independent Study in PSCI 0.0-12.0 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 I899 Independent Study in PSCI 0.0-12.0 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 I999 Independent Study in PSCI 0.0-12.0 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

Production Operations Management

Courses

POM 510 Operations and Supply Chain Management 2.0 Credits

This course is an introduction to some selected topics in the field of production and operations management. It covers process analysis, quality management, queueing and capacity management, lean operations, inventory management, aggregate planning and supply chain management.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 510 [Min Grade: C] or STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C]

POM 601 Operations Management 3.0 Credits

This course is an introduction to the field of production and operations management (POM). Production and operations activities such as forecasting, capacity planning, inventory control, scheduling, and ensuring quality are discussed from the supply chain perspective. The philosophies and characteristics of lean operations and responsive manufacturing/service systems are highlighted.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C]

POM 602 Strategic Operations & Quality 3.0 Credits

The integration of an organization's strategy with production/operations functions and high performance quality management practices. Topics include: operations & supply strategy and strategic fit, strategic capacity management, supply chain strategy, planning & controlling the supply chain, quality theory and strategic quality planning, quality improvement & cost reduction, operational quality planning, and managing supplier quality in the supply chain.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: POM 601 [Min Grade: C]

POM 610 Supply Chain Management I 3.0 Credits

This course, as the first of a two part comprehensive, in-depth coverage of Supply Chain Management, provides, first, a basic understanding of the operations function in organizations and the associated strategic, tactical and operational aspects of this functional area. Secondly, the nature and role of supply chains within the context of the major organizational functions, especially in the light of recent developments in manufacturing, transportation, information, communication and other relevant technologies, along with some supply chain policy formulation and decision making issues, receive thorough treatment. Topical coverage includes detailed discussions and problem solving in the areas of sales and operations planning, inventory management, MRP/DRP, operations scheduling, etc.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

POM 615 Supply Chain Management II 3.0 Credits

This is a continuation of SCM I (POM 610). The remainder of the strategic, tactical and operational issues of Supply Chain Management are covered in this course. Building on and extending the concepts developed in the previous course, policy questions and decision making technologies relevant for designing and managing supply chains, operating in an intensively competitive global business environment, are addressed in detail. Some of the topics covered in this course include supply chain coordination, transportation planning, sourcing and supply chain contracts, revenue management, supply network design, sustainability and social/environmental issues, etc.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: POM 610 [Min Grade: C]

POM 620 Management of Manufacturing Firms 3.0 Credits

Analyzes manufacturing management, strategic planning, process evaluation and design, capital budgeting, facility location, job design and work measurement, forecasting, production-inventory systems, quality planning and control, and maintenance planning and control.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

POM 622 Materials Management 3.0 Credits

Covers purchasing, production-inventory planning and control, warehousing, and physical distribution.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: POM 601 [Min Grade: C] or POM 620 [Min Grade: C]

POM 624 Management of Service Firms 3.0 Credits

Analyzes service firms (e.g., hotels, restaurants, transportation companies, and banking firms), including relevant decision models, such as manpower scheduling, and case studies.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

POM 625 Supply Chain Management 3.0 Credits

This course presents the concepts, practical tools, and support systems that are important for the effective management of supply chains. Strategic design and tactical and operational issues will be examined. In particular, relatively novel state-of-the-art concepts of globally optimal decision-making across traditional organizational boundaries will be emphasized.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: POM 601 [Min Grade: C] or POM 510 [Min Grade: C]

POM 628 Advanced Supply Chain Management 3.0 Credits

This course covers some selected topics on supply chain management at the advanced level, including sourcing and procurement, network designs in supply chains, closed-loop supply chains as well as sustainable supply chains. Advanced analytical models on multi-echelon supply chains, supplier selection and others, together with case studies, are the main focuses of the course. The current best practices on the selected topics will also be discussed.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: POM 615 [Min Grade: C] and OPR 601 [Min Grade: C] and STAT 610 [Min Grade: C]

POM 630 Transportation & Logistics Management 3.0 Credits

This course focuses on the role of the Transportation/Logistics function in complex supply chain networks. Strategic aspects of transportation infrastructure, as well as tactical planning and operational decision making, involving transportation and related activities, will be emphasized, towards gaining sustainable economic efficiencies and achieving competitive advantage in today's intensely competitive global economic environment. Topics covered include various modes of goods movement, the effects of public policy and regulations, costing and pricing of transportation activities, transportation planning/execution decisions and the inter-relationships between transportation/logistics and the other major supply chain activities across functional boundaries.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

POM 642 Sustainable Supply Chain Management and Logistics 3.0 Credits

This course presents management case studies on designing, evaluating, and improving 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

POM 643 Managing Queues for Service Operations 3.0 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 601 [Min Grade: C-] or ECON 540 [Min Grade: C-]) and POM 624 [Min Grade: C-]

POM 644 Revenue Management 3.0 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 601 [Min Grade: C-] and (STAT 601 [Min Grade: C-] or STAT 610 [Min Grade: C-]) or ECON 540 [Min Grade: C-]

POM 770 Supply Chain Management and Logistics Capstone Project 3.0 Credits

This course consists of an industry project to provide practical experience in identifying and solving supply chain management and logistics problems.

College/Department: LeBow College of Business

Repeat Status: Can be repeated 3 times for 12 credits

Prerequisites: POM 624 [Min Grade: C] and POM 628 [Min Grade: C]

POM 771 Supply Chain Management and Logistics Master's Thesis 0.5-9.0 Credits

This course is required of all students in the research track of the MS in Supply Chain Management and Logistics program. The topic of the thesis must be approved by the student's thesis advisor.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: POM 610 [Min Grade: C] and POM 615 [Min Grade: C] and POM 628 [Min Grade: C] and POM 624 [Min Grade: C] and POM 900 [Min Grade: C] and STAT 610 [Min Grade: C] and OPR 601 [Min Grade: C]

POM 900 Decision Processes in Operations Management 3.0 Credits

This course is a broad survey of managerial decision making areas within the operations function of organizations. The focus is on design or strategic, as well as statistical and control issues, with a strong emphasis on mathematical modeling of decision processes and systems.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: OPR 922 [Min Grade: C]

POM 922 Inventory Models Seminar 3.0 Credits

Major managerial and economic issues involving inventory management in manufacturing and services firms are examined in detail. The focus is on the development and application of operations research and applied probability based mathematical modeling approaches towards inventory decisions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: POM 900 [Min Grade: C]

POM 925 Supply Chain Management Seminar 3.0 Credits

Supply chain management encompasses all the physical and information flows that play a role in satisfying customer demand for goods and services. This course emphasizes mathematical approaches towards the development and implementation of solutions in the various strategic, tactical and operational aspects of integrated supply chains.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: POM 922 [Min Grade: C]

POM 930 Scheduling Theory 3.0 Credits

This course focuses on issues of scheduling resources in organizations. In particular, problems that arise in operations, employee and project scheduling will receive attention. The major emphasis is on mathematical modeling techniques that aid and support managerial decisions in this area.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: POM 900 [Min Grade: C]

POM 990 Service Operations Management 3.0 Credits

This course focuses on services management in general and service operations in particular. It explores the elements that unite services that differentiate service processes from manufacturing processes, and that differentiate various types of services from each other. It covers strategic and tactical issues associated with designing and managing service operations, and it provides tools to help assess, design and improve processes, and establish systems to help ensure an excellent customer experience.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

Prerequisites: POM 900 [Min Grade: C]

POM 997 Research Activity for PhD Students in STAT 0.5-12.0 Credits

PhD candidates in Decision Sciences and MIS in their second year undertake research activity with their advisor prior to defending their dissertation proposal. This course is designated to record that activity. The student is expected to conduct all major numerical studies and provide all theoretical support for their work, in the case of analytical modeling research, or to have built the model and started on the data collection, in the case of empirical research. It is expected that upon completion of this requirement, the student will make any final minor edits and submit the paper to a leading conference, preferably a referred one, by the end of the summer quarter.

College/Department: LeBow College of Business

Repeat Status: Can be repeated multiple times for credit

POM I599 Independent Study in POM 0.0-12.0 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

POM I699 Independent Study in POM 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

POM I799 Independent Study in POM 0.0-12.0 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

POM I899 Independent Study in POM 0.0-12.0 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

POM I999 Independent Study in POM 3.0 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 9 credits

POM T580 Special Topics in POM 0.0-12.0 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

POM T680 Special Topics in POM 0.5-9.0 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

POM T780 Special Topics in POM 0.0-12.0 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

POM T880 Special Topics in POM 0.0-12.0 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

POM T980 Special Topics in POM 0.5-9.0 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

Professional Studies

Courses

PRST 501 Communication for Professionals 3.0 Credits

This course covers applications of the communication discipline in professional settings. Students explore and assess the role of organizational, interpersonal, non-verbal, group, and employment communications in today's professional world. The main goal is to provide students with the tools necessary to become effective communicators in the workplace.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

PRST 503 Ethics for Professionals 3.0 Credits

This course will focus on the application of ethical principles to organizational systems and decision-making. Emphasis will be placed on how ethical principles affect and are applied to policy-making, leadership behavior, systems of communication, technology use, and systems of organization.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

PRST 504 Introduction to Research Methods & Design 3.0 Credits

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: GC-3690

Repeat Status: Not repeatable for credit

PRST 512 Computing for Professionals 3.0 Credits

Uses Microsoft Office business application software and Statistical Package for the Social Sciences (SPSS) to challenge and support students in their efforts to sharpen and integrate their computer, critical-thinking, problem-solving, data analysis, and reporting skills to achieve competency that addresses the demand for information technology proficiency in the new economy.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

PRST 515 Program Evaluation 3.0 Credits

Measuring results in business is fairly straightforward. Measuring results in government and other non-profit organizations is not so precise. This course provides knowledge and skill required to apply the scientific method to the assessment of social programs (organized, goal-directed activities designed to address a social, humanistic, or other human-related problem).

College/Department: GC-3690

Repeat Status: Not repeatable for credit

PRST 603 Communicating in Virtual Teams 3.0 Credits

This course explores the roles of virtual teams and allows students to experience the opportunities and challenges associated with communicating in a virtual environment.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

PRST 612 Data Analysis and Interpretation 3.0 Credits

This course covers the use of a computerized statistical analysis tool to calculate parametric and non-parametric statistics. Students will use creative and critical thinking skills to interpret, communicate, and defend results.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

Prerequisites: PRST 504 [Min Grade: C]

PRST 615 Program Evaluation 3.0 Credits

The course is designed to have students apply qualitative and quantitative methods to frame and implement an evaluation capable of being implemented in a broad range of for-profit and non-profit organizational settings, including those found in education, health care, government and private sector businesses. Students will study the purposes and models of program evaluation, roles of the evaluator and stakeholders, and address ethical issues associated with an evaluation. To gain practical experience with "continuous program improvement," students will design an evaluation of an existing program.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

PRST 640 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 the course can be used in many professional fields.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

PRST 655 The Art & Science of Influencing Others 3.0 Credits

This course will focus on the art and science of influencing others. In both our personal and professional lives, negotiation is an essential skill, and different approaches are required for different situations. Through lectures, readings, and simulated experiences, students will develop an understanding of the concepts, strategies, and tactics of negotiation, as well as the subtleties necessary to effectively influence those around them to achieve desired results.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

PRST 670 Fostering Diversity and Inclusion in the Workplace 3.0 Credits

Diversity in the workplace has moved beyond calculating a broad range of employee demographics. Employers are focusing on including and elevating diverse voices and diverse perspectives at the table to create more innovative services and products to gain a competitive edge. Abundant evidence demonstrates that diverse teams are more creative and productive than those characterized by homogeneity. But, inclusion cannot happen in a vacuum. Leadership must foster and support diversity and inclusion to create an environment where all employees are empowered to be productive and innovative. Students will begin with a historical look at workplace diversity and inclusion, and examine companies with varying degrees of success in fostering diversity and inclusion--and consumer trust-- learning from successes/failures.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

PRST 700 Capstone I: Project Exploration 1.5 Credit

The first of a two-course sequence in which students create a relevant, full-scale project in an area of interest that will showcase the student's learned professional skills and knowledge. Students complete four deliverables that will form the foundation for PRST 701.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

Prerequisites: PRST 501 [Min Grade: B] and PRST 503 [Min Grade: B] and PRST 504 [Min Grade: B] and PRST 603 [Min Grade: B] and PRST 612 [Min Grade: B] and PRST 615 [Min Grade: B] and PRST 640 [Min Grade: B] and PRST 655 [Min Grade: B] and ORGB 625 [Min Grade: B] and ORGB 631 [Min Grade: B]

PRST 701 Capstone II: Topical Analysis 4.5 Credits

The second of a two-course sequence allows students to integrate skills and knowledge learned in the classroom with his/her experience to research and report on a specific professional area of interest. Students will demonstrate their learned skills in communication, leadership, critical inquiry, and ethics, as well as speak in some manner to the student's professional development aspirations.

College/Department: GC-3690

Repeat Status: Not repeatable for credit

Prerequisites: PRST 700 [Min Grade: B]

PRST I599 Independent Study in PRST 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: GC-3690

Repeat Status: Can be repeated multiple times for credit

PRST I699 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: GC-3690

Repeat Status: Can be repeated 12 times for 6 credits

PRST I799 Independent Study in PRST 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: GC-3690

Repeat Status: Can be repeated multiple times for credit

PRST I899 Independent Study in PRST 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: GC-3690

Repeat Status: Can be repeated multiple times for credit

PRST I999 Independent Study in PRST 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: GC-3690

Repeat Status: Can be repeated multiple times for credit

PRST T580 Special Topics in PRST 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: GC-3690

Repeat Status: Can be repeated multiple times for credit

PRST T680 Special Topics in PRST 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: GC-3690

Repeat Status: Can be repeated 18 times for 18 credits

PRST T780 Special Topics in PRST 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: GC-3690

Repeat Status: Can be repeated multiple times for credit

PRST T880 Special Topics in PRST 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: GC-3690

Repeat Status: Can be repeated multiple times for credit

PRST T980 Special Topics in PRST 1.0-12.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: GC-3690

Repeat Status: Can be repeated multiple times for credit

Project Management

Courses

PROJ 501 Introduction to Project Management 3.0 Credits

This course will prepare students to manage scheduling, supply management, project team recruiting, resource allocation, time/cost tradeoffs, risk assessment, task coordination, team-building, progress monitoring, and post-project assessment through a comprehensive overview of project management. Case studies are used to illustrate the principles and tools of project management as a process.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PROJ 502 Project Planning & Scheduling 3.0 Credits

This course will prepare students to master concepts in project planning, scheduling and control. Project scheduling methods are covered including: critical path systems, critical chain scheduling, statistical analysis, Program Evaluation Review Technique, linear resource leveling, and legal ramifications on contracted projects.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 501 [Min Grade: B]

PROJ 510 Project Quality Management 3.0 Credits

Quality management is related to project management. Examines basic quality concepts and explores the three 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 501 [Min Grade: B]

PROJ 515 Project Estimation & Cost Management 3.0 Credits

This course will provide an overview of project financial and economic principles involved in product and system development. It is intended to familiarize project managers with methods in project accounting, budgeting, cost estimation, financial management, design optimization, and economics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 501 [Min Grade: B]

PROJ 520 Project Risk Assessment & Management 3.0 Credits

Examines the risk factors throughout every phase of a project. Looks at the overall project planning process, explores the use of high-level risk assessment tools, and describes key ideas for project risk planning. Models for risk analysis, assessment, and classification are presented.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 501 [Min Grade: B]

PROJ 525 E-Tools for Project Management 3.0 Credits

This course will examine the use of electronic tools as a means of creating a virtual workplace. Issues related to the use of the e-tools for collaboration and decision making for project management will be explored.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 501 [Min Grade: B]

PROJ 530 Managing Multiple Projects 3.0 Credits

Examines the complex and simultaneous management principles and techniques required to manage multiple projects. Emphasis is placed on a theory and practice of project management that is rigorous and disciplined, yet flexible.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 501 [Min Grade: B]

PROJ 535 International Project Management 3.0 Credits

Examines the uniqueness and adaptations of project management when operating in an international context. Details the investigation of cultural, legal, and regulatory environments as the context of international project management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 501 [Min Grade: B]

PROJ 540 Project Procurement Management 3.0 Credits

Examines role of procurement in project management including processes and activities needed to acquire products, services and results required to accomplish a project from outside the project organization. Planning, conducting administering and closing procurements are course components as are relevant legal and ethical issues, contract capacity, authority, public and private bidding processes and dispute resolution methods.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 501 [Min Grade: B]

PROJ 603 Project Leadership & Teamwork 3.0 Credits

Examines project leadership skills required for building and maintaining successful, high-performance project teams. Prepares project managers to facilitate teamwork through good management and wise leadership.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 501 [Min Grade: B]

PROJ 645 Project Management Tools 3.0 Credits

Examines theories relating to project management software acceptance, use of project management tools, and how tools relate to project success. Develops in-depth skills in a widely-used project management software package, and provides exposure to other selected project management tools for successful collaboration in collocated and virtual project teams.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 501 [Min Grade: B]

PROJ 650 Project Stakeholder Management 3.0 Credits

Examines theories and processes required to identify the individuals, groups, organizations, and other stakeholders that could impact or be impacted by a project. Also covers analyzing stakeholder expectations and their influence on the project, and developing strategies for engaging project stakeholders in effective project decisions to ensure successful project outcomes.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PROJ 665 Managing Project Knowledge 3.0 Credits

Examines how knowledge services are designed, developed, and implemented within an organization and a project. The goal is to build expertise with knowledge management materials and skills needed to succeed in building an effective knowledge strategy within a project, a program, and an organization. Students learn strategies for building knowledge services, including the theories, models, methods, processes, and social factors that promote successful change.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PROJ 670 Project Management Methodologies: Managing Project Lifecycles 3.0 Credits

Examines project management methodologies, including Project Management Institute (PMI)® global standards, Agile, PRINCE 2, SCRUM, ITIL, and other leading methodologies. Reviews how project lifecycles are designed, developed, and implemented within a project and across the organization. Builds knowledge and expertise with major project management methodologies and materials and develops skills needed to select, adapt, and apply an effective strategy for a project, a program, and an organization. Students learn strategies for managing projects throughout their lifecycles, including the theories, models, methods, processes, and other factors that enhance project success.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PROJ 695 Capstone Project in Project Management 3.0 Credits

Provides an opportunity for the student to successfully integrate knowledge and skills acquired during their master's program in project management. Students will evaluate the project management practices in an organization and create a report that identifies strengths and weaknesses in an organization and recommend strategies for improvement.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PROJ 502 [Min Grade: B] and PROJ 510 [Min Grade: B] and PROJ 515 [Min Grade: B] and PROJ 520 [Min Grade: B] and (PROJ 525 [Min Grade: B] or PROJ 645 [Min Grade: B]) and PROJ 530 [Min Grade: B] and PROJ 535 [Min Grade: B] and PROJ 540 [Min Grade: B] and PROJ 603 [Min Grade: B]

PROJ 899 Research Activity for PhD Students in Project Management 0.0-9.0 Credits

This course is designed to record independent research activity by PhD students in Project Management. The research undertaken should advance the PhD student's research towards achieving appropriate milestone(s) in the PhD in Project Management.

College/Department: College of Engineering

Repeat Status: Can be repeated 4 times for 45 credits

Restrictions: Can enroll if classification is PhD.

PROJ 901 Research Methodologies in Project Management 3.0 Credits

This course provides an introduction to the tools and methods of doing project management research. Topics covered include literature review methods and tools, text editors, hierarchy of research questions and research ethics so that students can critically read, interpret and evaluate academic writing. Quantitative and qualitative research methods are presented along with the types of research questions that are answered with each method. By the conclusion of the course, students will have constructed a coherent, well-formed research proposal and understand where in the literature, their topic fits.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if classification is PhD.

PROJ I599 Independent Study in PROJ 0.0-12.0 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 I699 Independent Study in PROJ 0.0-12.0 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 9 times for 81 credits

Prerequisites: PROJ 501 [Min Grade: B]

PROJ I799 Independent Study in PROJ 0.0-12.0 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 I899 Independent Study in PROJ 0.0-12.0 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 I999 Independent Study in PROJ 0.0-12.0 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 T580 Special Topics in PROJ 0.0-12.0 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 T680 Special Topics in PROJ 0.0-12.0 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

Prerequisites: PROJ 501 [Min Grade: B]

PROJ T780 Special Topics in PROJ 0.0-12.0 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 T880 Special Topics in PROJ 0.0-12.0 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 T980 Special Topics in PROJ 0.0-12.0 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 610 Facilities Management 3.0 Credits

This course focuses on the strategic role property managers play in facilities management. Property managers must be aware of all operational issues and are active participants in making strategic facilities decisions including in-house or outsourcing services, service specifications, managing service providers, and creative method of addressing sustainable development issues.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PRMT 625 Property Financial Analysis & Strategies 3.0 Credits

This course focuses on the importance of financial analysis to the strategic decision-making process employed by property managers including cash flow, tax implications, and risks of various projects. Decision-making models, lease valuation, and sensitivity analysis are employed in real situation. Current marketing conditions are discussed including alternative financing choices, cost of funds, tax incentive development options, and capitalization rates.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PRMT 645 Property Management Technology Strategies 3.0 Credits

This course focuses on the use of technology to effectively manage and market property. Successful strategies employing technology to gain operating efficiencies, increase employee and tenant communications, optimize rent management, increase tenant retention, and maximize security systems are featured. Best practice examples of integrated technology stems are reviewed and students perform a technology audit.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

PRMT 695 Capstone in Property Management 3.0 Credits

The Property Management Capstone Course, the graduate degree's final course, comprises a research project and paper on a topic with implications for the real estate management industry and/or built environment. The goal of this course is for students to synthesize, integrate, and apply theoretical and practical knowledge gained throughout their graduate school tenure. This course is an opportunity for students to design a research study, conduct primary and secondary research, and demonstrate their core competencies in real estate management and the built environment. Students are expected to analyze and synthesize research data, recognize data patterns, identify useful information, extrapolate meaningful conclusions that support suggested business decisions, and summarize in an academic research paper.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: PRMT 603 [Min Grade: B-] and PRMT 610 [Min Grade: B-] and PRMT 625 [Min Grade: B-] and PRMT 640 [Min Grade: B-] and PRMT 645 [Min Grade: B-] and REAL 568 [Min Grade: B-] and REAL 572 [Min Grade: B-] and REAL 574 [Min Grade: B-] and REAL 575 [Min Grade: B-] and BUSN 502 [Min Grade: B-] and STAT 601 [Min Grade: B-]

Psychology

Courses

PSY 510 Research Methods I 3.0 Credits

Develops a practical, conceptual understanding of statistical data analysis, the logic of hypothesis testing, and statistical inference. Requires students to identify researchable topics, critically review evidence from prior studies, and prepare proposals for gathering appropriate evidence.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 511 Research Methods II 3.0 Credits

This course will focus on topics regarding the development, execution, analysis, and interpretation of psychotherapy outcome investigations in the clinical psychology across a variety of topical areas (e.g., psychopathology, behavioral medicine).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 510 [Min Grade: C]

PSY 512 Cognitive Psychology 3.0 Credits

Emphasizes understanding normal cognition as a basis for recognizing and identifying when abnormality may exist. Covers topics including perception and pattern recognition; attention, learning, and memory; language and communication; and problem-solving and decision-making.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 514 Behavioral Assessment I 3.0 Credits

Reviews the major principles of learning developed by major theorists in psychology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 515 Clinical Case Conceptualization 3.0 Credits

This course will provide a review of the principles, assumptions, and purpose of clinical case formulation. The course is designed to provide a practical guide of how to integrate various assessment methods such as clinical interviews, direct observation in both analogue and naturalistic settings, applied behavioral analysis, psychological testing, self-report questionnaires, self-monitoring inventories, cognitive assessment, assessment of emotional regulatory processes, interpersonal patterns of behavior, and psychophysiological techniques in order to construct a case formulation leading evidence-based treatment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 514 [Min Grade: C]

PSY 516 Developmental Psychology 3.0 Credits

Studies the nature of developmental processes across the life -perceptual, intellectual, emotional, social, and neuropsychological-and the factors influencing or limiting them.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 517 Social Cognition 3.0 Credits

This course will examine the broad domain of social cognition, with special emphasis on its relevance for clinical psychology. The purpose of the course is to present current evidence regarding the influence of social cognitive variables on normal and abnormal behavior.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 518 Social Psychology 3.0 Credits

Studies the causes of social influence and the effects of others on behavior and cognitions of the individual, in such areas as attitude formation and change, social perception, affiliation, and attraction.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 520 Psychopathology 3.0 Credits

Familiarizes the student with existing categories of mental disorders, their diagnosis, and their treatment.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 522 Psychological and Intellectual Assessment 3.0 Credits

Covers the theoretical and practical uses of tests designed to measure intellectual, cognitive, and academic abilities, including administration and interpretation of the most widely used measures.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 524 Professional Issues and Ethics 3.0 Credits

Discusses issues in the delivery of professional psychology, including confidentiality, supervision, standards of practice, and ethics in clinical psychology. Uses case studies to emphasize state and APA regulations.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 530 Neuroanatomy and Behavior 3.0 Credits

Explores the structure and function of the central nervous system, with emphasis on the physiological basis of behavior. Covers topics including the senses, nerve function, cognition and brain structure.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 532 Introduction to Cognitive Modeling 3.0 Credits

This course provides an introduction to computational models of human cognition. As science advances our understanding of the brain and mind, computational models are becoming one of the most important and powerful tools in cognitive science. Cognitive models serve as an explicit theory of how the mind works, but more importantly, they are able to capture and explain the complex interactions among different processes that result in human cognition. This course will examine both classic and modern cognitive models as applied to a variety of domains, including perception, language, memory, motor control, decision-making, and learning from feedback.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 330 [Min Grade: C] or PSY 512 [Min Grade: C]

PSY 540 Principles of Neuropsychology 3.0 Credits

Introduces the current state of the field and well-recognized and commonly used approaches in the clinical understanding of human brain-behavior relationships.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 542 Neuropsychological Assessment 3.0 Credits

Covers the theory and practical use of major neuropsychological assessment devices, including the Halstead-Reitan and other tests used in contemporary neuropsychology.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 543 Neuropsychological Assess II 3.0 Credits

This course covers principles and practices of neuropsychological testing. Students are taught to administer and interpret major neuropsychological tests and batteries. The focus of the course is on practical knowledge, report writing and neuropsychological clinical practice.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 542 [Min Grade: C]

PSY 550 Multicultural Perspectives in Psychology 3.0 Credits

Provides an overview of the impact of cultural, ethnic and racial factors on the practice of applied psychology with the goal of developing multicultural competency in clinical practice.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

PSY 552 Proseminar in Diversity 2.0 Credits

The seminar series will focus on contemporary issues in psychology related to issues of diversity, especially with regard to clinical research and treatment. Seminars will involve a mixture of group discussions, lectures, and guest speakers.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY.

PSY 560 Teaching, Consultation and Supervision in Psychology 1.0-2.0 Credit

Teaching, Consultation and Supervision of Psychology is designed to teach psychology graduate students how to teach, consult and provide supervision within the discipline of psychology. First, to address teaching the basic principles of psychology, educational and psychological theories, as well as in class demonstrations will comprise course content, as well as discussion of "vignettes" and challenges that teaching assistants are likely to encounter in their early professional development. Second, key theories of consultation and supervision will be reviewed.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 4 credits

Restrictions: Can enroll if major is PSY.

PSY 562 Consciousness 3.0 Credits

A survey of the philosophical, behavioral, and biological basis for conscious thought. Particular attention will be paid to the neural correlates of consciousness and the evolution, development and neuropsychology of the self.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY.

PSY 610 Data Analysis in Psychology 3.0 Credits

Deals with the problems confronted by the social scientist in creating and working with a numerical database, including some coverage of the use of computers in calculating both parametric and non-parametric statistics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 611 Computer-Based Research Methods for Psychological Research 3.0 Credits

This course will develop students' ability to use computers for research in psychology. The focus will be on implementing local and online experiments (presenting stimuli, recording responses, etc.) and data formatting, pre-processing, and visualization. The course is designed to develop students' hands-on use of the specific software packages, but will also cover some basic programming concepts. It is meant for graduate students in the behavioral sciences (primarily psychology, but also including business/economics, human-computer interaction, neuroengineering, etc.), and for undergraduate students who intend to pursue graduate study in the behavioral sciences.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 612 Psychology of Human-Computer Interaction Design 3.0 Credits

Explores the psychological aspects of human interaction with computing technology, focusing on the design, evaluation, and redesign of usable and useful human-computer interactions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 614 Problem Solving & Creativity 3.0 Credits

Introduces current research on problem-solving and creativity. Includes lectures, classroom demonstrations, and exercises.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 615 Judgment & Decision-making 3.0 Credits

This course will provide a comprehensive overview of classical and recent results in the psychology and neuroscience of human judgment and decision-making. Modern research in this area is highly multidisciplinary, combining results in psychology, economics, game theory, computer science and machine learning, and neuroscience (to name a few). The goal of the course is to provide an accessible introduction to the important results from all of these fields as they relate to the central question of how (and how well) humans decide among alternatives, and learn from feedback.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 616 Motivation and Emotion 3.0 Credits

Considers the behavioral consequences of psychological levels of motivation and emotion.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 617 Empirical Unconscious Process 3.0 Credits

This course is designed to review empirical evidence concerning the assessments and nature of unconscious processes and to consider the relevance of this information for traditional conceptions of the unconscious and for psychotherapy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 618 Psychology of Loss & Bereavement 3.0 Credits

Covers the study of human attachment and loss, such as death, separation, job loss, and retirement.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 620 Personality Assessment 3.0 Credits

Introduces theories underlying the assessment of personality via the use of objective instruments. Teaches students to administer and interpret a select sample of major personality tests.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 621 Theories of Personality 3.0 Credits

Reviews different theories of personality, including behavioral, psychoanalytic, cognitive, and medical, as they apply to normal human functioning and abnormal behavior.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 624 Behavior Analysis 3.0 Credits

The course will provide an overview of learning theories as applied to both adaptive and pathological behavior. The assumptions underlying learning and conditioning of complex systems will also be presented. A behavior laboratory will provide problem-based projects for students to integrate and analyze their observation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY.

PSY 630 Biological Basis of Behavior and Treatment 3.0 Credits

This course examines neuroanatomy and physiology, with a particular emphasis on the interaction of physiology and anatomy on behavior and clinical syndromes. This course also examines the major classes of psychotropic medications used in clinical practice, with a particular emphasis on empirically supported psychopharmacological treatments and practical considerations relevant to effective clinical and psychopharmacological practice.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 632 Sensory and Motor Systems 3.0 Credits

Examines the physiological function of the sensory and motor systems, from the level of the central nervous system through receptor functions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 642 Neuropsychological Case Analysis and Integration 3.0 Credits

Reviews the analysis of neuropsychological data, including the integration of historical, interview, behavioral, and formal assessment data. Emphasizes integrating traditional interview and observation techniques and the ability to conceptualize actual clinical cases in oral and written form.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 646 Neuropsychological Assessment of Children and Adolescents 3.0 Credits

Covers instruments and issues related to the assessment of children and adolescents. Involves both didactic and practical training in psychological and behavioral assessment, test interpretation, and report writing for children with various neurological and psychiatric disorders.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 648 Forensic Assessment I 3.0 Credits

Discusses the use of psychological testing procedures as they relate to testimony in court and legal proceedings. Concentrates on the practical and ethical problems for the clinician involved in clinical practice.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 649 Forensic Assessment II 3.0 Credits

The course focuses on distinguishing forensic assessment from other kinds of assessment performed by mental health professionals, and describing core principles that can serve to guide forensic clinicians. Using frequently identified legal issues as a guide; the course provides a combination of practical training and empirical overview of various relevant topics within the area of forensic assessment. Students may have the opportunity to be involved in a supervised forensic assessment during the period over which the course is taught. Course requirements include writing a report based on hypothetical data, and a paper on a topic approved by the instructor.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 648 [Min Grade: C]

PSY 650 Child Psychopathology & Treatment 3.0 Credits

This course will explore empirical literature on the diagnosis, assessment, etiology, course, and treatment of various psychological disorders of childhood and adolescence. Students will understand the DSM-IV-TR diagnostic criteria's application to children, symptom presentation in children, and issues of differential diagnosis. Empirically supported treatments for childhood disorders will be examined.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY.

PSY 690 Master of Science Research I 3.0 Credits

Students will enroll in a three-term Master's Thesis course under the direct supervision of their mentor. The goal is to foster the development of an independent research project under the supervision of their designated research mentor. This is Part one of the 3-part sequence course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY.

PSY 691 Master of Science Research II 3.0 Credits

Students will enroll in a three-term Master's Thesis course under the direct supervision of their mentor. The goal is to foster the development of an independent research project under the supervision of their designated research mentor. This is Part two of the 3-part sequence course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY.

Prerequisites: PSY 690 [Min Grade: C]

PSY 692 Master of Science Research III 3.0 Credits

Students will enroll in a three-term Master's Thesis course under the direct supervision of their mentor. The goal is to foster the development of an independent research project under the supervision of their designated research mentor. This is Part three of the 3-part sequence course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY.

Prerequisites: PSY 690 [Min Grade: C] and PSY 691 [Min Grade: C]

PSY 710 Data Analysis II 3.0 Credits

The purpose of this course is to acquaint students with the advances statistical tools most frequently used in clinical psychology research. The class will give you a basic theoretical background in the procedure, and it will familiarize you with computer-based analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 610 [Min Grade: C]

PSY 711 Data Analysis III: Advanced Topics 3.0 Credits

The purpose of this course is to acquaint students with advanced statistical tools most frequently used in clinical psychology research. The class will give you a basic theoretical background on the procedures, and it will familiarize you with computer-based analysis. Emphasis will be placed on the application and interpretation of statistics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 610 [Min Grade: C] and PSY 710 [Min Grade: C]

PSY 712 History and Systems 3.0 Credits

Covers the history and various systematic theories of psychology.

Explores the conceptual foundations of psychology from its inception to the present day.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 720 Health Psychology 3.0 Credits

Discusses the role of the clinical psychologist in the medical setting. Involves didactic and clinical training focusing on behavioral medicine, sleep disorders, hypnosis, consultation-liaison services, and biofeedback.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 721 Principles of Psychotherapy 3.0 Credits

Introduces fundamental clinical interviewing skills.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 722 Theories of Intervention 3.0 Credits

A review of the major theoretical foundations of psychotherapeutic intervention derived from neuroscience, interpersonal, psychodynamic, and learning theories, including contextual/mindfulness-based approaches. The course will translate the various theoretic foundations toward a united approach to assessment and intervention.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 721 [Min Grade: C]

PSY 730 Criminal Law and Psychology 3.0 Credits

This advanced seminar focuses on the criminal justice system's treatment of mental disordered offenders. Students will learn about the major mental disorders and the ways in which our criminal law accounts for the impact of those illnesses on a defendant's criminal responsibility.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 734 Social Science Applications to the Law 3.0 Credits

This seminar is designed to inform doctoral students in psychology about the usefulness of social science information in the practice and scholarship of law, at the same time indicating the problems and pitfalls of using such information, particularly at the appellate level. Thus, the seminar explores the interplay and conflict between law and psychology and the many ways in which social science research can or should have an influence on legal decision making.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 740 Neuropsychological Evaluation and Interpretation of Adults 3.0 Credits

Covers the neuropsychological assessment of adult patients with brain injury and the subsequent design of reports and rehabilitation programs. Discusses both assessment instruments and rehabilitation techniques for brain injuries and associated problems. Emphasizes clinical experience with patients.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 746 Neuropsychological Evaluation and Intervention of Children and Adolescents 3.0 Credits

Covers the neuropsychological assessment of younger patients with brain injuries, learning disabilities, or developmental disorders.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 750 Autism Spectrum Disorders 3.0 Credits

In this course we will investigate autism spectrum disorders including characteristics, assessments, systems and family issues, and current theories about the nature and biological basis for autism.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 810 Behavioral Data Mining 3.0 Credits

This course provides an introduction to different data mining techniques, with emphasis on practical applications of them by using software such as R. These techniques are particularly useful for the analysis of large data sets, as can arise in clinical, survey, psychometric, genomic and marketing research. The course begins by introducing several examples of supervised and unsupervised learning. Beginning with well-established techniques, we discuss methods such as discriminant analysis, support vector machines, and clustering techniques. The second half of class is devoted to Big Data or high dimensional data analysis using dimension reduction and variable selection techniques. In addition to reading papers demonstrating the use of these techniques in behavioral research, we will provide step-by-step tuturi.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 811 Multilevel Regression 3.0 Credits

Multilevel regression is an advanced regression technique (closely related to hierarchical linear modeling) that was developed to model nested data -- data that contain multiple observations from each source, such as longitudinal data or repeated measures data. This course will provide hands-on training in the application of this method using the R statistical programming language. It will also cover advanced data visualization and data manipulation techniques using R.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY and classification is PhD and program is PHD.

Prerequisites: PSY 610 [Min Grade: C] and PSY 710 [Min Grade: C] and PSY 711 [Min Grade: C]

PSY 812 Cognitive Neuroscience 3.0 Credits

This course provides an overview of the field of Cognitive Neuroscience, including a review of sophisticated modeling and neuro-imaging technologies to answer important questions about behavior, the mind and the brain .

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CLPS or major is LWPY or major is PSY.

Prerequisites: PSY 530 [Min Grade: C]

PSY 814 Neuroimaging & Physiology of Behavior 3.0 Credits

Since the cognitive revolution in the 1960's, scientists have tried to understand what the brain is doing while we are thinking. Because they allow us to directly measure what the brain is doing, neuroimaging techniques continue to gain popularity as research and clinical tools. In this course, we will explore some of the commonly used imaging techniques and gain an appreciation for the data that they generate, and how that data is transformed into something interpretable.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PSY 530 [Min Grade: C]

PSY 815 Evidence-Based Psychotherapy 3.0 Credits

This advanced elective course will provide training in scientifically supported psychological assessment and treatment methods. A range of methods (e.g., Problem-Solving Therapy, Gottman marital therapy, etc.) will be presented through book chapters, videos, role plays, etc.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY and classification is PhD and program is PHD.

PSY 820 Cognitive-Behavioral Therapy 3.0 Credits

This course is designed to provide an introduction to cognitive behavior theory and therapy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 821 Family Therapy 3.0 Credits

Family therapy theories will be reviewed including historically important, current and innovative approaches. In this course students will: 1) learn/integrate concepts and methods of family therapy, 2) appropriately apply these concepts and methods to case material, (3) critically evaluate psychotherapy outcome research relevant to family therapy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CLPS or major is LWPY or major is PSY and classification is PhD.

PSY 822 Pediatric Psychology 3.0 Credits

The focus of pediatric psychology is the understanding, assessing, and intervening in the relationship between physical and psychological health. In this course students will: (1) learn pediatric psychology theory and practice including professional issues, assessment strategies and intervention approaches, (2) apply concepts to develop appropriate and effective treatment plans for case examples.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CLPS or major is LWPY or major is PSY and classification is PhD.

PSY 823 Substance Use 3.0 Credits

This course examines the effects of drugs on human thinking and behavior. Both illicit (street) and licit (prescription) drugs are examined in an attempt to understand how these drugs produce their physiological and psychological effects. The course will focus on understanding the etiology and epidemiology of drug use and drug abuse/dependence, the pharmacology of psychoactive substances, and empirically supported prevention and intervention strategies.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 824 Psychotherapy with Young Children 3.0 Credits

Reviews the different approaches of intervening with clinical issues in children and families.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 825 Seminar in Mind and Body Studies 3.0 Credits

Through a seminar format, this course will provide an exploration and analysis of the scientific literature concerning health and disease, regarding the integration of biomedical, psychological, social, spiritual, and philosophical domains.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 826 Social Problem Solving and Child Psychopathology 3.0 Credits

This elective course presents an overview of interpersonal cognitive problem solving (ICPS) and their prerequisite skills in normal and diagnostically disturbed populations beginning at age four, and is divided into three sections: Correlation Research; Preventive/Treatment Interventions; and the I Can Problem Solve (ICPS) prevention program.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 827 Behavioral Stress Management 3.0 Credits

This graduate level seminar will provide hands-on teaching of various behavioral stress management strategies. These strategies (e.g., progressive muscle relaxation) are the fundamental skills often part of larger anxiety reduction or stress management protocols for a wide variety of psychological problems. The emphasis of this course is on knowing when to apply these strategies and learning how to competently implement these skills for adult populations. The instructor will model the various strategies and students are expected to role play simulated therapy cases.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 828 Weight and Eating Disorders 3.0 Credits

The purpose of this course is to review psychological determinants of body weight and eating behavior as well as psychological treatments for obesity and eating disorders.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 829 Psychopathy 3.0 Credits

This course focuses on the historical concepts/definitions of psychopathy and the use of various assessment methodologies in clinical and forensic populations; review of comorbidity of psychopathy with other Axis I and Axis II disorders. Students will gain experience in the assessment of psychopathy.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CLPS or major is LWPY or major is PSY.

PSY 830 Advanced Topics in Health Psychology 3.0 Credits

This advanced seminar covers current empirical research in health psychology relevant to theory, epidemiology, and evidence based mental health assessment and intervention, focusing on medical conditions and chronic illnesses that psychologists most often encounter across varied populations, as well as the increased role psychologists play in medical and health settings.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 840 Advanced Cognitive-Behavioral Therapy 3.0 Credits

This course will include didactic training, in class demonstrations, video demonstrations, in-class practice sessions implementing cognitive and behavioral therapy techniques for specific psychological disorders including panic disorder, agoraphobia, obsessive compulsive disorder, depression and post-traumatic stress disorder.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PSY and classification is PhD and program is PHD.

Prerequisites: PSY 820 [Min Grade: C]

PSY 843 Neuropsychological Evaluation of Head Trauma 3.0 Credits

Covers the neuropsychological assessment of patients with head trauma and the subsequent design of reports and rehabilitation programs.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 845 Neuropsychological Evaluation & Intervention of the Elderly 3.0 Credits

Covers the neuropsychological assessment of elderly patients with brain injury, such as primary degenerative conditions (e.g., dementia and Alzheimer's disease).

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 850 Psychology of Disability 3.0 Credits

Reviews disability determination and discusses issues of disability.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 852 Neuropsychological Services Delivery Systems 3.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 854 Psychology of Rehabilitation 3.0 Credits

Discusses issues of psychological assessment and intervention as they apply to rehabilitation.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 897 Clinical Psychology Practicum Seminar 3.0 Credits

Consistent with APA requirements for accredited programs, the class serves a colloquium function, brings students together to learn about and discuss clinical- and practicum-related issues, and provides a vehicle for information on practice-related issues.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 898 Master's Thesis in Psychology 0.0-3.0 Credits

Requires supervised research at the master's level.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 899 Practicum 1.0 Credit

According to APA guidelines, students are required to accumulate clinical training hours during their course of studies. This course is intended to award students credit for each successful year of completed practicum work.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 4 times for 4 credits

PSY 998 Ph.D. Dissertation in Psychology 1.0-12.0 Credit

Requires supervised research, including literature research, data collection, and writing of doctoral thesis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY 999 Internship 1.0-12.0 Credit

Provides advanced, one-year full-time placement in a clinical setting determined by the clinical director and the student.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PSY I599 Independent Study in PSY 0.0-12.0 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 I699 Independent Study in PSY 0.0-12.0 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 I799 Independent Study in PSY 0.0-12.0 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 I899 Independent Study in PSY 0.0-12.0 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 I999 Independent Study in PSY 0.0-12.0 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 T580 Special Topics in Psychology 0.0-9.0 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

PSY T680 Special Topics in Psychology 0.0-9.0 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

PSY T780 Special Topics in Psychology 0.0-9.0 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

PSY T880 Special Topics in Psychology 0.5-9.0 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

PSY T980 Special Topics in Psychology 0.0-9.0 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

Public Health

Courses

PBHL 500 Practical Experience for the Master of Public Health 0.0 Credits

All graduate professional public health degree students must develop skills in basic public health concepts and demonstrate the application of these concepts through a practice experience that is relevant to students' areas of specialization. "Practice" refers to the implementing (doing) of public health rather than the understanding (researching) of public health. The Practical Experience will give students both a breadth of experiences to expand their knowledge and exposure to public health broadly, and a depth of experience and skill in an area closely related to their academic and professional goals.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 501 Introduction to Public Health 0.0 Credits

The purpose of this course is to provide a broad introduction to public health, as well as an understanding about how specialized health research contribute to achieving the goals of public health.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 2 times for 0 credits

PBHL 502 Evidence and Practice in Global WASH: Hygiene Promotion 3.0 Credits

This course will allow students to analyze the importance of community hygiene promotion in WASH projects, demonstrate how to implement participatory community hygiene promotion campaigns, define approaches used to hygiene promotion in successful WASH projects, recognize practical hygiene promotion strategies used in WASH and global health.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 504 Evidence and Practice in Global WASH: Behavior Change, Social and Software Aspects of WASH 3.0 Credits

Upon completion of this course, students will be able to: analyze the importance of behavior change to successful WASH projects, define WASH behavior change theories, describe behavior change approaches used in successful WASH projects, and recognize BC models and frameworks that can be applied to WASH and global health.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 510 Public Health Foundations and Systems I 4.0 Credits

This 4-credit course is part 1 of a two quarter, multi-disciplinary introduction to the theory and practice of public health. The course is divided into two 5-week modules: Determinants of Health and Human Rights, Ethics and History. The first lecture session provides background in the determinants of health, followed by a lecture describing human rights, ethics and history in relationship to the module theme. Weeks 2 through 4 address course objectives with examples that tie back to the focus for the module. The last two sessions of each module address translating knowledge into action and public health leadership, again with the theme highlighted in that module.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 511 Public Health Foundations and Systems II 4.0 Credits

This 4-credit course is part 2 of a two quarter, multi-disciplinary introduction to the theory and practice of public health. The course is divided into two 5-week modules: Translating Knowledge Into Action, and Public Health Leadership. The first lecture sessions provide background in the determinants of health, followed by a lecture describing human rights, ethics and history in relationship to the module theme. Weeks 2 through 4 address course objectives with examples that tie back to the focus for the module. The last two sessions of each module address translating knowledge into action and public health leadership, again with the theme highlighted in that module.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 510 [Min Grade: B]

PBHL 512 Methods for Public Health Research I 4.0 Credits

Students will learn how to formulate a research question, determine the population burden of disease, and distinguish between common study designs for characterizing determinants of disease, as well as identify common design and analytic challenges. We will illustrate these concepts within the context of contemporary public health research studies. Throughout the two quarters, students will be introduced to key concepts of biostatistics and will learn basic analytic methods, including statistical software, as well as qualitative analysis, including the role of qualitative data management and analysis software.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 513 Methods for Public Health Research II 4.0 Credits

This is the second quarter of a two-quarter sequence. The purpose of the sequence is to provide a foundation in quantitative and qualitative tools required for public health research. Students will learn how to formulate a research question, determine the population burden of disease, and distinguish between common study designs for characterizing determinants of disease, as well as identify common design and analytic challenges. We will illustrate these concepts within the context of contemporary public health research studies. Throughout the two quarters, students will be introduced to key concepts of biostatistics and will learn basic analytic methods, including statistical software, as well as qualitative analysis, including the role of qualitative data management and analysis software.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 512 [Min Grade: B]

PBHL 516ES Public Health History and Ethics 1.0 Credit

This course provides a historical overview of the field of public health – focusing on its encompassing principles, values and methods of prevention and intervention, and selected ethical issues entailed. Topics include responses to epidemics, vaccination policy and public health law, health disparities and cultural competency, and policy approaches to public health problems. Students reflect upon how historical experience affects our current understanding of public health in the United States and how ethical complications in the practice of public health, past and present, influence - and sometimes inform - decision making.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 520ES BIOSTATISTICS 4.0 Credits

Introduces and applies the biostatistics and analytical base required for population-based and community health assessment and evaluation. The focus is on providing a broad and basic understanding of biostatistics, with more advanced methods included as appropriate.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 525 MD/MPH Introduction to Public Health Seminar Series**1.0-4.0 Credit**

This seminar has been designed to provide an examination of the integrative nature of public health and the historical influences which still resonate in the current challenges of improving the health of populations. Readings focus on the roots of contemporary public health knowledge and policy and students are asked to reflect and discuss how that history impacts on the current context of public health in the United States, as well as globally. The highlighted cases touch upon all of the public health core disciplines – biostatistics, environmental health, epidemiology, health behavior, and health care organization and policy.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 530ES Epidemiology 4.0 Credits

Introduces and applies the principles of epidemiology and study design needed to support population-based and community health assessment and evaluation. Basic and more advanced methods are covered as appropriate with applications to public health and community contexts, and integration with the biostatistics taught in Block II.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 540ES Behavioral Assessment 4.0 Credits

Introduces principles of health behavior in context of the human life-cycle and covers their application to prevention and health promotion programs in a community context.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 550ES Community Based Prevention Practices 4.0 Credits

Provides an interdisciplinary foundation that is focused on strategies designed to enhance the health of the community. Also, to focus on the role of community capacity building community empowerment, action-oriented community diagnosis and the central role of community residents in the identification of local issues, goals, and priorities affecting their lives and neighborhoods.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 540ES [Min Grade: C]

PBHL 560ES MPH Comm Based MP Part A 1.0 Credit

Independent Study.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 1 times for 2 credits

PBHL 570 Integrated Public Health Case Analysis 4.0 Credits

The capstone course is designed to synthesize and integrate knowledge acquired in course work and other learning experiences and to apply theory and principles in a situation that approximates some aspect of professional practice. Students will work in groups to analyze a case study of public health practice and policy, and will develop a new case from current and emerging issues in public health. In both the case analysis and case development, students will apply general and discipline-specific public health knowledge from their course work to the effective resolution of a public health problem. Group presentations of both case analysis and case development will be required.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 570ES Integrated Public Health Case Analysis 4.0 Credits

The course is designed for Executive MPH students for completion in their final semester. After completion, students will be able “to synthesize and integrate knowledge acquired in course work and other learning experiences and to apply theory and principles in a situation that approximates some aspect of professional practice”. Students will work in groups to analyze a case study of public health practice and policy, and will develop a new case from current and emerging issues in public health. In both the case analysis and case development, students will apply general and discipline-specific public health knowledge from their coursework to the effective resolution of a public health problem. Group presentations of both case analysis and case development will be required.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 580 Public Health Practice (EMPH) 1.0 Credit

All graduate professional public health degree students must develop skills in basic public health concepts and demonstrate the application of these concepts through a practice experience that is relevant to students' areas of specialization. “Practice” refers to the implementing (doing) of public health rather than the understanding (researching) of public health. The Applied Practical Experience will give students an opportunity to expand their knowledge and exposure to public health topics through a project or internship and gain skill in an area closely related to their academic and professional goals.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 600ES Health Management and Leadership 4.0 Credits

Explores critical elements of the assurance role of public health, beginning from the premise that effectiveness of program delivery and of the assurance role itself requires an understanding of organizations, leadership, and change, in economic, strategic and systematic context. Applies management concepts and theories through an integrated model of the management process. In the latter portion of the block, extends, applies, and integrates previously developed concepts and theories with those of strategy, planning, accounting, financial management, and information systems.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 602ES Practicing Public Health 1.0 Credit

Practicing Public Health is a course that exposes students to the application of public health management and policy concepts to public health practice. The course consists first of a series of readings on the settings and tools of public health practice and the provision of public health services. This part of the course is followed by case studies related to public health assessment, policy development and assurance. The course builds skills in critical thinking, effective program management, and creative problem solving related to the practice of public health at the national, state and local levels.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 603ES Research Methods: An Introduction 1.0 Credit

This course introduces students to components of research, measurement, data analysis, and assessment applicable to Health Services Research (HSR). It provides context for students who will be carrying out policy research, social science research or program impact evaluation related to health care delivery systems, public practice and/or population health. It is also relevant to those who will apply the results of HSR done by others.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 612ES Program Planning & Evaluation 4.0 Credits

Beginning from the premise that the health-assurance role of public health begins with program planning, development, and evidence-based practice, this block examines concepts and theories underlying program planning, development, and evaluation. Emphasizes program application in context of specific problems and community context.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 630ES MPH Comm Based MP Part B 1.0 Credit

Independent Study.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 635ES MPH Comm Based MP Part C 2.0 Credits

Independent Study.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 640ES Environmental & Occupational Health 4.0 Credits

Introduces concepts, theories, and programmatic applications within the fields of environmental and occupational health.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 650ES Health Policy & Advocacy 4.0 Credits

This course is about making policy in public health and in health care: what it is, who makes it, and how and when it's made successfully. It aims to provide a grounding in public policy theory and health policy; highlight several selected critical health policy issues; and build skills in critical, reflective thinking.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 653 Preparation for Integrative Work in Public Health 1.0 Credit

This course is designed to provide students with skills that will enable them to conduct integrative independent work in public health and health sciences. The focus is on methods for exploration and critical analysis of health sciences literature and reviewing important genres of public health inquiry and scholarship. Students will learn how to search literature in public health and the health sciences and the methods for producing different types of literature reviews, including meta-analyses. Students will also review and critique different research study designs in public health, and methods for conducting health policy analysis and health impact assessments.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 667 Professional Seminar for the Executive MPH Program I 2.0 Credits

This course is a requirement of all students completing their MPH degree in the Executive program. Using DSPH faculty and external partners, this seminar will enhance the EMPH coursework and enable students to build connections between the classroom and their public health careers. This is the first part of a two-quarter sequential course.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHEX.

PBHL 668 Professional Seminar for the Executive MPH Program II 2.0 Credits

This course is a requirement of all students completing their MPH degree in the Executive program. Using DSPH faculty and external partners, this seminar will enhance the EMPH coursework and enable students to build connections between the classroom and their public health careers. This is the second part of a two-quarter sequential course.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PHEX.

PBHL 680 Community Based Master's Project I 1.0-3.0 Credit

This course is the first of 3 CBMP courses and will encompass the first stages of the year long process of producing a final master's project. Activities will include selection of CBMP site, CBMP workshops, student logs, IRB and HIPAA training. A learning agreement, community site profile and project proposal will be expected as end-products of student's first 10 weeks at site and aforementioned activities.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 681 Community Based Master's Project II 1.0-3.0 Credit

This course is the second of 3 CBMP courses and will encompass the intermediate stages of the CBMP process. Activities will include CBMP workshops, IRB submission (if applicable) and regular attendance at community site. Student's progress at site and on final project will be assessed through Community Site Preceptor Mid-Year Report and assessment by Faculty Advisor.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 682 Community Based Master's Project III 1.0-3.0 Credit

This is the third of 3 CBMP courses and represents the final stage of the CBMP process. Draft of final project will be previewed through short presentation to SPH community. Final oral defense, presentation of CBMP Poster and submission of final project paper for binding are the major activities of this course.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 699ES Special Topics in PH 1.0 Credit

Public health is a multi-disciplinary field, drawing from the disciplines of Biostatistics, Environmental Health Sciences, Epidemiology, Health Policy Management and Social and Behavioral Sciences. Through the use of archived online presentations, this self-directed course allows students to draw from a library of lectures which focus on the five core disciplines of public health. After viewing online lectures, students will then analyze and synthesize newly learned concepts with their own understanding of public health and public health practice.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL 700ES Research Methods 1.0 Credit

This 1 credit self-paced course is designed to provide students the opportunity to increase their understanding of and to strengthen their skills in the scientific methods underlying rigorous epidemiologic research and use of publicly available data for description and decision making.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 707 Monitoring and Evaluation in Global Health 3.0 Credits

This course is designed to provide students with a systematic approach to planning, implementing, monitoring, and evaluating global programs. Students will learn the general principles of monitoring and evaluation (M&E) as well criteria for selecting indicators and metrics and various tools/ models will be introduced to offer students an overview of the program planning and M&E process.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 709 Global Health Capstone Project 6.0 Credits

This course is designed to provide guidance on the successful completion of a capstone project. Components of the project may include systematic review/meta-analysis, data collection, data management and analysis, and/or developing a monitoring and evaluation plan or policy analysis/ recommendation.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 711 Global Issues in Sanitation 3.0 Credits

Sanitation was one of the most off-track MDGs and progress in urban sanitation is proving especially difficult to achieve. In this course students will learn about the global sanitation crisis; analyze and compare issues related to water, sanitation, and hygiene; learn about the need to develop measures to reduce the global burden of disease from poor sanitation and hygiene; as well as affordable and context-specific sanitation solutions, sector planning tools, and community-led frameworks.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 995 Ph.D. Dissertation Companion 1.0-9.0 Credit

PhD Dissertation Companion.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL 999 Thesis Research: Dissertation Guidance and Epidemiology 1.0-12.0 Credit

Directed guidance of dissertation research, preparation for presenting dissertation research to colleagues at the dissertation seminar and preparation for the final defense.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if program is DRPH.

PBHL I599 Independent Study in PBHL 1.0-3.0 Credit

Independent Study in Community Health and Prevention. Independent study concerning concepts, methods, or specific health issues in community health and prevention. May be repeated six times for credit.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 6 times for 9 credits

PBHL I699 Independent Study in PBHL 1.0-3.0 Credit

Independent Study in Community Health and Prevention. Independent study concerning concepts, methods, or specific health issues in community health and prevention. May be repeated six times for credit.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 6 times for 9 credits

PBHL I799 Independent Study in PBHL 1.0-3.0 Credit

Independent Study in Community Health and Prevention. Independent study concerning concepts, methods, or specific health issues in community health and prevention. May be repeated six times for credit.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 6 times for 9 credits

PBHL I899 Independent Study in PBHL 1.0-3.0 Credit

Independent Study in Community Health and Prevention. Independent study concerning concepts, methods, or specific health issues in community health and prevention. May be repeated six times for credit.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 6 times for 9 credits

PBHL I999 Independent Study in PBHL 1.0-3.0 Credit

Independent Study in Community Health and Prevention. Independent study concerning concepts, methods, or specific health issues in community health and prevention. May be repeated six times for credit.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 6 times for 9 credits

PBHL T580 Special Topics in PBHL 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL T680 Special Topics in PBHL 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL T780 Special Topics in PBHL 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL T880 Special Topics in PBHL 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated multiple times for credit

PBHL T980 Special Topics in PBHL 0.5-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated multiple times for credit

Public Policy

Courses

PLCY 503 Theory and Practice of Policy Analysis 3.0 Credits

The aim of this course is to develop an understanding of the social, political, and ethical context of policy research, and how this understanding can be translated into an applied practice of policy analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PLCY 504 Methods of Policy Analysis 3.0 Credits

Course focuses on the logic and procedures used in carrying out social research for policy purposes. The aim of the course is to develop the student's capacity to conceptualize, design, and conduct research.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PLCY 506 Institutional Dynamics of the Policy Process 3.0 Credits

Introduces students to the American policy process, looked at through the lens of historical institutional analysis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PLCY 507 Nonprofit Organizations 3.0 Credits

This course focuses on distinctive features of managing and governing nonprofit organizations and draws on current theories, concepts, and real world examples to explore particular management challenges. Course includes a mix of lecture, discussion, case applications, and presentations by practitioners from the local nonprofit community.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PLCY 509 Sustainability & Public Policy 3.0 Credits

Course introduces students to the concept of sustainability as it relates to policy planning, design, and implementation, and examines how different definitions of sustainability (e.g. environmental, economic, and social) can be translated into best practices, performance benchmarks, and other metrics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PLCY 510 Introduction to Case Study Research 1.0-3.0 Credit

An introductory course for public policy students to engage in case study research and choose their policy research topic.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PLCY.

PLCY 511 Case Study Literature Review 1.0 Credit

A tutorial course for public policy students to review and report on academic literature relevant to their chosen case study topics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PLCY 504 [Min Grade: C] and (PLCY 510 [Min Grade: C] or PLCY 514 [Min Grade: C])

PLCY 512 Case Study Document Review 1.0 Credit

A tutorial course for public policy students, to collect and report on original documents (legislation, hearing transcripts, reports, etc.) relevant to their chosen case study topics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PLCY 511 [Min Grade: C] (Can be taken Concurrently) PLCY 504 [Min Grade: C] and (PLCY 510 [Min Grade: C] or PLCY 514 [Min Grade: C])

PLCY 513 Case Study Interviews 1.0 Credit

A tutorial course for public policy students to interview personnel relevant to their chosen case study topics.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PLCY 511 [Min Grade: C], PLCY 512 [Min Grade: C] (Can be taken Concurrently) PLCY 504 [Min Grade: C] and (PLCY 510 [Min Grade: C] or PLCY 514 [Min Grade: C])

PLCY 515 Case Study Colloquium 1.0 Credit

A group discussion course for public policy students to consolidate and report on their case study research and to comment on the research of other students.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Prerequisites: PLCY 504 [Min Grade: C] and PLCY 511 [Min Grade: C] and PLCY 512 [Min Grade: C] and PLCY 513 [Min Grade: C] and (PLCY 510 [Min Grade: C] or PLCY 514 [Min Grade: C])

PLCY 516 Case Study Research II 1.0-3.0 Credit

A tutorial course for public policy students to collect and report on original documents (legislation, hearing transcripts, reports, ect) relevant to their chosen case study topics.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 5 times for 18 credits

PLCY 517 Case Study Final Project 1.0-3.0 Credit

A final tutorial course for public policy students writing their case studies. Students complete and submit their final case study reports. Passage of this course is contingent completing an oral defense of their case studies.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

PLCY 521 City Policy and Political Systems 3.0 Credits

Emerging theory as well as real-life demographics indicate that the world is becoming heavily urbanized. Though the US has been and continues to be less urbanized than the rest of the world, American cities have re-emerged as very attractive economic, cultural and social engines; they are understood to be an essential 'working unit' of how we live. With that, comes a concomitant belief that cities are where most of the pressing problems of the day will need to be solved: in sustainability, in education, in economic development and in poverty and economic inequality. Students will be expected to read select articles and books, produce weekly blog-posts in response to readings and presentations and produce a final paper on a topic of their choosing from within the course outline.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PLCY I599 Independent Study in PLCY 0.0-12.0 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

PLCY I699 Independent Study in PLCY 0.0-12.0 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

PLCY I799 Independent Study in PLCY- 0.0-12.0 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

PLCY I899 Independent Study in PLCY 0.0-12.0 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

PLCY I999 Independent Study in PLCY 0.0-12.0 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

PLCY T580 Special Topics in Public Policy 0.0-9.0 Credits

Course covers on a rotating basis a variety of topics of interest to students in public policy, including (though not limited to) urban policy, environmental policy, and technology.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PLCY T680 Special Topics in Public Policy 0.0-9.0 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

PLCY T780 Special Topics in Public Policy 0.0-9.0 Credits

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

PLCY T880 Special Topics in Public Policy 0.0-9.0 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

PLCY T980 Special Topics in Public Policy 0.0-9.0 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

Publishing

Courses

PUB 504 Drexel Publishing Group Special Projects 3.0 Credits

The English Department is home to the Drexel Publishing Group.

Students in the program will have the opportunity to assess the publications produced by DPG, create ways to build upon or improve an aspect of the group or an individual publication within the group, develop a proposal, and implement those ideas. These projects will be considered on a case-by-case basis, approved, and overseen by the director.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 1 times for 6 credits

PUB 530 The Publishing Environment 3.0 Credits

This course provides an overview of the publishing industry from inception to the current time. It covers publishing fundamentals, genres and formats, discusses publishing trends, and begins development of the students' contacts in the industry. The course emphasizes the changes and trends in the publishing industry brought about by the advancement of digital technology. This course helps students identify their real interest and the avenue they want to take in the publishing industry.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PUB 631 Publication Design: Print and Digital 3.0 Credits

This course introduces both the theoretical and practical fundamentals of publication design, spanning books and magazines in print as well as digital formats including ebooks, webzines, etc. (These principles are applicable not just to general books and magazines but to a wide variety of professional publications, from trade journals and corporate reports to blogs and coffee-table books.)

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PUB 635 Periodicals Publishing 3.0 Credits

Provides the student with a thorough understanding of periodical publishing and the current environment. Students learn how to publish a successful periodical from launch to sales and distribution. Strategy and implementation are stressed. Current publishing methods are emphasized and students gain directly applicable experience.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PUB 701 Independent Project in Publishing 1.0-3.0 Credit

In this course, students will work under the direction of one of the Publishing teaching faculty members. The subject matter will cover a specific research area in publishing or an area of academic study not offered in an existing Publishing course. Only students with sufficient background work, and a clear vision of his or her project will be accepted by the instructor. A contract will be drawn between the student and appropriate overseeing faculty or professionals.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated 2 times for 9 credits

PUB 720 The Ebook and Online Magazines 3.0 Credits

This course will concentrate on the practical differences between electronic and print publishing, the possibilities of new platforms, and the (positive and negative) impact of the industry's movement away from print. Students will research the expanding world of indie publishers, innovative products and business models. Students will engage in practical exercises, producing working examples of ebooks, websites, and social media. Students will study various delivery models, analyze reader engagement, and develop a complete digital marketing platform. This course provides information about how the business of digital publishing works, how to effectively market and sell your digital publication, and how to write a simple business plan for a digital publishing endeavor.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PUB 730 Book Publishing 3.0 Credits

Analyzes managerial decisions including acquisitions, development, design, financial, and copyright implications of books publishing. Includes books of all genres: non-fiction, fiction, scientific, children's and others.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PUB 750 Small Press Development 3.0 Credits

For graduate students who wish to study the history, ideas, and practice of small press publishing, including acquisition, page and cover design, book structure, and marketing. This course covers the how-to, economic, copyright, technical, and mailing regulation considerations of founding a press or magazine and examines the current, important phenomenon of the developing small-press movement in the American literary scene. Course includes an electronic publication component. This course provides an opportunity to explore book binding, book structures, limited-edition runs and writing for small-press publishing.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

PUB I599 Independent Study in PUB 0.0-12.0 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

PUB T680 Special Topics in Publishing 3.0 Credits

In this course, students will explore specific areas not covered in the regularly offered Publishing courses. The course will be taught by teaching faculty members of the Publishing, or by visiting professors. This is a three-credit elective course for the MA in Publishing. It may also be used as a free elective course for a variety of students.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

Real Estate

Courses

REAL 568 Real Estate Development 3.0 Credits

This course will provide a comprehensive exploration of the development process for real estate development projects. Residential, multi-family, single family, apartments, office buildings, retail projects, industrial developments and the development process for each market segment.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

REAL 571 Advanced Real Estate 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 student's knowledge and judgment for investment decision making.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

REAL 572 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

REAL 573 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

REAL 574 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

Prerequisites: REAL 568 [Min Grade: C]

REAL 575 Real Estate Finance 3.0 Credits

This course will focus on the options and implications of different financing methods with the unique tradeoffs associated with each considered.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

REAL 576 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

REAL 577 Legal Issues in Real Estate Development 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

REAL I599 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 I699 Independent Study in Real 0.0-12.0 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 I799 Independent Study in Real 0.0-12.0 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 I899 Independent Study in Real 0.0-12.0 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 I999 Independent Study in Real 0.0-12.0 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 T580 Special Topics in REAL 0.0-12.0 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 T680 Special Topics in REAL 0.0-12.0 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 T780 Special Topics in REAL 0.0-12.0 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 T880 Special Topics in REAL 0.0-12.0 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 T980 Special Topics in REAL 0.0-12.0 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

Rehabilitation Sciences

Courses

RHAB 761 Foundations of Rehabilitation Research 3.0 Credits

Provides exposure to theories and models related to rehabilitation sciences research. Theories that may be applied to various phases of the enabling-disabling process are examined. Students discuss how these theories are tied to development of research questions in line with the mission, goals and research priorities of funding sources.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

RHAB 763 Biomechanics in Rehabilitation 3.0 Credits

The first half of the class focuses on statics (muscle forces and stress-strain analysis), and the second half concentrates on dynamics (kinematic and kinetic analysis of human motion) with applications. Some minor computer work is required for this class, mainly using the Microsoft Excel spreadsheet program.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

RHAB 764 Biomechanics in Human Movement 3.0 Credits

The first half of the class focuses on the development of the tools necessary to conduct biomechanics research, process the data, and perform biomechanical data analysis. The second half of the class works through common biomechanics questions related to human movement in three dimensions.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

RHAB 765 Introduction to Movement Science 3.0 Credits

This class focuses on structures and mechanisms underlying human movements, principles of movement control and learning, and methods of motor control and learning research using current theories of motor control and motor learning in healthy populations. Applied lab activities are used to enhance student learning of theoretical concepts. May be repeated once for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 3 credits

Restrictions: Can enroll if major is PT or major is RHAB.

RHAB 768 Advancing the Practice of Rehabilitation 3.0 Credits

This course examines how leaders and educators promote professional development and expertise in the field of rehabilitation. The course provides an in-depth look at processes including conceptualization of knowledge, critical reasoning, professional judgment, and reflective practice. The course considers how the therapist and practice setting affect these processes.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

RHAB 812 Interpretation of Data 3.0 Credits

This is an advanced seminar on issues such as power and effect size calculations and interpretation of results of statistical analysis including outputs of statistical software packages.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 3 credits

RHAB 813 Measurement Theory in Rehabilitation 3.0 Credits

The emphasis of this course is on the assessment of the uses, advantages, validity, reliability, and sources of error in measurement tools commonly used in rehabilitation sciences and on methodological and outcome research methods.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

RHAB 814 Research Designs in Rehabilitation 3.0 Credits

Research Designs is a core course in the PhD program and provides a review of concepts and principles for PhD students. The focus is on application of research designs and methods that are applicable to rehabilitation sciences research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

RHAB 816 Special Topics 1.0-4.0 Credit

The course description will be developed by the Course Director depending upon the course content. May be repeated three times for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 12 credits

Restrictions: Can enroll if major is PT or major is RHAB.

RHAB 817 Sensors & Transducers in Rehabilitation 3.0 Credits

This course combines clinical, electronics and engineering background, and a step-by-step process of understanding the different instrumentation used to gather information about the status of human activity and motion. The course provides the student with knowledge needed to choose, use and improve measurement systems for application in rehabilitation sciences.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PT or major is RHAB.

RHAB 823 Research Practicum 1.0-6.0 Credit

Prepares the student for dissertation research through faculty-supervised research experiences. Focuses on one or more stages of the research process, such as developing a question, literature review, design and method, IRB, grant writing, subject recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of results. May be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 12 times for 12 credits

Restrictions: Can enroll if major is PT or major is RHAB.

RHAB 824 Teaching Practicum I 1.0 Credit

This course requires a negotiated agreement, leading to a contract among the Course Director/Instructor, the student and the student's advisor.

The student develops a syllabus, write goals and objectives, prepare and present materials, develop assessments strategies, and participate in the administrative responsibilities of the course. May be repeated three times for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 3 credits

Restrictions: Can enroll if major is PT or major is RHAB.

Prerequisites: RHAB 762 [Min Grade: C]

RHAB 825 Teaching Practicum II 2.0 Credits

This course requires a negotiated agreement, leading to a contract among the Course Director/Instructor, the student and the student's advisor.

The student develops a syllabus, write goals and objectives, prepare and present materials, develop assessments strategies, and participate in the administrative responsibilities of the course. May be repeated twice for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 4 credits

Restrictions: Can enroll if major is PT or major is RHAB.

Prerequisites: RHAB 762 [Min Grade: C]

RHAB 826 Teaching Practicum III 3.0 Credits

This course requires a negotiated agreement, leading to a contract among the Course Director/Instructor, the student and the student's advisor.

The student develops a syllabus, write goals and objectives, prepare and present materials, develop assessments strategies, and participate in the administrative responsibilities of the course. May be repeated twice for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Can enroll if major is PT or major is RHAB.

Prerequisites: RHAB 762 [Min Grade: C]

RHAB 830 Dissertation Research 1.0-12.0 Credit

Through dissertation a student demonstrates mastery of the research process unique to his/her specialty and produces an original contribution of knowledge. The dissertation process provides the student with the foundation for a continued career as a scholar. May be repeated for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 12 times for 12 credits

Restrictions: Can enroll if major is RHAB.

RHAB I899 Independent Study 1.0-4.0 Credit

Independent study is offered to graduate students to afford them the opportunity to develop various components of their research or for content related to their interests. The course is structured with a contract and is designed to allow students access to avenues and resources (personnel, mentorship, institutional) to enrich their learning. May be repeated three times for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 16 credits

Restrictions: Can enroll if major is PT or major is RHAB.

Research

Courses

RSCH 503 Research Methods and Biostatistics 3.0 Credits

This course provides an exploration of research concepts, literature searches, research methods, designs, data collection, analysis, and interpretation techniques. This course is designed to provide graduate students with the skills necessary to evaluate the relationship between practice and published research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is NURS.

RSCH 504 Evaluation and Translation of Health Research 3.0 Credits

This course provides specific approaches to the evaluation of the quality and translation of relevant research. The student will learn to conduct efficient literature searches, evaluate the quality of that research through the appraisal of research design, methodology, and data analysis. Each student will develop and evaluate a plan for the translation of the research into their practice.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 503 [Min Grade: B]

RSCH 519 Introduction to Biostatistics 3.0 Credits

This is an introductory course which focuses on the fundamentals of biostatistics for health sciences graduate students. Excel-based and SPSS assignments will be used to supplement the content.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HI or major is NURS.

RSCH 523 Methods for Health Research 3.0 Credits

The course is designed to provide professional graduate students with the skills necessary to evaluate the relationship between practice and published research. The course content includes an overview of research concepts, ethics in research, literature searches and reviews, quantitative and qualitative research methods and designs, and data collection, analysis and interpretation techniques. An interdisciplinary team of faculty teaches the course using a problem solving approach. When feasible, concepts and problems are addressed by students in interdisciplinary teams through evaluation of published research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HI or major is NURS.

Prerequisites: RSCH 500 [Min Grade: C]

RSCH 701 Introduction to Biostatistics for Clinical Research 3.0 Credits

This is an introductory course which focuses on the fundamentals of biostatistics and clinical research for nursing graduate students. Excel-based and SPSS assignments will be used to supplement the content.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

RSCH 714 Qualitative Research Methods I 3.0 Credits

This course provides students foundation knowledge in inductive inquiry, including philosophical assumptions, interpretive frameworks, and common approaches to qualitative research. Students will learn basic skills in qualitative design, data collection, and data analysis.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

RSCH 733 Qualitative Research Methods II 3.0 Credits

This is an advanced seminar course in qualitative research methods. Through assigned readings, experiential exercises, and class discussions, students will engage in in-depth discussions of philosophical, theoretical, ethical and practical aspects of qualitative research. Using existing data sets as well as those collected during the course, students will demonstrate skills in identifying and aligning analytical strategies compatible with their research topics.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 714 [Min Grade: B]

RSCH 741 Foundations in Scholarly Inquiry & Writing 3.0 Credits

The focus of this course is on the development of competencies in scholarly writing in health sciences research. Strategies for approaching writing assignments in other courses and in preparation for dissertation research and manuscript writing are discussed and practiced.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

RSCH 758 Application of Evidence to Practice 3.0 Credits

The focus of this web-based course is on finding, appraising, communicating, and applying knowledge and research to the health professions. Participants will develop competencies in decision-making, knowledge translation and development and evaluation of health care services.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

RSCH 759 Foundations of Biostatistics 3.0 Credits

This is an introductory course which focuses on the fundamentals of biostatistics for nursing and health science doctoral students. Excel-based and SPSS assignments are used to supplement the content. May be repeated once for credit.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 1 times for 6 credits

RSCH 770 Foundations in Research Methods 3.0 Credits

This course is a survey of human subject quantitative and mixed research methodology. Doctoral students completing the course will develop skills to understand, evaluate, and apply research across the sciences and the health professions. This course emphasizes why a particular methodology is suited to a particular research agenda and introduces students to the importance of interdisciplinary team science.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

RSCH 811 Intermediate Biostatistics 3.0 Credits

This is an advanced level statistics course focusing on general linear models and selected multivariate statistical tests used in the rehabilitation and health sciences and biomedical engineering.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

RSCH 812 Interpretation of Data 3.0 Credits

This is an advanced topics course on issues such as power and effect size calculations and interpretation of results of statistical analysis including output of statistical software packages.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

RSCH 813 Measurement Theory in Healthcare 3.0 Credits

The emphasis of this course is on the assessment of the uses, advantages, validity, reliability, and sources of error in measurement tools commonly used in healthcare and on methodological and outcome research methods.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

RSCH 814 Intermediate Biostatistics II 3.0 Credits

This is an advanced level statistics course focusing on selected multivariate, measurement and correlational statistical tests used in rehabilitation, health and medical sciences.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 811 [Min Grade: B]

RSCH 815 Scientific Inquiry and Writing 3.0 Credits

This is an advanced seminar on scientific inquiry and writing. Emphasis is on conceptualization and writing of research proposals and research reports. Seminar topics have direct application for dissertation research. Students must have knowledge of important issues and familiarity with the research in their planned area of dissertation research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: RSCH 770 [Min Grade: B] and RSCH 759 [Min Grade: B]

RSCH 816 Intermediate Mixed Methods Research 3.0 Credits

This intermediate mixed methods research course prepares PhD students to design and implement mixed methods research studies. The course builds on knowledge gained in ARTS 715 Innovative and Emergent Research Methods I, NURS 863 Mixed-Methods Research, or other introductory level mixed methods research course. Through readings, class discussions, and implementation of a mixed methods research project, this course addresses complex design and data collection, analysis and integration challenges that are specific to mixed methods research.

College/Department: College of Nursing Health Professions

Repeat Status: Not repeatable for credit

Prerequisites: ARTS 715 [Min Grade: B] or NURS 863 [Min Grade: B]

RSCH 823 Research Practicum 1.0-6.0 Credit

Prepares the student for dissertation research through faculty-supervised research experiences. Focuses on one or more stages of the research process, such as developing a question, literature review, design and method, IRB, grant writing, subject recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of results.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 12 times for 72 credits

RSCH T880 Special Topics in Research 1.0-4.0 Credit

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor.

College/Department: College of Nursing Health Professions

Repeat Status: Can be repeated 3 times for 16 credits

Science, Technology and Society Courses

SCTS 501 Introduction to Science, Technology and Society 3.0 Credits

This seminar introduces students to the study of science, technology, and society. Students will investigate different approaches to the study of STS, including methods of problem selection and research questions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 502 Research Methods 3.0 Credits

This graduate seminar will provide an in-depth exploration of many of the research methods used by science and technology studies [STS] scholars. Participants will learn how to define a meaningful research question and to identify which methods will best answer that question. They will also learn how to design interview guides and conduct interviews, surveys, focus groups, fieldwork, content analysis, experiments and archival research. Strategies for analyzing data will also be addressed. A thorough understanding of research design and methodologies is crucial to the STS toolkit.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 503 Advanced Research Methods 3.0 Credits

This course focuses on a single social scientific research method. The course takes students through the inception of research ideas, research design, implementation and data-analysis in order to understand the limitations and possibilities of the research process according to methodology. The method focused on will vary according to instructor. Course may be repeated for credit.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 504 Science, Technology & Society Theories 3.0 Credits

This course is designed to provide participants with a rigorous introduction to important social theories used in the study of science, technology and society. In this course, we will read work by classical and contemporary theorists, exploring a variety of explanations and critiques of contemporary social life. Wrestling with these ideas will allow students to experience the diversity and richness of social theory and to explore how theory allows us to see topics in new, unique ways.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 550 Special Topics in STS Lab 3.0 Credits

In this course, students, faculty and community members team up in a hands-on, immersive social science laboratory setting to address contemporary social issues. Course covers on a rotating basis a variety of topics related to science, technology and society.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

SCTS 561 Mobilities Lab 3.0 Credits

This course will address the large-scale transitions toward “sustainable” and “smart” technologies in transportation systems with an emphasis on how new information and communication technologies are transforming or disrupting the transport sector. Unlike other courses, it will do so through an innovative problem-based, hands-on, interdisciplinary “lab” experience in which students collaborate with others to work on “real-world” problems and solutions.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 562 Identity and Intersectionality Lab 3.0 Credits

The practices of modern science, technology and medicine are deeply raced and gendered. This class moves beyond studies of singular social categories to explore intersections among individuals’ identities (race, class, gender, sexuality, [dis]ability, age, etc.) through critical reading of primary and secondary sources undertaken in a social-science “laboratory” setting.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 563 Philadelphia in a Changing Climate Lab 3.0 Credits

In this Science, Technology and Society (STS) lab course, participants will learn and use STS approaches and tools to conduct interdisciplinary research on climate change in Philadelphia. Philadelphia is a dynamic space for climate adaptation work in municipal, nonprofit, health, and educational sectors. Local initiatives are backed by robust climate science from leading experts, emerging data techniques, state-of-the-field intersectoral work, and community-based networks of climate science educators who engage Philadelphia’s public in multiple arenas. This course offers hands-on research experience in which participants will make use of a digital platform for research so that they can collaborate and share their research along the way.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 570 Environmental Policy 3.0 Credits

This interdisciplinary seminar investigates how interests and ideas interact in environmental policymaking. Students will explore how conceptual and political innovations play out across several environmental issues, including wildlife management, energy development, and the regulation of environmental risks.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 571 Science and Technology Policy 3.0 Credits

This graduate seminar examines the relationship between science and technology policy and democracy. Students will tackle basic questions about the degree to which science and technology policies have advanced or compromised core goals of a democratic society, including economic prosperity, public health, environmental justice, and political equality more generally.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 575 Digital Power and Resistance 3.0 Credits

This course examines how power and resistance operate in these times of ubiquitous connectivity. Digital infrastructure and technology do not merely connect but also transform the way we think about, experience, and inhabit the world we live in. This course will examine the historical forces, social processes and economic mechanisms that contribute to such a transformation. It will examine the values, rationalities, and norms inherent to the design of connected existence. It will scrutinize the effects of connectivity on social inclusion and exclusion, as well as on participation in public life. We will draw upon conceptual tools and empirical work from science and technology studies. A variety of teaching methods will be used, including lecturing, group discussions, and the projection of short films.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 580 Special Topics in Science, Technology and Society 3.0 Credits

This seminar will focus on graduate level topics in the area of science, technology and society selected by the professor. The exact content, readings, and grading will be determined by the professor on a course by course basis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 584 Historiography of Science 3.0 Credits

This course is an introduction to the advanced study of the history of science and will explore major themes, debates, and theoretical approaches in the discipline.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 600 Contemporary Feminist Theory 3.0 Credits

This course surveys contemporary feminist theory with an emphasis on "new materialist" approaches to sex and sexual difference. An umbrella term, new materialism refers to a variety of recent attempts to re-imagine nature, sex, body, and matter. During the "linguistic turn" of the 20th century, many postmodern feminists retreated from these materials and their associated sciences; enamored of texts but allergic to bodies, postmodern feminists tended to embrace radical constructivism and reject scientific methods and knowledges. Today, new materialists return to biology, nature, sex, body, and matter in order to move beyond the logics of essentialism and somatophobia. This course will survey the results of this return with a special emphasis on understandings of sex and sexual difference.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 610 Material Culture 3.0 Credits

This course explores the relationship between human beings and material objects. Drawing from literature in anthropology, archaeology, cultural studies, and science and technology studies, we will explore the cultural and social life of things: how they move across borders, accumulate and disperse, and lend our lives weight and meaning.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 612 Medical and Healthcare Ethics 3.0 Credits

This course will introduce students to a range of topics including the role of explanatory narratives and patient experience in healthcare, the ethics of the design and conduct of clinical trials, the evolution of diagnostic categories, and the problem of healthcare access both in the US and in a global context.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 614 Technology, Progress, and Determinism 3.0 Credits

In this course, students will examine multi-disciplinary approaches to the meaning of technology. Students will focus on two major themes in the history of technology: progress and technological determinism. Students will examine the historical context of contemporary technologies as well as criticism of technology and industrialization.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 615 The Biopolitics of Health 3.0 Credits

This course explores theories of biopolitics and its application to ethical debates in health and medicine. Biopolitics is a powerful lens for examining how modern societies shape and define life itself.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 620 Medicine, Technology and Science 3.0 Credits

This graduate seminar focuses on the social dimensions of medicine, health and illness. Students will explore how definitions and experiences of health and illness are shaped by technology use, cultural contexts, institutional practices, health care policies, and inequalities. Students will examine social trends in medical technology and science as well as how illness categories are created, negotiated, and resisted. Participants in this course will gain the ability to assess the changing role of science and technology in medicine as well as think critically about the social dimensions of the experience of health and illness.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 639 Politics of Life 3.0 Credits

In this course students 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, we 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 our discussion in class. This is a reading and discussion-intense course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 640 STS Perspectives on Risk and Disaster 3.0 Credits

This course introduces students to critical debates and methods of analysis in science, technology, and society (STS) through the consideration of the modern history of global risk and disaster.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 641 Risk and Disaster Policy 3.0 Credits

This course introduces students to critical debates and methods of analysis in science, technology, and society (STS) through the consideration of public policy formation around global risk and disaster concerns.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 643 Contemporary Stem Workforces: Organizations of Labor in Lab, Shop and Clinic 3.0 Credits

In response to a growing national concern with STEM workforce development, this class critically analyzes scientific and technical labor and management practices in factories, laboratories, and clinics, and the social implications of STEM training and education. US and global cases are explored through the study of primary documents, artifacts, and the spaces of STEM work.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 645 War and Technoscience 3.0 Credits

Students will examine technology in the context of warfare and military institutions. Students will study major questions in the history of military technology, including the Revolution in Military Affairs, arms races and technological determinism. Students will also examine the technological relationships between military institutions and the broader societies in which they are embedded.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 650 Global Subjects of Biocapital 3.0 Credits

Students explore issues related to capitalism based on biotechnologies, the life sciences, medicine, agriculture and other related industries globally. Students consider specific cases of human trafficking, the global trade in human organs, global agribusiness and biotech, global clinical trials and medical tourism. The experiences of workers, farmers, research participants, and donors will be a central focal point. This is an intensive reading, writing and discussion course.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 651 Transnational Science, Technology & Capitalism 3.0 Credits

This course will explore the importance of considering the “transnational” in understanding the historical role of science and technology in the making of capitalism and the modern world.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 660 Theoretical and Sociological Aspects of Measurement 3.0 Credits

This course familiarizes students with theoretical and sociological issues related to measurement by focusing on topics at the crossroads of the history and philosophy of science and technology such as the notion of theory, the nature and epistemology of experiments, and related themes of instrumentation, measurement and coordination.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 665 Advanced Topics in Philosophy of Science 3.0 Credits

This course studies advanced topics in the philosophy of science such as confirmation theory and theory choice, rationality and objectivity, scientific realism, laws of nature, scientific models and representation, explanation, reduction, computer simulations and climate change.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 697 Internship in Science, Technology and Society 0.5-3.0 Credits

Internships provide opportunities for students to clarify career interests; synthesize prior academic knowledge with direct experience; and sharpen critical thinking, analytical, and observational skills. Learning from and networking with professionals in the field is enhanced. This course requires formulation and investigation of a research problem and a written paper.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS 798 Master's Research 0.5-9.0 Credits

Independent research supervised by an STS faculty member toward completion of a Master's Project or Thesis.

College/Department: College of Arts and Sciences

Repeat Status: Not repeatable for credit

SCTS I599 Independent Study in SCTS 0.0-12.0 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

SCTS I699 Independent Study in SCTS 0.0-12.0 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

SCTS I799 Independent Study in SCTS 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 3 times for 12 credits

SCTS I899 Independent Study in SCTS 0.0-12.0 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

SCTS I999 Independent Study in SCTS 0.0-12.0 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

SCTS T580 Special Topics in SCTS 0.0-12.0 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

SCTS T680 Special Topics in Science Technology and Society 0.0-9.0 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

SCTS T780 Special Topics in Science Technology and Society 3.0 Credits

Course covers on a rotating basis a variety of topics related to science, technology and society, including (though not limited to) environmental issues, the social dimensions of health and medicine, and the ethical, cultural and political dimensions of new technologies and scientific practices. May be repeated for credit when topics vary. Course content will vary so syllabus will be designed based on topic related to science, technology and society.

College/Department: College of Arts and Sciences

Repeat Status: Can be repeated multiple times for credit

**SCTS T880 Special Topics in Science Technology and Society
0.0-9.0 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

**SCTS T980 Special Topics in Science Technology and Society
0.0-9.0 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

Special Education

Courses

EDEX 537 Special Education Law and 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 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

EDEX 538 Special Education Law and Processes 7-12 3.0 Credits

This course focuses on special education processes available for students with disabilities in grades 7-12. 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 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

EDEX 542 Fundamentals of Special Education 3.0 Credits

This course provides an overview of the essentials of special education for today's teachers. Specific emphasis is placed on the history of special education, purposes of formal and informal assessments and current research on inclusive classrooms. Additional focus will be placed on legal/ethical considerations in testing and the translation of data.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 543 Emotional and Behavioral Support of Individuals with Disabilities 3.0 Credits

The focus of this course is on both low and high-incidence emotional and behavioral problems encountered in general and special education environments. Specific emphasis will be on understanding of characteristics and interventions that work with the most challenging students. The course also emphasizes behavior reduction strategies that are consistent with a positive behavioral support approach. Research in the area of behavior disorders will also be introduced. Field experience hours are required for this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

EDEX 544 The Inclusive Classroom 3.0 Credits

The focus of this course is to teach teachers how to manage instruction for students with diverse learning and behavioral profiles in the inclusive classroom by examining normal and abnormal cognitive, physical, social, behavioral and language development of children. The course will address curricular, environmental and instructional adaptations in addressing students' needs. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: C]

EDEX 545 Teaching STEAM in an Inclusive Pre-K to 8 Environment 3.0 Credits

The focus of this course is the teaching of mathematics, science, technology and the arts to all students in an inclusive environment. STEAM is an educational approach that uses content for guiding students in inquiry, dialogue, creative and critical thinking. This course will teach instructional interventions and strategies for improving student understanding of complex concepts and fostering experiential and creative learning opportunities. Field experience hours are required for this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

EDEX 546 Literacy and Content Skill Development PreK-8 3.0 Credits

The focus of this course is literacy skill development in individuals at-risk for disabilities and with disabilities as well as causes and correlates of individual differences in reading ability. Research, theory, identification approaches and practical, research-supported instructional strategies will be provided for working with students. Field experience hours are required for this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: C] and EDEX 544 [Min Grade: C]

EDEX 549 Teaching Individuals with High Incident Disabilities 3.0 Credits

This course focuses on high-incidence disabilities, specifically learning disabilities and language disorders encountered in the general and special education environments. Additional emphasis is placed on an understanding of characteristics and interventions that support these students. Research-based instructional strategies and accommodations will also be discussed. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: C] and EDEX 544 [Min Grade: C]

EDEX 550 Teaching Individuals with Low Incident Disabilities 3.0 Credits

This course focuses on curriculum development approaches, instructional strategies and accommodations for students with low incident and moderate/severe disabilities, with emphasis on age-appropriate functional education in school and community based programs. Additional emphasis is placed on disabilities such as low vision and blindness, hearing impairment and deafness and severe health and physical disabilities. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: C] and EDEX 544 [Min Grade: C]

EDEX 552 Integrating Technology for Learning & Achievement 3.0 Credits

This course is designed to teach educators how to integrate technology into instruction to support achievement in general 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 542 [Min Grade: C] and EDEX 544 [Min Grade: C]

EDEX 555 Teaching Students with Autism Spectrum Disorder 3.0 Credits

The focus of this course is on students with an Autism Spectrum Disorder (ASD). Specific emphasis will be on the understanding of characteristics, instructional strategies, and interventions that work with the range of students with ASD. The course also emphasizes behavior reduction strategies that are consistent with a positive behavioral support approach for use with students with ASD. Research in the area of ASD will also be emphasized. Field experience hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 556 Characteristics & Methods: Autism 3.0 Credits

This course furthers the student's understanding of the diagnosis of Autism. Students will explore current issues and best practices in providing educational services that meet the unique characteristics and needs of students with Autism. Current theories in the field of Autism will be a focus of the course. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 551 [Min Grade: C] or (EDEX 630 [Min Grade: C] and EDEX 631 [Min Grade: C] and EDEX 632 [Min Grade: C] and EDEX 633 [Min Grade: C])

EDEX 558 Characteristics & Methods: High Functioning Autism 3.0 Credits

This course furthers the student's understanding of the diagnosis of High-Functioning Autism and how it is or is not different from Asperger's Syndrome. Students will explore current issues and best practices in providing educational services that meet the unique characteristics and needs of students with High-Functioning Autism and Asperger's Syndrome. Field experience hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 551 [Min Grade: C] or (EDEX 630 [Min Grade: B] and EDEX 631 [Min Grade: B] and EDEX 632 [Min Grade: B] and EDEX 633 [Min Grade: B])

EDEX 560 Communication & Language Interventions: Autism Spectrum Disorders 3.0 Credits

The focus of this course is on communication and language skills, deficits, needs, and interventions for students with Autism Spectrum Disorders (ASD). Students will gain an understanding of the development of communication and interventions for students with ASD who are non-verbal, limited verbal, or verbal. Social pragmatics will be covered. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 551 [Min Grade: C] or (EDEX 630 [Min Grade: C] and EDEX 631 [Min Grade: C] and EDEX 632 [Min Grade: C] and EDEX 633 [Min Grade: C])

EDEX 562 Behavior & Sensory Support: Autism Spectrum Disorders 3.0 Credits

The focus of this course is on specific behavioral and sensory issues of students with Autism Spectrum Disorders (ASD). Students will gain skills in research-based interventions for the behavioral issues and sensory needs of students with ASD. Close attention will be paid to prevention strategies that are effective for students with ASD. Field observation hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 551 [Min Grade: C] or (EDEX 630 [Min Grade: C] and EDEX 631 [Min Grade: C] and EDEX 632 [Min Grade: C] and EDEX 633 [Min Grade: C])

EDEX 565 Teaching Secondary Mathematics in an Inclusive Environment 3.0 Credits

The focus of this course is the teaching of mathematics to all students in an inclusive environment. Mathematics and problem-solving are critical life skills and students with disabilities often struggle to master these key skills. This course will teach instructional interventions and co-teaching strategies for improving student understanding of mathematics and fostering problem-solving learning. Field experience hours are required for this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

EDEX 566 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. This course requires a field experience.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

EDEX 570 Integrating Assistive Technology for Individuals with High Incident Disabilities 3.0 Credits

This course is designed to teach educators how to integrate assistive technology into instruction to support achievement in general and special education classes for students with disabilities in high incidence programs.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 552 [Min Grade: C]

EDEX 572 Integrating Assistive Technology for Individuals with Low Incident Disabilities 3.0 Credits

This course is designed to teach educators how to integrate assistive technology into instruction for students with low incidence disabilities, including communication impairments, intellectual disabilities, autism, and physical disabilities.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 552 [Min Grade: C]

EDEX 576 Special Education Practicum PreK-8 3.0 Credits

The focus of this course is on instructional strategies to meet the unique learning needs of 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 with also is emphasized. Students choose, evaluate, and construct instructional materials. This course has a stage III field experience and candidates will be observed by a university supervisor a minimum of three times during the term.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: C] and EDEX 544 [Min Grade: C]

EDEX 577 Special Education Practicum 7-12 3.0 Credits

This course is designed as a 3.0 credit course. The first 3 credits of this course will be made up of 30 hours of class time which will be delivered using either a traditional face to face or on-line format. Additionally, activities that include 30 hours of field experience will be required. The field experience for this course must be in an inclusive setting or a special education classroom. A total of three observations by a university supervisor are required for this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 542 [Min Grade: C] and EDEX 544 [Min Grade: C]

EDEX 580 Social Emotional Wellness and Evidence-Based Preventative School Practices 3.0 Credits

This course is designed to teach educators the critical role that social emotional wellness plays in the academic, social and behavioral development of children and youth. Research based programs and practices, including but not limited to, universal screening and school-wide PBIS and proactive educative approaches to encouraging coping and resiliency will be highlighted. Students will develop an understanding of universal screenings, assessments and instructional strategies related to resiliency and social emotional wellness. 15 hours of field placement are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 581 Understanding Social Emotional Disorders 3.0 Credits

This course is designed to provide educators with an understanding of social emotional wellness and common types of mental health issues that children and youth in school experience. An understanding of the role adverse childhood experiences and trauma has on the growth, development and learning of children and youth will be stressed. Additionally, the role of the teacher and the school in contributing information to the assessment process and their responsibility to provide support according to a student's classification and/or diagnosis will be explored. 15 hours of field placement are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 582 Evidence-Based School Interventions and Trauma Informed Education/Care 3.0 Credits

This course is designed to teach educators about research-based interventions that schools use to support individual students in the general education setting who are struggling with mental health issues or students who have experienced trauma or adverse childhood experiences. Students will gain an understanding of the critical features of mandated and best-practice programs (e.g., trauma-informed care, PBIS, crisis planning) that support students within school settings. Evidence-based tools that can be used on a daily basis will be presented as well as crisis de-escalation. This course will focus on the use of data to inform educational practices and interventions. 15 hours of field placement are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 583 Collaboration and Community Based Practices to Promote Social Emotion Wellness 3.0 Credits

This course will highlight the need to work collaboratively and authentically with parents, students and the community to address and promote social emotional wellness as well as intervening with students who are experiencing mental health issues at an intensive level. Tools and processes to communicate and advocate on behalf of students will be highlighted. Structured, intensive interventions, curriculum, and best practices will be addressed that have research support to address the needs of the individual students most in need of supports. This is a 3-credit course with 15 hours of field placement required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 600 Family, School and Community Engagement in Special Education 3.0 Credits

This course is designed to provide an understanding of how to effectively implement the spirit of the Individuals with Disabilities Education Act (IDEA) and Section 504, using a collaborative approach among families, educators, and service providers. Specifically, this course focuses on the structure and operation of efficacious collaborative teams, facilitating co-educator partnerships and integrating internal and external supports through positive family engagement.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 601 Special Education Advocacy 3.0 Credits

This course is designed to provide students with an opportunity to explore and master collaborative advocacy practices critical to the special education process.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 602 Special Education Dispute Resolution and Skills Training 3.0 Credits

This course is designed to provide a comprehensive understanding of special education dispute resolution opportunities and training in the communication skills necessary to successfully participate within each of those opportunities.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 610 Action Research for Special Education Teachers I 4.5 Credits

This course will introduce action research, a form of self-reflective systematic inquiry by practitioners on their own practice. The goals are the improvement of practice, a better understanding of practice, and an improvement in the situations where practices are carried out. Findings are examined: to support school/instructional change.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 606 [Min Grade: B] (Can be taken Concurrently) EDUC 602 [Min Grade: B] and EDUC 604 [Min Grade: B] and EDUC 608 [Min Grade: B] and LING 560 [Min Grade: B]

EDEX 611 Action Research for Special Education Teachers II 1.5 Credit

In this second course in action research sequence, students will come to class with data from the classroom. The class will focus on the issues pertaining to the ethics of data collection, data analysis and interpretation, and writing the action research study.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 610 [Min Grade: C]

EDEX 630 Fundamental Elements of Behavior Change 4.5 Credits

This course is designed to provide students with an understanding of behavioral processes as described and defined by the behavior analytic orientation of psychology. Students will learn the terminology associated with operant and classical conditioning including understanding the difference between a procedure and a process, reinforcement, extinction, punishment, association, conditioned stimulus and unconditioned stimulus.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 631 Measurement and Experimental Design 4.5 Credits

Graduate level intensive introduction to research methods in behavior analysis. The empirical methods of inquiry used in behavior analysis are substantially different than those used in traditional psychology. Course design provides knowledge of the concepts and issues related to single-subject design as used in applied behavior analysis research. Topics include the distinction between single subject and group research designs, issues related to reliability and validity, data collection and analysis techniques, treatment integrity and other ethical and professional issues.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 630 [Min Grade: B] (Can be taken Concurrently)

EDEX 632 Behavioral Assessment and Functional Analysis 4.5 Credits

Course provides knowledge and skills of behavioral assessment and methodologies for evaluating the effectiveness of interventions. First half of course explores range of assessment techniques in a variety of settings including direct observation/data collection methods, data analysis, functional assessment, stimulus preference and reinforcer assessments, and ethical and professional issues. Second half focuses on functional analysis and history of and variations to the methodology. Relationship between assessment techniques and development of least-restrictive but most effective behavioral intervention explored.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 630 [Min Grade: B]

EDEX 633 Behavioral Interventions 4.5 Credits

This course is designed to provide the student with advanced knowledge of behavioral interventions designed for both skill acquisition and reduction purposes. Considerations of ethical, social, and cultural variables affecting the selection and effectiveness of intervention strategies will also be highlighted. The course readings and writing assignment will provide students with the skills and opportunity to critically evaluate various intervention procedures and identify opportunities and methods to promote generalization and maintenance of treatment outcomes.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 630 [Min Grade: B]

EDEX 634 Consultation, Systems Change and Supervision 4.5 Credits

This course is designed to provide the knowledge and skills necessary to effectively consult with education, mental health and behavioral health staff working in community settings. The course is designed to familiarize students with theories and models of adult behavior change, and the procedures and processes used in an indirect-service delivery model. Students will be expected to apply the knowledge acquired through the consultative process and with a consultee.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 630 [Min Grade: B]

EDEX 635 Ethical Considerations and Professional Conduct 4.5 Credits

Addresses the American Psychological Association's Ethical Principles of Psychologists and Code of Conduct, and the Behavior Analysis Certification Board's Ethical Principles and Ethical Guidelines. These guidelines and principles are required readings for those engaging in psychological services and to sit for the National Certification in Behavior Analysis: 1. Ethical Principles of Psychologists and Code of Conduct and 2. Guidelines for Responsible Conduct for Behavior Analysts including Professional Disciplinary and Ethical Standards, Ethical Complaint Process, and summary of possible Disciplinary Actions.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 630 [Min Grade: B]

EDEX 636 Applications of Fundamental Elements of Behavior Analysis 4.5 Credits

This course provides intensive practice in application of behavioral concepts introduced earlier in the program course sequence. Students will be introduced to basic concepts and practices of Organizational Behavior Management (OBM) and Performance Management (PM) in order to create meaningful procedures and materials that can be used as future behavior analysts. Course topics and assignments also include creating plans for future supervisory relationships, pinpointing behavior definitions, developing measurement plans, creating a means for feedback, effective use of reinforcement, management strategies with the greatest effect, overall evaluation of management/supervision strategies, and ethical/professional issues.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 630 [Min Grade: B]

EDEX 640 An Analysis of Verbal Behavior 3.0 Credits

This course will introduce students to Skinner's (1957) analysis of verbal behavior, including the use and classification of verbal operants, private events, and language training. Students will learn strategies to assess language deficits and instructional tools to teach vocal and non-vocal verbal responses. Lastly, students will read seminal and current research related to verbal behavior and understand its application to teaching individuals with language delays.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 700 Practicum in Applied Behavior Analysis 1.0-4.0 Credit

This course is designed as a 1-4 credit practicum placement. Course instructors and the practicum coordinator will support the placement of Drexel ABA master's students in mental health, behavioral health, educational and rehabilitation services settings in the region. In coordination and cooperation with agency staff responsible for the on-site supervision, students will contribute to the discussion and implementation of evidence-based behavior analytic practices within multi-disciplinary team settings. Students will be expected to keep a daily journal recoding their activities, complete a reflection paper and.

College/Department: School of Education

Repeat Status: Can be repeated 6 times for 28 credits

Prerequisites: EDEX 630 [Min Grade: B]

EDEX 701 Field Experience in Applied Behavior Analysis 3.0 Credits

This course allows students to discuss and apply technical knowledge, professional skills, and ethical guidelines to their experiences in the field of applied behavior analysis. The course requires a field experience placement of 30 hours per week under the supervision of a Board Certified Behavior Analyst (BCBA) in a behavioral health and/or educational or community-based setting. In addition, students will participate in bi-weekly collaborate meetings with the instructor. The focus of the collaborate meetings is behavior analysis in practice with an emphasis on practical and professional issues that arise in the workplace as well as a review and discussion of the course assignments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 630 [Min Grade: B]

EDEX 702 Field Experience in Applied Behavior Analysis II 3.0 Credits

This is the second course in a 2-course series designed to allow students to discuss and apply technical knowledge, professional skills, and ethical guidelines to their experiences in the field of applied behavior analysis. The course requires a field experience placement of 30 hours per week under the supervision of a Board Certified Behavior Analyst (BCBA) in a behavioral health and/or educational or community-based setting. In addition, students will participate in bi-weekly collaborate meetings with the instructor. The focus of the collaborate meetings is behavior analysis in practice with an emphasis on practical and professional issues that arise in the workplace as well as a review and discussion of the course assignments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDEX 701 [Min Grade: B]

EDEX 710 School Law & Policy in Special Education 3.0 Credits

This course provides an overview of the legal rights of students and families in the field of special education. Students will explore the source, history, current status, and litigation affecting special education. This course relates equal protection and procedural due process to school practices and policies affecting students with disabilities.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDEX 712 Instructional & Curriculum Leadership in Special Education 3.0 Credits

This course explores the administration of teaching/learning as a system in an inclusive school. Students learn leadership practices for universal screening, integrating assistive technology, research/evidence based-practices, and assessment systems responsive to and linguistic diversity. Special focus on leadership issues related to the urban, suburban, and rural context.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 544 [Min Grade: C]

EDEX 714 Development, Supervision, & Support: Special Education Leadership 3.0 Credits

This course provides an overview of personnel functions: recruitment, selection, orientation, support, evaluation, and development; interpersonal skills; motivation/change theories; and the utilization of technology in the process. In addition, it will look at the unique issues of co-leading personnel with other administrators, collective bargaining, and the grievance process.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 544 [Min Grade: C]

EDEX 716 Organization & Administration of Special Education 3.0 Credits

This course is designed to provide an overview of the organizational practices for the administration of special education programs. Students will be introduced to special education revenue sources, compliance, child count, and budget monitoring as well as the special education plan.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 544 [Min Grade: C]

EDEX 721 Supervisor of Special Education Internship: Special Education Leadership 1.0 Credit

The student will be required to log at least 75 hours of mentored leadership activities during each quarter to total at least 300 hours and compile activities in a portfolio. This is the first of a four-term internship. The focus is on legal and policy issues in special education leadership.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 544 [Min Grade: C]

EDEX 722 Supervisor of Special Education Internship: Instructional Leadership 1.0 Credit

The student will be required to log at least 75 hours of mentored leadership activities during each quarter to total at least 300 hours and compile activities in a portfolio. This is the second of a four-term internship. The focus is on instructional leadership in special education leadership.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 544 [Min Grade: C]

EDEX 723 Supervisor of Special Education Internship: Collaboration & Personnel 1.0 Credit

The student will be required to log at least 75 hours of mentored leadership activities during each quarter to total at least 300 hours and compile activities in a portfolio. This is the third of a four-term internship. The focus is on collaboration and personnel issues: special education leadership.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 544 [Min Grade: C]

EDEX 724 Supervisor of Special Education Internship: Finance & Management 1.0 Credit

The student will be required to log at least 75 hours of mentored leadership activities during each quarter to total at least 300 hours and compile in a portfolio. This is the fourth of a four-term internship. The focus is on school resources in special education.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 544 [Min Grade: C]

EDEX I599 Independent Study in EDEX 0.0-12.0 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 I699 Independent Study in EDEX 0.0-12.0 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 I799 Independent Study in EDEX 0.0-12.0 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 I899 Independent Study in EDEX 0.0-12.0 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 I999 Independent Study in EDEX 0.0-12.0 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 T580 Special topics in EDEX 0.0-12.0 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 T680 Special topics in EDEX 0.0-12.0 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 T780 Special topics in EDEX 0.0-12.0 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 T880 Special topics in EDEX 0.0-12.0 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 T980 Special topics in EDEX 0.0-12.0 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 501 Coaching Theory and Principles 3.0 Credits

This course will include understanding the various roles of the coach and introduce students to the field of coaching. An emphasis is placed on creating an athletic environment to enhance the social-emotional growth of athletes.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 502 Ethical Considerations in Coaching 3.0 Credits

This course will include the various ethical situations coaches encounter within their organizations and with other coaches and athletes. Students will gain an understanding of the ethical considerations in sport and develop strategies to become ethical coaches and develop athletes who understand the importance of ethics in sport.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 503 Pedagogical Strategies in Coaching 3.0 Credits

This course focuses on coaching pedagogies and the ways in which humans learn movement skills through instructional practices. Skill acquisition is critical to sport success and coaches must understand the complexities of motor skill development and how athletes learn in varying situational contexts. This course provides a foundation in various pedagogical theories for coaches.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 504 Coaching Psychology 3.0 Credits

This course includes a comprehensive look at mental skills training in athletic populations and the ways in which coaches can use this type of training to improve athletic satisfaction and performance outcomes. The major areas of focus include each of the psychological skills athletes can use to increase satisfaction and improve performance and how coaches can create a mental skills training program for their athletes to best utilize these skills.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 614 Sport Performance & 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: School of Education

Repeat Status: Not repeatable for credit

SCL 615 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 and be compliant with NCAA, NAIA, and NJCAA rules when recruiting.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 616 Sport 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.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 617 Prevention & 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.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 618 NCAA Compliance 3.0 Credits

This course is designed to provide students with the opportunity to learn the basic regulatory and due process rules that govern NCAA competition. Students will be introduced to the basic elements of NCAA regulations, rules interpretations, enforcement decisions and sanctions.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 619 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: School of Education

Repeat Status: Not repeatable for credit

SCL 620 Biomechanics in Rowing 1.5 Credit

This course is designed to provide students with an understanding of the fundamental concepts of biomechanics in the sport of rowing. The principles of biomechanics and their relationship to boat speed will be reviewed in detail.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 621 Physiology and Training Methods for Rowing 3.0 Credits

This course is designed to provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the sport of rowing. The significance of the effects of physical conditioning and training on the rower will be examined and students will have the opportunity for practical application through the development of their own comprehensive rowing-focused physiological training program.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 622 Emerging Technologies and Trends in Rowing 1.5 Credit

This course focuses on the state of rowing through emerging technologies and new trends. Contemporary developments in rowing will be explored in order to aid students with the information necessary to best approach a changing landscape for sustained success and prepare athletes for successful competition.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 623 Equipment Management and Rigging for High Performance 1.5 Credit

This course will provide students with an opportunity to learn about selecting, purchasing, and managing equipment in rowing. Special focus will be placed on how to properly rig racing shells based on specific athlete needs.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 624 Rowing Safety and Risk Management 1.5 Credit

This course is designed to provide students with an understanding of the safety and risk management principles and procedures critical to providing a safe environment for their athletes. Rowing-specific safety basics and best practices for risk management and emergency protocol will be examined.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 625 Racing: Rules, Preparation, and Strategy 1.5 Credit

This course is designed to provide students with the tools needed to manage athletes and environments associated with competition in rowing. Managing coxswains, the rules of racing, strategic race plans, athlete selection, and communication with other coaches and officials will all be covered.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 626 Rowing Technique 1.5 Credit

This course will cover principles associated with rowing technique. Students will learn to evaluate technical aspects of the stroke and work with athletes to make improvements for increased speed and performance.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 630 History of Lacrosse 1.5 Credit

This course is designed to provide students with an understanding of the origins of lacrosse and the significance of how "America's first sport" developed over time into the youth, interscholastic, professional and international modern sport of lacrosse played today. The history and evolution of the sport of lacrosse will be explored and students will have the opportunity to gain in-depth knowledge about how lacrosse has become one of the world's fastest growing sports.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 631 Physiology and Training Methods in Lacrosse 3.0 Credits

This course is designed to provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the sport of lacrosse. The significance of the effects of physical conditioning and training on the lacrosse player will be examined and students will have the opportunity for practical application through the development of their own comprehensive lacrosse-focused physiological training program.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 632 Emerging Technologies and Trends in Lacrosse 1.5 Credit

This course focuses on the state of the game of lacrosse through emerging technologies and new trends. Contemporary developments in lacrosse will be explored in order to aid students with the information necessary to best approach a changing landscape for sustained success and prepare players for the modern game.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 633 Equipment and Field Management in Lacrosse 1.5 Credit

This course provides a foundation for the equipment and field management needs fundamental to the sport of lacrosse. Modern-day equipment and field standards will be explored and current advancements in equipment for enhanced performance will be examined.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 634 Lacrosse Safety and Risk Management 1.5 Credit

This course is designed to provide students with an understanding of the safety and risk management principles and procedures critical to providing the safest playing environment for players. Lacrosse-specific safety basics and best practices for risk management and emergency protocol will be examined.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 635 The Women's Lacrosse Game: Rules, Preparation, and Strategy 3.0 Credits

This course delivers a strategic approach to game preparation and management with a focus on skill development specific to the women's lacrosse game at a variety of age, skill and competitive levels. Effective methods for teaching both technical and tactical skills are investigated and students will acquire the tools necessary to manage athletes and environments associated with competition in women's lacrosse.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 636 The Men's Lacrosse Game: Rules, Preparation, and Strategy 3.0 Credits

This course delivers a strategic approach to game preparation and management with a focus on skill development specific to the men's lacrosse game at a variety of age, skill and competitive levels. Effective methods for teaching both technical and tactical skills are investigated and students will acquire the tools necessary to manage athletes and environments associated with competition in men's lacrosse.

College/Department: School of Education

Repeat Status: Not repeatable for credit

SCL 695 Coaching Practicum I 0.5 Credits

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: School of Education

Repeat Status: Not repeatable for credit

SCL 696 Coaching Practicum II 0.5 Credits

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: School of Education

Repeat Status: Not repeatable for credit

SCL 697 Coaching Practicum III 2.0 Credits

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: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: SCL 696 [Min Grade: C]

SCL I599 Independent Study in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

SCL I699 Independent Study in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

SCL I799 Independent Study in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

SCL I899 Independent Study in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

SCL I999 Independent Study in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

SCL T580 Special Topics in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

SCL T680 Special Topics in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

SCL T780 Special Topics in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

SCL T880 Special Topics in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

SCL T980 Special Topics in SCL 0.0-12.0 Credits

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

Sport Management

Courses

SMT 601 Sports Industry Management 3.0 Credits

This course provides detailed overview of the sports industry and its management and business practices. Students will study organizational theory, human resources, decision making, policy development, planning, governance and the management functions necessary to provide them with the appropriate skills and knowledge for the effective management of sport organizations.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 602 Sport Law 3.0 Credits

This course will examine the diverse and complex nature of sport law by providing an overview of the legal issues that are of particular concern to sport managers. In addition, the course will expose students to the legal standards, principles and practices that can be applied to the various management challenges that exist within the sports world. Students will be introduced to sport law through lectures, readings and assignments.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 603 Sports Marketing 3.0 Credits

The course provides a study of marketing, sponsorship and public relations concepts with an application to the sports industry. Students will cover topics including licensing, merchandising, sponsorships, ticketing, consumer behavior, market segmentation and pricing. The role of research in marketing and practices of mainstream marketing will also be examined.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 601 [Min Grade: C]

SMT 604 Sport Media & Technology 3.0 Credits

An analysis of the sport media's changing landscape and the role it plays in political, social and technological climates. Emphasis on professional and intercollegiate sports and the implications of simultaneous production and consumption. Course will examine new information technologies, commercial pressures in sport media and global sport media expansion.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 605 Sports Economics 3.0 Credits

Students explore general economic principles as they apply to the sports industry. Economic analysis is utilized to study sports markets: demand, supply and pricing; league organization, monopoly power and market failure; labor relations, labor market problems and remedies, public finance of sports.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 606 Social Issues in Sport 3.0 Credits

This course provides a detailed analysis of the sociology of sport in our society. Sports are connected to the many areas of our life including the family, the economy, the media, politics, education, and religion. This course will provide an opportunity for students to explore each of these components in an in-depth manner.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 601 [Min Grade: C]

SMT 607 Sport Budgets & Fiscal Practices 3.0 Credits

Basic theory in accounting and finance applied to managerial control of sport organizations. Includes forms of ownership, taxation, financial analysis, capital budgeting, and economic impact studies.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 608 Sport Media & Public Relations 3.0 Credits

Course is an overview of the discipline of sports information/public relations and its role in the field of sport management. Course will cover a wide variety of skill sets and roles necessary to succeed in this continually evolving discipline. New media issues and procedures will be covered.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 609 Sports Ticket Sales & Strategies 3.0 Credits

Course will examine changing environment of ticket and operation sales in the sport industry. Course will expose students to the standards, practices and strategies that can be applied to the multitude of areas that ticketing touches within the sports industry.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 610 Seminar on Sports Research 1.0 Credit

This course will consist of an integration of real world issues with the rigor of academic research. It will involve a series of lectures by leaders in the field of sports management, which will then stimulate further research and discussion by the students in a seminar setting.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Corequisite: SMT 601

SMT 611 Corporate Sponsorship Sales & Strategies in Sport 3.0 Credits

Course will examine marketing strategy and techniques used by industry professionals to increase revenues for sports properties. Students will gain an understanding of sponsorship sales terminology, cold calling and prospecting techniques, marketing proposal presentation guidelines and relationship building strategies to increase overall sales.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 601 [Min Grade: C]

SMT 612 Development & Fundraising Strategies in Sport 3.0 Credits

Course will examine skills, strategies and techniques needed for successful annual and major gift solicitation in the field of athletic development. Topics include understanding annual fund and major gift fundraising; examining booster club organization structure, benefits; priority seating programs and importance of donor research in the fundraising process.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 615 Introduction to the College Sport Industry 3.0 Credits

College sport as a multibillion dollar industry rests at the intersection of higher education, corporate America, and global commerce. This course offers an in-depth view of the college sport industry from historical, educational, financial, legal, political, and social perspectives.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 618 NCAA Compliance 3.0 Credits

This course is designed to provide students with the opportunity to learn the basic regulatory and due process rules that govern NCAA competition. Students will be introduced to the basic elements of NCAA regulations, rules interpretations, enforcement decisions and sanctions.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 621 Leadership in Sport Management 3.0 Credits

Students will discuss the process of leadership and leadership development in sports organizations. Leadership styles, qualities, philosophies and the ability to adapt to different situations are addressed. Information on recruiting, training, supervising and evaluating personnel are examined as are current sporting issues and their impact on sport leadership.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 622 Labor Relations & Collective Bargaining in Sport 3.0 Credits

Course examines various aspects of professional sports including the unique office of the league commissioner, the antitrust and labor law dimensions of the player-labor market and the peculiar institution of the player agent in a unionized and collective bargained industry.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 602 [Min Grade: C]

SMT 623 Sports Facility Management 3.0 Credits

The course will encompass the range of sport facilities including arenas, stadiums, athletic tracks, swimming pools and golf courses. Students will learn the skills required to manage these facilities and the main components of facility management, including budgeting, scheduling, organizing and maintenance.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 601 [Min Grade: C] and SMT 604 [Min Grade: C]

SMT 625 Sports Promotion and Sales 3.0 Credits

Promotions and sales within the context of sport management. This provides a comprehensive study of promotions and marketing practices in the industry. Analysis of sport sponsorship, retention strategies and evaluation methods, plus fundraising and promotion of sports services and products to the sports consumer.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 603 [Min Grade: C]

SMT 626 Globalization of Sport 3.0 Credits

An analysis of the impact of globalization on the Sport Industry. Students will be introduced to managerial, human resource and cultural differences that impinge upon the sports industry. An oversight of the different governance structures employed throughout the industry overseas will also be examined.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 627 Sports Tournaments & Events 3.0 Credits

The organizing, planning and running of sporting events is crucial to any sport manager at any level. Issues of staffing, volunteers, location, security, medical and risk management considerations are just a number of areas that this course will cover. Students will be expected to organize and run their own sporting event.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 628 Coaching and Management 3.0 Credits

Through this course, students will gain a detailed understanding of coaching at the school, college and professional level. The management and organizational structures, coaching theories, periodization of training and issues pertinent to coaching including drugs, overtraining, ethical considerations and eating disorders will be addressed.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 629 Managing Coaches & Teams 3.0 Credits

Course will include setting performance goals in coaching, the various roles of the coach, ethical conduct in coaching, coach-athlete compatibility, burnout, personality of the coach and coaching youth sports. Emphasis will be placed on how administrators can best manage coaches for continued athletic program success.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 630 Sports Industry Practicum 3.0 Credits

The practicum is designed to develop greater breadth and depth of student's understanding and experience within the industry. The practical application of the knowledge and skill acquired in classes will help students to extend their expertise by working in a sport management related organization.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 633 Sport Tourism Strategies 3.0 Credits

Course will examine sport tourism as a marketing strategy for cities, sport tourist consumer behaviors, the interrelationships of businesses involved in sport tourism and the economic, environmental and social-cultural impact of sport tourism. Other course topics include event bidding, facility and financing.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 601 [Min Grade: C] or HRM 501 [Min Grade: C]

SMT 635 Sport Facilities & Event Management 3.0 Credits

Course is designed to provide learning experience in managing sports facility operations, planning new sports facilities and renovating and maintaining existing facilities. Course also provides student exposure to comprehensive event planning and management for sport and special events.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 640 Consumer Behavior in Sport 3.0 Credits

Course will examine consumer behavior in the sport industry and its impact on fan retention and revenues. Students will examine customer services philosophies and techniques used by successful companies and sport organizations to improve the overall experience of consumers. Students will conduct research to measure fan and sponsor experience.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 601 [Min Grade: C]

SMT 642 Administration of Interscholastic Sports 3.0 Credits

Interscholastic sports represent the largest and most complex sector of the sport enterprise in the United States. This course offers an in-depth exploration of the challenges that administrators confront in running interscholastic athletic programs.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 645 Gridiron Glory 3.0 Credits

For over 100 years, higher education and college football have shared an interesting and tenuous relationship. College Football brings a dynamic to a college campus unlike many other features. The United States is the only country in the world to link sports and academics so intricately. But that nexus creates tensions and challenges, for students on the team, for the athletic department and for the College Administration. So much of higher education's sense of place and self has revolved around football on campus. Those who wish to work in Higher Education will be exposed to the dynamics that football brings to a college campus. This course will cover the finances, oversight, enrollment, and campus climate and will include discussions on NCAA Divisions I, II and III, as well as community colleges.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 648 Gender Equity in High School & College Sports 3.0 Credits

This course is designed to provide students with the opportunity to about the impact Title IX and other gender equity laws have had in shaping high school and college athletic programs. Consideration is given to the challenges associated with achieving equity in a system that is sex-segregated.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 650 Sports Contracts 3.0 Credits

Course is designed to provide students with the opportunity to learn the legal issues and strategies surrounding a wide variety of contract issues in sports. Students will be introduced to the core elements of contract law and see it applied by the court system in the context of the sports industry. An understanding of the importance of contracts in sports will be gained through a review of legal cases, actual industry contracts, speakers, and other standard classroom material.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 655 March Madness: The Economics, History, & Social Impact of the NCAA Basketball Tournaments 3.0 Credits

This course will examine the business of one of sport's most lucrative and popular properties. Consideration will be given to the economics of this sport mega-event, its history, and its social impact.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

SMT 698 Research Design & Techniques in Sport 3.0 Credits

An examination of research designs, methodology and techniques used in developing the research project or thesis. Historical, empirical and experimental methods will be discussed plus skills related to writing reviews and critiques of literature. Students will learn to design an original study and begin to develop the outline for their final Masters work.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 604 [Min Grade: C]

SMT 699 Project/Research Thesis 3.0 Credits

The course requires the preparation of a substantial research and writing project/research thesis planned and completed under the guidance of a graduate faculty advisor. It is the culminating work of the Masters program and hence is expected to include research design, organization, analysis, evaluation, literature review, plus the student's conclusions pertaining to the research findings.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: SMT 698 [Min Grade: C]

SMT I599 Independent Study in SMT 0.0-12.0 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

SMT I699 Independent Study in SMT 0.0-12.0 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: Can enroll if major is SMT.

SMT I799 Independent Study in SMT 0.0-12.0 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

SMT I899 Independent Study in SMT 0.0-12.0 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

SMT I999 Independent Study in SMT 0.0-12.0 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

SMT T580 Special topics in SMT 0.0-12.0 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

SMT T680 Special topics in SMT 0.0-12.0 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

SMT T780 Special topics in SMT 0.0-12.0 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

SMT T880 Special topics in SMT 0.0-12.0 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

SMT T980 Special topics in SMT 0.0-12.0 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

Systems Engineering

Courses

SYSE 510 Systems Engineering Process 3.0 Credits

This course covers the complete system engineering process, touching on the many facets of engineering systems from needs and requirements generation to production and construction to operation. Engineering involves application of science to perform a myriad of technical processes including development, manufacturing, and maintenance, sustainment and operation of systems. Engineering education is concerned with cognitive, hardware, and software tools to attack technical problems. Engineers are normally introduced to component level problems before proceeding to more complex ones. Systems engineering covers a higher level system concept, applying well tested engineering practices to address processes critical to most large engineering efforts, and optimizing them for effectiveness and financial success.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

SYSE 511 Systems Engineering Tools 3.0 Credits

This course focuses on teaching a variety of tools and applications. Stochastic modeling and simulation tools used for systems engineering analysis are covered. Course provide a comprehensive understanding of use of tools as well as modeling and simulation concepts to perform simulation analysis of physical and conceptual systems. Systems engineering has great potential for solving problems related to physical, conceptual and esoteric systems. The power of systems engineering relies on the ability to conduct elaborate analysis in an attempt to employ the most optimal integrated system. This approach requires understanding of tools for conducting requirements analysis, analysis of alternatives and systems architectural design. Students will learn how to apply "state of the art" tool.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 571 [Min Grade: C] and EGMT 572 [Min Grade: C] and EGMT 573 [Min Grade: C]

SYSE 520 Global Sustainment and Integrated Logistics 3.0 Credits

Logistics activities are critical integrating functions in any type of business. Annual expenditures on logistics in the United States alone are equivalent to approximately 10% of US Gross domestic product. Logistics expenditures represent an even larger percentage of the world economy. Thus, achieving state-of-the-art excellence in logistics functions, and attaining the inherent cost reductions associated with outstanding logistics efforts is very important in terms of competitiveness and profitability. This course discusses traditional methods and contemporary topics associated with logistics and global sustainment. It also introduces methodologies and tools for achieving affordable integrated logistics.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

SYSE 521 Integrated Risk Management 3.0 Credits

Will expose students to various methodologies for the evaluation of strategic alternatives to allow analysis and organizational visibility of the underlying assessment of risk, communication and organizational debate of the decision choices among plausible strategic alternatives. Assessment of uncertainty, identification of risk variables, formulation of mitigation plans and real options will be covered. The role of financial analytics to provide consistent criteria and illustrate the impact of alternative decisions and uncertain market scenarios will be discussed. Provide understanding of most sensitive factors that influence risk for each strategy or project allows an organization to select a risky strategy that meets the risk tolerance of the enterprise and leverages value of future gains.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 531 [Min Grade: C]

SYSE 522 Engineering Supply Chain Systems 3.0 Credits

Covers the concepts and methods used for designing, modeling, and managing the supply chain as a strategy that organizations use to be competitive in the global marketplace. The course has broad applications for different types of industries such as manufacturing, service, and retailing. Includes both practical and analytical approaches used for managing supply chain. Students in this course will apply industrial and systems engineering tools to design, analyze, and optimize the supply chain such as, mathematical optimization, inventory management, transportation and network location, facilities planning and material handling. More advanced topics are interrelated such as: value of information sharing in the supply chain, customer value, strategic alliances, international issues and decision support systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 572 [Min Grade: C]

SYSE 523 Systems Reliability Engineering 3.0 Credits

The course focuses in modeling and analysis of systems reliability using probability models. The primary reason for modeling reliability systems is to improve the reliability and availability of a product or a system. The course covers three major aspects of reliability: reliability models, analysis of failure and repair distributions, and finally preventive maintenance and warranty models. Upon completion of the course, students will be able to apply reliability models for a product or system during its life-cycle: design, production, and warranty.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 572 [Min Grade: C] and EGMT 573 [Min Grade: C]

SYSE 524 Systems Reliability, Availability & Maintainability Analysis 3.0 Credits

Introduction to systems reliability, maintainability and availability analysis (RM&A) for systems. The course has an application to all phases of the systems engineering process including requirements definition through systems design and development. Introduces design for sustainability of systems during the life cycle of operation. Discusses RM&A and modeling, trade off analysis and cost-effective maintenance concepts for optimization of reliability and availability of a system.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 571 [Min Grade: C]

SYSE 525 Statistical Modeling & Experimental Design 3.0 Credits

This course focuses on statistical modeling to systems engineering problems; relationships between experimental measurements using regression and correlation theory and analysis of variance models; design of experiments with one and more than one levels; emphasis on inherent variability of systems and processes; response surface methodology, control chart techniques and statistical process control.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 572 [Min Grade: C]

SYSE 530 Systems Engineering Design 3.0 Credits

Course introduces the student to the design of complex systems. Specific topics include needs analysis, conceptual physical and implementation architectures, technology quality and fundamentals of great system designs, selecting system designs, system and design requirements, system element designs, system design verification and validation, and sustainability design.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (EGMT 688 [Min Grade: C] or SYSE 688 [Min Grade: C])

SYSE 531 Systems Architecture Development 3.0 Credits

System architecture development is the most important activity in a complex system solution: pick the wrong architecture and the final system may not work, be overcome by displacement technology, or never be implemented because of cost, complexity, or other issues. Course Topics include architecture frameworks, architecture drivers, selection criteria, depiction, generic alternatives, trade studies, architecture selection, open closed architectures, vendor independence and technology choices, and architecture information products.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: (EGMT 688 [Min Grade: C] or SYSE 688 [Min Grade: C])

SYSE 532 Software Systems Engineering 3.0 Credits

Many of our systems today are extremely software intensive. This course introduces software intensive systems engineering. This course is for software and non-software engineers. Topics from the systems perspective include capability maturity models (CMM, CMMI, SE CMM), systems and software interaction, deriving allocating software requirements, traceability, certification needs, mission critical software, software safety, software fault tolerance, human software interface, system and software architectures, reuse and breakthrough software, software interface management, software maintainability, software testability, technology considerations, software change control and configuration management, software quality, software integration verification and validation, software planning and management.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 688 [Min Grade: C] or SYSE 688 [Min Grade: C]

SYSE 533 Systems Integration and Test 3.0 Credits

The systems engineering process applies well tested engineering practices to address the processes which are critical to most large engineering efforts, and optimizing them for effectiveness and financial success. The process covers the complete engineering system evolution from needs and requirements generation to production and construction and operation. Throughout the systems engineering process, various disciplines of engineering as well as various forms of information and technology need to be integrated, and the effectiveness of each step of the process ascertained. This course will address the processes, methods, and tools to integrate, test and evaluate the myriad of engineering information, technology, and products that are encountered throughout the systems engineering process.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

SYSE 540 Systems Engineering for Peacebuilding 3.0 Credits

Peace Engineering is a relatively new topic. This course will apply systems thinking and systems tools in the context of peacebuilding. The course is intended to give an introduction to systems engineering and system dynamics and utilize them for this new application. Topics include system architecting, systems mapping, causal loop diagrams, stock and flow diagrams, data sourcing, decision making and game theory. Specific examples of conflict will be presented and various theories of change will be tested with the system models. This course will utilize some recent literature on systems engineering use in peacebuilding.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

SYSE 598 Capstone in Systems Engineering 3.0 Credits

The capstone course is completed independently or within a group class setting over a full quarter term. The capstone course is the culmination of the student's academic and professional experience, and it will be completed under the direction of a Systems Engineering faculty member. Over the course of the term, students will apply the knowledge gained during their tenure in the program to create a Capstone Project. This project will integrate the skills necessary for analyzing issues, thinking creatively, working collaboratively, and presenting impactful ideas. The Capstone Project should be one of the most comprehensive and applied works a student completes in his or her academic career.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 571 [Min Grade: C] and EGMT 572 [Min Grade: C] and EGMT 573 [Min Grade: C] and (EGMT 685 [Min Grade: C] or SYSE 685 [Min Grade: C]) and EGMT 531 [Min Grade: C] and (EGMT 688 [Min Grade: C] or SYSE 688 [Min Grade: C]) and (EGMT 690 [Min Grade: C] or SYSE 690 [Min Grade: C]) and SYSE 510 [Min Grade: C] and SYSE 520 [Min Grade: C] and SYSE 521 [Min Grade: C] and SYSE 533 [Min Grade: C]

SYSE 605 Naval Systems Engineering 3.0 Credits

Systems engineering is an elaborate guide for the development of complex systems, including new technology. It is an interdisciplinary approach that encompasses the entire technical effort, through a fundamental process for the purpose of providing solutions that satisfy customer needs. This course serves as an introduction to systems engineering with emphasis on application to Naval Systems. It teaches students the art of systems engineering as established by the Department of Defense (DoD) Systems Engineering Fundamentals Guide throughout the system life cycle. Upon completion of the course, students will understand the DoD approach to systems engineering and apply it to Naval Operations.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

SYSE 610 Naval Engineering for the 21st Century 3.0 Credits

This course serves as an introduction to the theory and design of engineering machinery and equipment aboard modern ships. Primary emphasis is placed on helping the student acquire an overall view of the development, design, construction and operation of ships and weapon systems and an understanding of the mechanical systems encountered onboard navy ships. An emphasis will be placed on the propulsion and auxiliary systems for conventional and nuclear steam propulsion, gas turbine power plants and internal combustion engines.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

SYSE 611 Advanced Naval Engineering 3.0 Credits

This course provides students with the knowledge and skills needed to plan and execute operations on naval vessels. Topics include the design, operating principles, construction, safety, testing and maintenance needed to ensure safe and efficient operation of the system.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: SYSE 610 [Min Grade: C]

SYSE 640 Model Based Systems Engineering 3.0 Credits

System complexity is continually increasing, demanding more rigorous approaches to modeling. Document based approaches become cumbersome with large scale systems and a model based approach helps to better manage complexity, improve quality and lower cycle time. This course addresses modeling of the system description as well as its functions using OMG SysML. This formal modeling language supports all aspects of the systems engineering process from specification through verification and is applicable across a broad range of industries.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 571 [Min Grade: C] or SYSE 510 [Min Grade: C] or SYSE 685 [Min Grade: C]

SYSE 685 Systems Engineering Management 3.0 Credits

Course teaches the art of systems engineering. Students will learn SE processes and skills to integrate user needs, manage requirements, conduct technological evaluation and build elaborate system architecture, to assess risk, establish financial and schedule constraints. Course provides pedagogically sound approach to the subject matter. Any graduate students involved with new product development, technology development and/or integration will find this course useful.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

SYSE 688 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

SYSE 690 Modeling and Simulation 3.0 Credits

This course is a crossover course for Engineering Management majors and Systems Engineering majors. The course focuses on a combination of deterministic and stochastic quantitative techniques and tools used for systems analysis, engineering analysis, and managerial analysis. Associated topics will be Probability Theory to support Decision Analysis, Pareto Trade Off Models, Analytical Hierarchy Process, Inventory Management & Control Operations, Waiting Line Models and Simulation & Modeling techniques. Emphasis will be placed on spreadsheet modeling and Monte Carlo simulation. The primary focus will be on utilizing excel based models and tools to support quantitative systems analysis.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: EGMT 572 [Min Grade: C] and EGMT 573 [Min Grade: C]

SYSE 898 Master's Thesis in Systems Engineering 1.0-9.0 Credit

The thesis option is intended to familiarize a student with the techniques for guiding an entire project and to develop a student's creativity in solving real problems. An academic research thesis generally involves more than an industrial project in that the goal is not merely to solve the specific problem but also to understand its relevance to previous work and to the discipline in which one is working. It is expected that the thesis work will represent an advance in understanding of the state-of-the-art and that it will be suitable for publication in an engineering journal or for inclusion as part of a more comprehensive publication. The thesis generally takes a considerable amount of time and effort, with successful completion of the entire process taking more than a year's time. The study and investig.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

SYSE 1599 Independent Study in SYSE 0.0-12.0 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

SYSE 1699 Independent Study in SYSE 3.0 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

SYSE 1799 Independent Study in SYSE 0.0-12.0 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

SYSE 1899 Independent Study in SYSE 0.0-12.0 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

SYSE 1999 Independent Study in SYSE 0.0-12.0 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

SYSE T580 Special Topics in SYSE 0.0-12.0 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

SYSE T680 Special Topics in SYSE 0.0-12.0 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

SYSE T780 Special Topics in SYSE 0.0-12.0 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

SYSE T880 Special Topics in SYSE 0.0-12.0 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

SYSE T980 Special Topics in SYSE 0.0-12.0 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

Taxation

Courses

TAX 611 Tax Research 3.0 Credits

Uses tax research cases to demonstrate the use and interrelationship of statutory, legislative, and judicial authority. Requires students to have access to a personal computer for assignments.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 341 [Min Grade: C] or TAX 342 [Min Grade: C] or TAX 620 [Min Grade: C] or TAX 630 [Min Grade: C]

TAX 615 Tax Practice and Procedure 3.0 Credits

Covers the history and organization of the Internal Revenue Service, audit and conference procedures, administrative and judicial procedures governing tax controversies, and rights and obligations of the taxpayer.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

TAX 620 Individual Taxation 3.0 Credits

Covers fundamentals of federal income taxation with respect to individuals, addressing items of income inclusion and exclusion and statutory deductions in arriving at tax liability. Students who have taken individual taxation at the undergraduate level should not enroll in this course.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

TAX 630 Corporate Taxation 3.0 Credits

Examines the impact of federal income taxes on corporate income and corporate distributions received by shareholders.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 620 [Min Grade: C]

TAX 631 Advanced Corporate Taxation 3.0 Credits

Continuation of TAX 630 with emphasis on consolidated tax returns.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 630 [Min Grade: C]

TAX 640 Partnership Taxation 3.0 Credits

Examines statutory and administrative authority governing the federal taxation of partnership.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 620 [Min Grade: C] or TAX 341 [Min Grade: C]

TAX 645 Joint Venture Taxation 3.0 Credits

Examines tax planning for the structure, operations, and tax impact of joint ventures, partnerships, LLC's and S Corporations. Extends the study of the taxation of flow through entities in Business Entity Taxation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 342 [Min Grade: C] or TAX 630 [Min Grade: C]

TAX 650 Estate and Gift Taxation 3.0 Credits

Covers taxation of lifetime gifts and decedent's estate, including valuation of property subject to estate and gift taxes.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 620 [Min Grade: C] or TAX 341 [Min Grade: C]

TAX 651 Estate Planning 3.0 Credits

Covers planning aspects of personal investments and business transactions, with emphasis on the potential impact of federal taxes on the transfer of wealth.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 650 [Min Grade: C]

TAX 652 Fiduciary Income Taxation 3.0 Credits

Provides an in-depth analysis of Subchapter J of the Internal Revenue Code, with case studies involving both compliance and planning.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 630 [Min Grade: C] or TAX 342 [Min Grade: C]

TAX 660 Tax Basis for Decision Making 3.0 Credits

An analysis of the legal, economic, and social effects of the federal income tax structure on taxpayers. Examines how taxes impact decision making for business strategy, business operations, and personal investment and planning purposes.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

TAX 675 Taxation of Multi-national Corporations 3.0 Credits

Examines provisions of the Internal Revenue Code relating to the taxation of income earned by corporations doing business in the United States and one or more other countries.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

TAX 710 Accounting for Income Taxes 3.0 Credits

This course examines how income taxes are reported in the financial statements including current and deferred income taxes on the balance sheet, income tax expense on the income statement, and required disclosures. This course gives students an in-depth look at major and significant differences between financial accounting principles and income tax rules commonly known as the book to tax differences.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 342 [Min Grade: C] or TAX 630 [Min Grade: C]

TAX 715 Tax Experiential Learning 3.0 Credits

This experiential service learning class requires students to complete a short IRS training program and then prepare actual individual income tax returns to help those in need of pro bono assistance in the Philadelphia community through a neighborhood service project.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

TAX 723 Tax Accounting 3.0 Credits

Covers accounting periods and methods, allocations among taxpayers, timing of income and deductions, relief provisions, and other accounting aspects of federal taxation.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 620 [Min Grade: C] or TAX 341 [Min Grade: C]

TAX 730 Taxation of Sub S Corporations 3.0 Credits

Covers federal income taxation of small business electing Subchapter S status.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 630 [Min Grade: C] or TAX 342 [Min Grade: C]

TAX 740 State and Local Taxation 3.0 Credits

Covers the various state and local taxes in the tri-state area.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 620 [Min Grade: C] or TAX 341 [Min Grade: C]

TAX 761 Qualified Retirement Plans 3.0 Credits

Examines the income from qualified plans, Keoghs, SIMPLEs, 401(k)s, and 403(b)s.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

TAX 781 Tax Fraud & White Collar Crime 3.0 Credits

Covers civil and criminal tax investigations, including administrative summons, document production and constitutional protection, professional responsibilities and ethics for the tax practitioner, and privileged communications.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

Prerequisites: TAX 620 [Min Grade: C]

TAX 790 Tax Policy Seminar 3.0 Credits

In-depth discussion and analysis of current tax issues including the specific dynamics of legislation and the effect on taxpayers. Topics will vary and will be dependent on current legislations and court decisions relative to tax policy.

College/Department: LeBow College of Business

Repeat Status: Not repeatable for credit

TAX I599 Independent Study in TAX 0.0-12.0 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 I699 Independent Study in TAX 0.0-12.0 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 I799 Independent Study in TAX 0.0-12.0 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 I899 Independent Study in TAX 0.0-12.0 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 I999 Independent Study in TAX 3.0 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 9 credits

TAX T580 Special Topics in TAX 0.0-12.0 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 T680 Special Topics in TAX 0.5-9.0 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 T780 Special Topics in TAX 0.0-12.0 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 T880 Special Topics in TAX 0.0-12.0 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 T980 Special Topics in TAX 0.0-12.0 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 505 Instructional Systems Design 3.0 Credits

This course explores and offers in-depth analysis of relevant theories relating to contemporary application of Instructional Systems Design. The purpose is to provide the student with theoretical, experimental and critical perspectives on instructional design as it is applied in a number of educational venues.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 506 Assessment of Young Learners 3.0 Credits

Candidates will demonstrate a thorough understanding of the role of the assessment process in early childhood education. The content will provide graduate candidates with an in-depth review of informal evaluation procedures and classroom-based data collection strategies for young children in inclusive early child care and education settings.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 521 [Min Grade: C]

EDUC 507 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.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 508 Creating a Postive Classroom Climate 3.0 Credits

Teacher Leadership skills and strategies are examined toward developing individual approach to leading and managing a classroom for pre-service teacher candidates. Topics include the practical, theoretical, philosophical and ethical aspects of classroom management, school safety and other critical social issues that relate to providing a positive and productive learning environment are examined with a focus on classroom settings located in high-need and under-served schools. The teacher's role in "knowing the learner," identifying individual student needs, building rapport, and constructing a "democratic classroom" are addressed.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 510 Computer Applications In Teaching 3.0 Credits

Analyzes issues concerning uses of computing in instruction. Evaluates the microcomputer as an instructional aide in elementary and secondary classroom instruction. Provides hands-on experience with applications in students' subject matter fields to develop competence in selecting and integrating appropriate instructional software for computers found in today's classrooms, with particular focus on the Macintosh.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 512 Focus on World Geography 3.0 Credits

Through the study of geography, students will be encouraged to find a meaningful framework for understanding the system of human culture on Earth and become familiar with the vast interactive system involving humanity and its natural environment.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 513 Elementary Science Teaching Methods 3.0 Credits

Methods for teaching elementary 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 514 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.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 515 Adolescent Learners in Secondary Schools 3.0 Credits

Enables student to understand the organizational structure of high school programs as related to the diverse needs of the adolescent learner. Students will acquire competence in designing learner-oriented communities of practice in the classroom to foster achievement and overall well-being of the secondary learner.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 516 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 (and strategies for).

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 520 Professional Studies in Instruction 3.0 Credits

For students who lack professional-level classroom teaching in grades K to 12. Examines and develops skills in instructional planning, pedagogy, motivation, classroom management and discipline, interrelationships among diverse populations within school settings, and identification of instructional resources. Discusses current principles of developmental and learning theories and instructional design applied to teaching.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 521 Typical and Atypical Development in Early Childhood Education 3.0 Credits

This course addresses the multifaceted complexities of typical and atypical child development, through the discussion of classic and emerging theories. The primary aim of the course is to foster the students' ability to recognize and apply the connections among developmental domains and of theory and research with educational practice. The readings and class assignments make use of research-based, real-world, and cross-cultural examples.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 522 Evaluation of Instruction 3.0 Credits

Enables the student to acquire competence in evaluation techniques including portfolios, journals, performance assessments, individual and collaborative projects, and presentations. The course covers qualitative and quantitative assessment used in measuring student achievement. Techniques for grading will also be explored.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 524 Current Research in Curriculum & Instruction 3.0 Credits

Examines the relationship of curricula and instruction to current research in learning and knowledge construction, developing higher-order thinking in specific disciplines and content areas, and the role of understanding and metacognition in learning. Complex problems of pedagogy are identified and analyzed (e.g., interdisciplinary curricula, team teaching, collaborative learning), with attention to designing learning goals and outcomes with effective instructional strategies.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 525 Multi-Media Instructional Design 3.0 Credits

Investigates learning theory and its implications for interactive multimedia formats, including the relationship of instructional design principles to selection of media elements (text, video, sound, animation, and graphics) for high-quality design. Examines human-computer interface principles, navigation features, and visual thinking using a wide range of educational software examples. Criteria for software assessment and virtual classrooms are reviewed. Students design and write a software prototype as a group design project. Complex issues and concepts in technology and education are analyzed.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 526 Language Arts Processes 3.0 Credits

Applies contemporary research to processes and problems in teaching oral and written communication, with the basic assumption that listening, speaking, writing, and reading are integrated processes and should be taught as such. Covers analysis and use of instructional strategies for teaching developmental reading and writing, reading and writing in content areas, written correspondence, research reports, journal writing, poetry, and appreciation of children's literature.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 528 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

EDUC 529 Early Literacy 3.0 Credits

Course examines research-validated literacy instruction and literacy interventions. Topics include; phonics, fluency, comprehension, vocabulary, and the reading-writing connection. Significant emphasis is placed on the socio-cultural aspects of reading: appreciating linguistic diversity, integrating cultural narratives, building reading communities, and motivating children through authentic reading and writing experiences.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 530 Advanced Techniques in Instruction & Assessment 3.0 Credits

Major professional and educational issues associated with college teaching are addressed. Provides multiple opportunities to develop and enhance teaching skills, as well as exposure to alternative assessment.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 531 College Teaching & Communication Skills 1.0 Credit

This course addresses critical issues in college teaching and communication skills. These are: what is learning, comparative philosophies of education, understanding the adult learner, best practices in integrating technology to enhance learning, methods of evaluation student learning including performance-based assessments and foundations for effective oral and written communication.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 532 Designing Virtual Communities for Staff Development - Non-Field Experience 3.0 Credits

Examines the impact of distance learning and multimedia technologies on the educational systems of teachers, administrators, librarians, and other professionals in schools responsible for technology and professional development. Online discussion groups, video conferencing, and web-based instruction will be used to form a virtual learning community. There is no field experience component in this course.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is HRD.

EDUC 536 Distance Learning 3.0 Credits

The course explores pedagogical issues in distance learning. Readings are integrated with hands-on use of the tools used to create distance learning programs.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 538 English Teaching Methods 3.0 Credits

This course is designed to support the development of pre-service teachers in the secondary English/Language Arts Classroom. Students will be provided opportunities to integrate and apply theories of learning, curriculum and pedagogy of English and L. Arts in the secondary classroom. Additional classroom-based observation hours will be required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 539 Expressive Arts 3.0 Credits

The focus of this graduate course is to teach future educators to develop and incorporate relevant curriculum for the expressive arts (dance, music, theatre and visual arts), into the PK-4 classroom. Through observation, curriculum development and assessment, educators will be able to identify, administer, interpret and plan instruction for PK-4 learners.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 521 [Min Grade: C]

EDUC 540 Field Experience 3.0 Credits

Provides supervised field experience at a cooperating school designed to develop skills in instructional planning, pedagogy, motivation, classroom management and discipline, interrelationships among diverse populations within school settings, identification of instructional resources, and applications of current research on effective teaching.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 520 [Min Grade: B]

EDUC 541 Student Teaching Seminar 3.0 Credits

This seminar course is designed to compliment the Student Teaching capstone field experience by developing the pre-service teacher's teaching knowledge and strengths throughout their field placement, supervision, and reflective practice. The goal of the seminar is to create reflective practitioners by providing a forum for collaborative, critical inquiry based on the field experience.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDUC 545 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 555 Social Studies Teaching Methods 3.0 Credits

Course prepares the preservice teacher in making appropriate decisions about students and instructional processes in the social studies classroom. Perceptions and perspectives as it relates to social studies instruction in the following areas are explored: curriculum standards, unit development, assessment design and construction, interdisciplinary/integrated curriculum planning, specific group strategies, individualizing techniques, instructional technology, and professional development.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 556 Secondary Social Studies Methods (7-12) 3.0 Credits

Course provides understanding of effective Social Studies methods in secondary classrooms. History of pedagogical debates within Social Studies, is examined to incorporate effective Social Studies teaching methods. Careful attention is given to the Common Core Standards for Social Studies. Requirements include 30 hours of field experience in a school setting to include at least two lessons taught independently. In order to participate students must have the necessary background clearances.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 515 [Min Grade: B]

EDUC 560 Conflict and Dispute Resolution 3.0 Credits

Examines the concept of conflict and means for its resolution as it occurs between individuals and within organizations. Provides foundational knowledge for professionals practicing in many fields and industries to resolve conflicts in positive ways. Students will examine obvious and hidden organizational conflict and the dispute resolutions systems available to resolve these issues. Includes skill development techniques for dispute resolution to apply learned knowledge.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 561 Mediating and Resolving Conflict in School Settings 3.0 Credits

Current theory and research in the field of conflict resolution and mediation with focus on becoming familiar with evidence-based strategies applicable to challenging environments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 562 Middle Years Social Studies Methods 1.5 Credit

This course prepares pre-service teachers with the skills to plan, design and teach adolescents a social studies curriculum with appropriate assessments based on national and state standards related to middle year social studies (e.g., National Council for Social Studies, PA Department of Education) encompassing geography, history, civics and government, and economics. Preparation includes exploration of adolescent development, subject matter pedagogy, assessment and intervention for students with disabilities and English Language Learners. Classroom-based field hours will be required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 563 Middle Years Mathematical Methods (4-8) 1.5 Credit

This course focuses on critical knowledge and skills for teaching mathematics in middle years, including learning theories and psychology in mathematics education, mathematics curricula, teaching mathematics, technology, assessment, and meeting individual student needs. The major goal is to provide prospective middle school teachers the opportunity to develop concepts, skills, and pedagogical procedures for effective teaching of mathematics in middle years. Important social and cultural aspects of teaching math that impact student learning will be considered, as well as reflection occur on how teaching mathematics can be made exciting, intriguing, and understandable for students.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 564 English/Language Arts Teaching Methods for the Middle Years 1.5 Credit

The course prepares pre-service teachers to teach reading and writing to adolescents in middle years classrooms by providing knowledge of the literacy needs of middle level learners with emphasis on reading and writing development, methodology, assessment and accountability. The latest research findings are reflected in studies of how middle level learners require instructors to be adept at a breadth of instruction. Strategies and methods for assisting adolescents are provided as they become fluent readers and writers.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 565 Foundations in Instructing English Language Learners 3.0 Credits

This is a foundations course to prepare all pre-service teachers to work with English Lang. Learners. Focus will be on gaining an understanding of the linguistic, social and academic needs of ELLs and the roles and responsibilities of the classroom teacher in meeting those needs. Field-based observation hours will be required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 566 Futures Studies in Education and the Workplace 3.0 Credits

Course explains and analyzes the field of futures studies including overview of the origins of futures studies, study of how futures studies methods are and can be utilized in education and a range of other industries, and techniques for developing strategic forecasts and plans. A critical approach is taken to enable an analysis of the field's strengths and weaknesses.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 567 Middle Years Science Methods 1.5 Credit

This course examines the many aspects of the teaching of science in elementary schools today. The role of national and state standards (e.g., National Science Education Standards, the Next Generation of Science Standards, and the Pennsylvania State Standards) in curriculum development and reform is explored in depth. Topics covered include planning science instruction to include inquiry and integrated concepts, developing authentic assessments involving a variety of tools, creating and maintaining a safe laboratory and learning environment that meets the needs of diverse learners, and the integration of technology into science education. Classroom-based field hours will be required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 576 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 602 Language Learning & Teaching 3.0 Credits

This course introduces participants to theory and practice in second language learning and instruction, with a focus on English learners (ELs) at the level of primary and secondary education. The course explores how ELs acquire language, what factors influence the learning process, and how instruction could effectively facilitate language, culture, and content learning. Course readings include accounts of second language theory, research, and practice. Topics include linguistic and learning theories, language teaching methods and approaches, the relationship between academic and social language, cultural issues surrounding language teaching and learning, and the roles of teachers and learners in the classroom. Field-based hours are required.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 604 Structure and Sound System of English 3.0 Credits

This course focuses on the structural features of the English language, including phonetic, phonological, morphological, syntactic and pragmatic features. In the practicum component, participants will collect and analyze language from both native and non-native speakers of English, using it to develop targeted structural exercises for English instruction.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 606 Design and Assessment 3.0 Credits

This course emphasizes the role of ESL teachers as course developers and action researchers, focusing on effective lesson planning, task design, materials development, assessment and evaluation, and the use of computers in instruction. In the practicum component, participants will design thematic units, determine objectives, develop materials, and design assessment tools.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 607 Intercultural Learner Portfolio 1.5 Credit

This course is designed to assist students in developing a professional Teaching English as a Second Language (TESL) Teaching Portfolio. In this course the students will focus on the TESL competencies that are covered in EDUC 608 and demonstrate through artifacts, reflections, activities and course work how they can directly relate the standard to the instructional setting.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Corequisite: EDUC 608

EDUC 608 The Intercultural Learner 4.5 Credits

This course explores the needs, experiences, values, and beliefs of culturally and linguistically diverse learners and their families and communities. Building home/school relations and adapting and supporting curriculum through school services will be a focus. For a practicum, participants will engage in a case study of an English language learner.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 609 Language & Culture in Education 3.0 Credits

The purpose of this course is to explore the identity and cultural backgrounds of English Language Learners (ELLs) in our schools and to discuss the impact of these backgrounds on students' educational progress. The course will address the ways in which teachers can provide an appropriate learning environment for students of diverse backgrounds.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 611 Social Media in Education 1.5 Credit

This course investigates the current K-12 social media landscape and its implications for student success in formal and informal learning environments, potential pitfalls, and possible administrative uses. In addition, the course introduces students to the participatory culture of social media through an emphasis on community activities. The course is designed to focus on learning to lead in the area of social media in schools.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 620 Physics in the Arts in Philadelphia 3.0 Credits

This course explores the city of Philadelphia to identify "physics" concepts within the city and in its art with the goal for students to become better aware of the importance of STEM (science, technology, engineering and math) in their daily lives. STEM knowledge empowers citizens as consumers and voters. An elementary understanding of the basic principles of science can inform better decisions regarding energy use, environmental protection, and even, dietary and exercise choices. Using the city as a laboratory we will explore learning in informal settings and put theoretical lessons into a real-world context.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 622 The Science of Sport 3.0 Credits

STEM concepts will be learned through the vehicle of sports in which the underlying principles of science and mathematics are discovered. Topics that will be covered in the course include: geometry, forces, motion, mechanics, biomechanics, anatomy and physiology, kinesiology, simple machines, energy transformations, and aerodynamics. Students will learn these concepts while performing aspects of different sports. The purpose is for students to actually see the science and mathematics concepts happening.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 700 Classroom Research for Teachers I 4.5 Credits

This course introduces candidates to teacher research, a form of self-reflective systematic inquiry by practitioners on their own practice. The goals of teacher research are the improvement of practice, a better understanding of that practice, and an improvement in the situation in which the practice is carried out. Also examined will be findings from research on practice and how it can be used to support school and instructional change.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 701 Classroom Research for Teachers II 1.5 Credit

In this second course in a two-course sequence, students will utilize school-based, collected research data. Issues pertaining to the ethics of data collection, data analysis and interpretation and writing the classroom research study will be examined and explored. Students will be mentored in the writing of research with a view toward submission of their research for publication and presentation.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 700 [Min Grade: B]

EDUC 750 Critical Issues in Education Seminar 3.0 Credits

This course is offered in the style of a "proseminar" that consists of reading, reflection and discussion with a faculty member on a focused critical issue in education. Specific foci will change each term and be aligned with faculty expertise and student interests. The course is designed to inform doctoral students on educational issues to impact their teaching and research agenda.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ELLT.

EDUC 800 Educational Leadership & Change 3.0 Credits

Covers leadership characteristics, styles, and profiles along with the dynamics of the change process. Students develop an action plan for a school-based project, keep a log, and do reflective analysis. Students will interview a leader about their experiences in change and develop a leadership portfolio.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 801 Creative Strategies For Educational Leaders 3.0 Credits

Examines the theoretical and research issues pertaining to creativity and the development of the creative thought process. Emphasizes how role playing and drama techniques can become a powerful tool to promote creative thinking, innovation, and change for educational leaders.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 802 Using and Integrating Learning Technologies 3.0 Credits

Covers learning theories and integrative models as they use instructional software in different contexts and subject areas. Demonstrates strategies for using and implementing multimedia, hypermedia, and electronic networking for candidates to implement in their own school settings.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 803 Educational Research Design I 3.0 Credits

Introduces students to research design paradigms and the assumptions behind them, use of the literature, developing research questions, qualitative and quantitative procedures, and research study formats.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 804 Program Evaluation in Organizations 3.0 Credits

This course provides an experience in designing effective program evaluations for many purposes. Increasingly, evaluation and assessment are required for education research, research grants, school and organizational reform, and public policy. Students will study the foundations of program evaluation, examine underlying assumptions about the purposes and models of evaluation, and explore the various roles of the evaluator. In studying examples, students will vicariously experience various program evaluations from start to finish and understand the complexities of decision-making that evaluators face.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 805 Doctoral Seminar for Proposal Writing 3.0 Credits

In this course, PhD students will learn the fundamentals of proposal writing. The focus will be on writing the dissertation proposal, and on writing grant proposals.

College/Department: School of Education

Repeat Status: Can be repeated 10 times for 33 credits

EDUC 806 Linking Educational Theory to Research 3.0 Credits

Course designed to acquaint students with educational theories and perspectives that have shaped the education discipline. A range of educational theories developed throughout 19th, 20th and 21st centuries will be discussed and explored toward guiding students on how these theories and viewpoints apply to research and educational practice today.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 807 Multi- & Cross-Cultural Perspectives in Leadership 3.0 Credits

Course will assist administrators, researchers and scholars to transform schools to address persistent inequities present in US educational systems and serve the needs of disadvantaged and disenfranchised groups. Course will deepen students' knowledge of multicultural education and advance their skills and talents as educational leaders.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 809 Introduction to Data Collection and Analysis 3.0 Credits

This course prepares students to collect basic quantitative and qualitative data to be analyzed in a subsequent required course. Students will be introduced to educational research data and implications and use in research.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ELLT.

Prerequisites: EDUC 803 [Min Grade: B] and EDUC 810 [Min Grade: B]

EDUC 810 Educational Research Design II 3.0 Credits

The course builds upon Educational Research Design I and focuses on five main themes: research design, sampling design, data collection, data analysis, and reporting research results using educational applications.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 803 [Min Grade: C]

EDUC 811 Designing and Developing Multimedia Applications For Learning 3.0 Credits

Allows students to design and develop a multimedia application for learning using an object-oriented authoring application and the process of design, development, and testing. Demonstrates and applies principles of learning that affect interface design, instructional design, storyboarding, navigation, interactivity, and feedback design.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 812 Staff Development & Team Building 3.0 Credits

Helps educational leaders explore effective models for professional development in schools and school districts. Covers the development of effective strategies and practices based upon current research, adult learning theory, and successful local and national models. Also provides in-depth training in the area of effective meeting design, involvement, and decision-making.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 813 Educational Issues Seminar 3.0 Credits

Examines current issues in public education, including school community, staff relations, integrating educational innovation, negotiating the bureaucracy, public charter schools, and urban education.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 814 Designing Educational Organizations 3.0 Credits

Examines innovation in rostering, scheduling, and defining the instructional program. Emphasizes middle school education and design of small learning communities such as the cluster concept and public charter schools.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 815 Writing for Research, Publication and Funding in Education 3.0 Credits

Guides students in the writing for research, publication, and funding in education by studying examples of effective writing formats written by successful practitioners and by using an active writing process approach: writing drafts, and giving feedback in small peer groups. Students produce a final document for each type of writing that employs authentic tasks and assessments.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 816 Inclusion Issues 3.0 Credits

Examines the various inclusion models whereby children with special needs become part of the teaching and learning community in which everyone-teacher and all students-can benefit by an inclusive program. Addresses such topics as how administrators may take leadership in implementing inclusion and designing an inclusive school.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 818 Applied Research Study 0.5-20.0 Credits

Offers candidates a field-based opportunity to design and implement a pilot research study that will be presented and defended. Steps include framing the question and methodological approach, collecting and analyzing data, interpreting the results, and writing a report. Students document their research activities in a log. Research approaches can include action research, case studies, experimental designs, etc.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 835 Quantitative Research Methods and Data Analysis 4.0 Credits

Continuation of EDUC 810. Use of statistical methods using real-world problems and real-world data to gain experience with following topics: analysis of variance and covariance, simple and multiple linear regression, multivariate techniques of factor analysis, cluster analysis and multi-level and structural equation modeling. Course includes a lab for practice-based learning using SPSS.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ELLT or major is ELMG.

Prerequisites: EDUC 803 [Min Grade: C] and EDUC 810 [Min Grade: C]

EDUC 836 Qualitative Research Methods and Data Analysis 4.0 Credits

Use of qualitative methods using real-world problems and real-world data to gain experience with following research techniques such as ethnography and case studies to gain skills in participant observation, interviewing, archival research and historical analysis. Other theoretical frameworks and methodological approaches for qualitative research will be discussed. Course includes a lab for practice-based learning to use computer software for data collection/analysis.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ELLT or major is ELMG.

EDUC 837 Advanced Qualitative Methods and Data Analysis 3.0 Credits

Course introduces students to advanced qualitative research methods used in educational research. Students will become literate in the range qualitative research designs and analyses used in qualitative research geared towards the social science research in the field of education. The course will focus on a) producing transcripts of data collected in EDUC 836, e.g., interviews, focus groups and observation, and b) apply data collection and analysis methods. Formal research methods will complement individual, student-driven project goals. Students ultimately gain proficiency in core research skills required for an action-oriented doctoral dissertation that will help prepare them for future research collaborations.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 838 Doctoral Qualitative Research Methods and Data Analysis 4.0 Credits

Use of qualitative methods using real-world problems and real-world data to gain experience with following research techniques such as ethnography and case studies to gain skills in participant observation, interviewing, archival research and historical analysis. Other theoretical frameworks and methodological approaches for qualitative research will be discussed. Course includes a lab for practice-based learning to use computer software for data collection/analysis.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 840 Theories of Individual Cognition in STEM Education 3.0 Credits

Course foci is on the knowing and learning of STEM education from a social perspective from an individual cognitive perspective and will include emphasis on both recent research and seminal literature. The course will be an introduction to the psychological foundations of STEM education. This course is the first in a three-course STEM (Science, Engineering, Technology and Mathematics) education content specialization sequence.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ELLT.

EDUC 841 Foundations of Educational Theory: Contextualizing Leadership and Policy I 3.0 Credits

Course is first of two-term course sequence (EDUC 841 and EDUC 843) designed to introduce graduate students to foundational and learning theories relevant to the field of educational leadership, policy and social change. Course offers interdisciplinary and often critical approach to understanding educational change from social, political, historical, economic and cultural perspectives. Each week, students examine a theoretical piece that informs how the field is studied, or an empirical piece of research that extends theory, or applies it in new contexts. Students creatively explore personal research interests toward developing independent research projects for use in the second course in the two-term sequence.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 842 Social Foundation and Group Cognition in STEM Education 3.0 Credits

Course foci is on the knowing and learning of STEM education from a social perspective and will include emphasis on both recent and seminal literature. The course will include an introduction to the sociocultural research and foundations of STEM education. This course is the second in a three-course STEM (Science, Engineering, Technology and Mathematics) education content specialization sequence.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is ELLT.

EDUC 843 Foundations of Educational Theory: Contextualizing Leadership and Policy II 3.0 Credits

Course is second of two-term course sequence (EDUC 841 and EDUC 843) designed to introduce graduate students to foundational and learning theories relevant to the field of educational leadership, policy and social change. Course offers interdisciplinary and often critical approach to understanding educational change from social, political, historical, economic and cultural perspectives. Each week, students examine a theoretical piece that informs how the field is studied, or an empirical piece of research that extends theory, or applies it in new contexts. Students implement independent research project developed in the first course in the two-term sequence.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 844 Creativity and Innovation in STEM Education 3.0 Credits

This course will provide a foundation of creativity, innovation theory, awareness of research and seminal literature in the context of STEM education. Theories of creativity and creative thinking, the methods for studying creativity and the biological basis of creativity. The course is the third in a three-course STEM (Science, Engineering, Technology and Mathematics) education content specialization sequence.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 845 Transformative Leadership: Finding One's Source 3.0 Credits

Employing Otto Scharmer's Theory U theoretical framework, the course provides students with knowledge and skills to develop and support their professional development towards becoming effective leaders. Teaching and learning activities in the course include readings, videos, written assignments, E-learning, self-assessments, and individual and team opportunities. Opportunities are provided for students to better understand trends in organizations, enhance their self-awareness, develop leadership skills, and apply these skills and perspectives in real-world contexts.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 846 Doctoral Advanced Qualitative Research and Data Analysis 3.0 Credits

Designed to provide an advanced examination of qualitative research methods with a focus on research in education, although others from different fields are equally welcome. In particular, students will continue conducting qualitative research based on work completed in EDUC 838 and data analysis I by reading about and executing a basic qualitative study that uses qualitative analysis in one of the five major designs. Careful attention will be placed to the subjectivity of the researcher, ethics of research, and the trustworthiness of a qualitative study. This course seeks to also spur the student to begin to consider their own research stances, objectives, and their voice as a researcher. It is essential that students are familiar with the various ontological, epistemological, and methodological assumptions.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 838 [Min Grade: B]

EDUC 847 Doctoral Advanced Quantitative Methods: Applied Regression Analysis 3.0 Credits

This course reviews and extends knowledge and application of regression models. The course explores the ways in which multiple regression techniques allow for the analysis of the relationship between outcome and predictor variables while controlling for other variables. In doing so, students learn to build and evaluate multiple regression models using continuous outcome variables as well as logistic regression models using categorical outcome variables. Students gain applied experience fitting, visualizing, and interpreting regression models. The course also covers important topics in regression analysis including non-linear relationships, analysis of residuals, variable transformations, missing data, and multinomial logistic regression.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 835 [Min Grade: B]

EDUC 848 Learning & Cognition in Education 3.0 Credits

The course will be an introduction to the psychological/individual and social foundations of learning and cognition. This includes an emphasis on both recent research and seminal literature and applicable research methods.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 849 Design, Mind, Media and Learning 3.0 Credits

This course is about design and the process of design involved in the development of technologies (in the broadest sense) for learning. The design, mind, media, and learning seminar is an advanced course in media design for learning and communicating. In this course, multimedia design is a dynamic combination of learning pedagogy, design-based research, digital media, virtual learning technologies, art, story, interface design, and information architecture. The purpose of the course is to introduce students to design and the process of design in facilitating transformation of cognitive and non-cognitive experiences.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 850 Foundations of Research in Education 3.0 Credits

Introduces students to the process of educational research. Although all the components of the process of designing and conducting research will be introduced in this course, the focus will be on understanding the difference between the paradigms underlying quantitative and qualitative educational research, the respective underlying assumptions and worldviews. The course (a) emphasizes qualitative and quantitative methodological approaches and paradigms underlying those approaches; (b) introduces students to ethical implications of research; (c) enables students to become more effective consumers of research; (d) prepares students for subsequent and related courses; (e) proves a foundation for students to be able to conduct original research that may lead to the doctoral dissertation.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 851 Research Designs and Methods in Education 3.0 Credits

The course facilitates students' understanding of the process of educational research providing a broad overview of the different research designs and methods (i.e., quantitative, qualitative, mixed-methods) available, as well as equips them with the knowledge needed to determine best fit between research designs and methods and research questions.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 852 Survey Research Methods 3.0 Credits

This course focuses on the design of questions and questionnaires used in survey research. The course will explore the theoretical and experimental literature related to question and questionnaire design as well as focusing on practical issues in the design, critique, and interpretation of survey questions. There will be exercises both in and outside of class to reinforce both theory and practice, including the construction and testing of a questionnaire.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 854 Mixed Method Research 3.0 Credits

The purpose of this advanced research methods course is threefold: (a) Study predominant models of mixed methods research (MMR) as described by seminal scholars, (b) Learn about notable features of successful MMR studies through critically analyzing published work and (c) Gain direct data collection and analysis experience by composing and interpreting results of a small MMR project using both quantitative and qualitative data sets. The course will also focus on developing well-crafted discussion and implications sections required in standard research reports (e.g., dissertations, articles, and grant reports). As a result of this course, students will gain core research skills for completing a mixed methods doctoral dissertation as well engaging in future MMR and interdisciplinary research.

College/Department: School of Education

Repeat Status: Not repeatable for credit

Prerequisites: EDUC 835 [Min Grade: B] and EDUC 836 [Min Grade: B] and EDUC 838 [Min Grade: B]

EDUC 855 Identity Exploration and Learning 3.0 Credits

The purpose of this course is to introduce ideas about how to stimulate and build on the initial interests of students to support longer term identities as learners and professionals by exploring psychoeducational theories about the self and learning with possible selves that could be achieved from their current states. Life in the 21st century will require the orientation and skills to repeatedly explore and reconstruct one's identity in reflexively and intentionally as people move from one career to another and so on.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 856 Gender and Education in Global Contexts 3.0 Credits

The course explores and highlights different international perspectives on gender in education including how gender relations, structures and identities are constructed and reproduced in various cultural contexts.

College/Department: School of Education

Repeat Status: Not repeatable for credit

EDUC 880 Doctoral Seminar 1.0-1.5 Credit

Seminar to prepare students who have completed the core doctoral courses and residency requirement to work with their Dissertation Advisor in the development of their dissertation research proposal.

College/Department: School of Education

Repeat Status: Can be repeated 10 times for 11 credits

Prerequisites: EDUC 810 [Min Grade: B]

EDUC 881 Doctoral Seminar (EdD) 1.5 Credit

The course is the final research course before an EdD student begins formal Dissertation work in the EdD program. Each student participates in a seminar and works directly with their Dissertation Advisor in the development of the student's dissertation research proposal.

College/Department: School of Education

Repeat Status: Can be repeated 4 times for 25 credits

Prerequisites: EDUC 810 [Min Grade: B]

EDUC 997 Doctoral Dissertation 1.0-9.0 Credit

Allows candidates to conduct an original research study that will comprise the dissertation.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDUC 998 PhD Dissertation 1.0-12.0 Credit

Allows candidates to conduct an original research study that will comprise the dissertation.

College/Department: School of Education

Repeat Status: Can be repeated multiple times for credit

EDUC I599 Independent Study in EDUC 0.0-12.0 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 I699 Independent Study in EDUC 0.0-12.0 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 I799 Independent Study in EDUC 0.0-12.0 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 I899 Independent Study in EDUC 0.0-12.0 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 I999 Independent Study in EDUC 0.0-12.0 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 T580 Special topics in EDUC 0.0-12.0 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 T680 Special topics in EDUC 0.0-12.0 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 T775 Special topics in EDUC 0.0-12.0 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 T780 Special topics in EDUC 0.0-12.0 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 T880 Special topics in EDUC 0.0-12.0 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 T980 Special topics in EDUC 0.0-12.0 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

Telecommunications

Courses

ECET 501 Fundamentals of Communications Engineering 3.0 Credits

Fundamentals of Communications Engineering. This course introduces basic modulation, detection and coding techniques in modern telecommunications systems, including PAM and FSK, spread-spectrum and OFDM, ML receiver, ISI and equalization, compression code and coded modulation. May be repeated once for credit.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECES 521 [Min Grade: C] and ECES 522 [Min Grade: C]

ECET 511 Physical Foundations of Telecommunications Networks 3.0 Credits

Physical Foundations of Telecommunications Networks. Introduction to wired and wireless telecommunication systems. Review of wave propagation. Review of wireline transmission media. Modeling wireline and wireless point-to-point communication links. N-port linear networks and network analysis/parameters. Review of passive RF components, semiconductor devices. Optical communication devices: optical switches, couplers, isolators, sources, modulators, detectors, amplifiers. Overview of active circuits.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECET 512 Wireless Systems 3.0 Credits

Fundamentals of modern wireless systems. Fundamentals of radio propagation and link performance. Cellular concept: interference, base stations and cell sites, handoffs, system capacity. Fading environments: multipath propagation, delay spread, Doppler Spread, statistically fading channel models. Multiple-access schemes: FDMA, TDMA, CDMA, SDMA. Emerging methodologies: phases/adaptive antenna array, multi-array (MIMO) communication systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECET 513 Wireless Networks 3.0 Credits

Introduction to Wireless Networks, Evolution: 1G, 2G, 3G, Next-G. Wireless Networks Operation: Mobility and Resource Management, Security. Wireless WANs: GSM, CDMA, IS-95, and IMT-2000, Mobil Data Networks, Wireless LANs: 802.11, HIPERLAN, Ad Hoc Networks, Mobil IP. Next Generation Wireless Systems.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

ECET 602 Information Theory and Coding 3.0 Credits

This course introduces fundamental information theory and source and channel coding technology. Major topics include: entropy and mutual information, source coding theorem, Huffman code, rate-distortion function and vector quantization, channel capacity, channel coding theorem, linear block code, cyclic code, convolution code, Turbo code, LDPC code, trellis coded modulation, space-time code. May be repeated once for credit.

College/Department: College of Engineering

Repeat Status: Can be repeated 1 times for 3 credits

Prerequisites: ECES 521 [Min Grade: C]

Corequisite: ECES 522

ECET 603 Optical Communications and Networks 3.0 Credits

This course introduces fiber-optic based transmission and networking technology. Major topics include: Loss and dispersion characters of fiber, shot noise, modulation, line code, direct receiver, coherent receiver, link budget, optical layer, SONET, WDM, photonic packet switch, Hybrid systems (CATV).

College/Department: College of Engineering

Repeat Status: Can be repeated 1 times for 3 credits

Prerequisites: ECET 501 [Min Grade: C] and ECET 511 [Min Grade: C]

ECET 604 Internet Laboratory 3.0 Credits

This course aims to prepare the next generation of Internet engineers for the challenges of understanding, maintaining, and participating in an ever-evolving Internet through hands-on experiments on real networking equipment. The long term objective of the internet Laboratory course is to graduate students who can maintain, update, improve, and even redesign the Internet.

College/Department: College of Engineering

Repeat Status: Not repeatable for credit

Prerequisites: ECEC 631 [Min Grade: C] or ECEC 531 [Min Grade: C]

ECET 697 Research in Telecommunications 1.0-12.0 Credit

Research credits in telecommunications. May be repeated for credit.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECET 699 Supervised Study in Telecommunications 3.0 Credits

Supervised Study in Telecommunications Engineering. May be repeated for credit.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECET 890 Advanced Special Topics in Telecommunications 1.0-9.0 Credit

Covers advanced special topics of interest to students and faculty.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECET 898 Master's Thesis in Telecommunications 1.0-12.0 Credit

Master's thesis in telecommunications. May be repeated for credit.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECET 997 Dissertation Research in Telecommunications 1.0-12.0 Credit

Graded Ph.D. dissertation in telecommunications engineering.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECET 998 Ph.D. Dissertation in Telecommunications 1.0-12.0 Credit

Ph.D. Dissertation in Telecommunications. May be repeated for credit.

College/Department: College of Engineering

Repeat Status: Can be repeated multiple times for credit

ECET I599 Independent Study in ECET 0.0-12.0 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

ECET I699 Independent Study in ECET 0.0-12.0 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

ECET I799 Independent Study in ECET 0.0-12.0 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

ECET I899 Independent Study in ECET 0.0-12.0 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

ECET I999 Independent Study in ECET 0.0-12.0 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

ECET T580 Special Topics in ECET 0.0-12.0 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

ECET T680 Special Topics in ECET 0.0-12.0 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

ECET T780 Special Topics in ECET 0.0-12.0 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

ECET T880 Special Topics in ECET 0.0-12.0 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

ECET T980 Special Topics in ECET 0.0-12.0 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

Television Management

Courses

TVMN 600 Television Management Colloquium 3.0 Credits

Practitioners and students come together for dialogue about standards and best practices. Students study tools and techniques including HR management, labor relations and contract negotiations, intellectual property and media law practice, applied convergence, and the role of business, marketing, advertising, and promotion plans in television enterprises.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 605 Foundation Seminar in TV Management 3.0 Credits

This course explores the scope and methods of study in television management including its technological and social history, evolution and convergence with new media, qualitative and quantitative methodologies, literature research strategies and proposal writing, and the production of a thesis proposal.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 606 The Field of Television Management 3.0 Credits

This course is designed as an introduction to the history, discipline, scope, research methods, strategies and analytics associated with the field of television management.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 610 Media Law for Television Management 3.0 Credits

Media Law for TVMN focuses on the regulatory frameworks and radio, television and converging media law. Content includes contracts, releases, negotiations, standards and best practices in HR, intellectual property, and collective bargaining in media industries. The role of in-house and function of external legal counsel is reviewed.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 620 Audience Measurement 3.0 Credits

Audience Measurement. The course addresses statistical measurement of television audiences. Students learn the basic principles of rating, share, and demographics; and understanding how this information is used in sales, marketing, and strategic planning for television stations, broadcast and cable networks.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 621 Audience Data and Analytics 3.0 Credits

This course examines the various ways in which television audiences are measured and monetized. You will become familiar with the organizations that measure audiences; their histories, methodologies, their strengths/weaknesses, and their output. Also examined will be how media organizations utilize this data. You will understand the various terminology used in audience analysis; Ratings, Impressions, HUT/PUT, Shares, Cume, Reach and Frequency. Additionally, examples of actual industry research.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 623 TV Advertising: Strategy, Planning and Analytics 3.0 Credits

Advertising fuels the TV industry and this course focuses on strategies, metrics, tools and planning techniques employed by advertising agencies and media companies as they design campaigns to reach disparate audiences. Market timing, campaign tactics, creative and post-campaign analytics are included.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 625 Media Sales 3.0 Credits

Commercial media today are almost solely dependent on advertising revenue for their profitability and ultimate survival in a multichannel marketplace. This course will examine the process of revenue generation by local stations, cable operators, broadcast and cable networks; the structure of sales departments, interaction with other departments (news, programming, engineering, finance, promotion, public affairs) and will look at the customer base from the viewpoint of the media seller and media buyer. We will also look at the human side of the equation; how sales teams are hired, motivated, coached, compensated, and evaluated. Additionally, we will examine the role of sports, websites, programming decisions and Nielsen ratings and their effects on sales.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 630 Television Production 3.0 Credits

Television Production. Television production techniques in common use at local television stations are taught including multi-camera (studio) production, single camera (film style) production, and basic editing techniques. Throughout the term, the course also examines production issues from a manager's point-of-view.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 631 TV Production Laboratory 3.0 Credits

This course will explore television production management techniques at the network, cable, local and industrial company levels. Throughout the term, the course will examine production issues from a manager's point-of-view. However, in an effort to fully understand the challenges production personnel face on a daily basis, management students will learn very simple and basic production skills. Class participants will use these tools to write, produce, direct, shoot and edit their own productions.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 640 Media Ethics of Television Management 3.0 Credits

Media Ethics for TVMN explores issues central to the decision-making process in which media managers engage. Case studies in television and evolving media, investigation of contemporary events that reflect ethical dilemmas, and research into the intersection of financial, regulatory, and career considerations with ethical choice are closely examined.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 645 Social TV 3.0 Credits

In this course, students learn about the rapidly changing space of Social TV. As media are evolving, convergence is accelerating at a rapid pace. Media that used to be alone in a silo are now coming together in ways we've never seen. It is important that TV professionals understand the intersection of these two media and how the future may play out.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 650 Structure of Television Organizations 3.0 Credits

This course is a survey of the organizational structures and functions that form the work setting in which television managers operate. It is concerned with exploring the specific tasks managers confront and the analytic and decision-making tools they apply to the management of television systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 651 Media Systems and Dynamics 3.0 Credits

This course is intended as a survey of the organizational structures and functions that form the working context in which television managers operate. It is concerned as well with exploring the specific tasks managers confront and the analytic and decision-making theories and tools they apply to the operation of television systems.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 655 Multi-Platform Strategy 3.0 Credits

TV content reaches its audiences through legacy and newly converged channels. This course concentrates on the delivery of television content across multiple platforms and illuminates ways in which television content is disaggregated and re-aggregated to create new services on multiple devices. It examines closely the business models, regulatory questions and intellectual property issues that underlie the dynamics of the streaming TV industry.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 660 The Social Impact of TV 3.0 Credits

The Social Impact of Television. The aim of this course is to broaden awareness of how the phenomenon of television affects or may affect society. Examined are several arguments regarding television's impact. Some of these arguments are based on experimental research, some on survey research, and some on critical argument.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 671 Media Deal-Making 3.0 Credits

TV managers must be skilled deal-makers. This course provides the fundamentals of deal-making skills including such topics as re-transmission consent deals, script optioning, the "green lighting" process, FCC representations and license renewals, Guild union deals, interest-based exchanges, balancing good will, integrity and on-going business relationships, forms of leverage, the use of best practices research and information-gathering; it provides a brief overview of arbitration and mediation.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 675 Global Television - London 3.0 Credits

This is a blended "study abroad" course taught online with a one-week London residency. The course examines the roots of the TV industry in the UK and the symbiotic relationship between US and UK TV entities.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 680 Management of News and Sports Programming 3.0 Credits

Management of News and Sports Programming. Through lectures, case studies, and individual and project work, this course explores management issues in news and sports programming. Students learn about news and sports journalism, sales/marketing/sponsorship of news and sports programming, legal and ethical issues, personnel issues, market research, technology, and how to critique new sports programming.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 685 Producing for Television 3.0 Credits

This course introduces students to the art and craft of producing for television. It focuses on the role of the TV producer who is central to the creation, maintenance and ultimate success of television series, movies or specials.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 698 Special Topics in TV Mgmt 3.0 Credits

Special Topics in Television Management. This course offers rotating topics in Television Management that could include a closer look at an aspect of management (e.g., contract law and negotiation as it applies to television), an examination of an issue (e.g., violence and TV), or an in-depth analysis of a particular case study (e.g., coverage of a disaster from a manager's point-of-view). The course (but not the same topic) may be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVMN 699 Independent Study in TV Mgmt 1.0-6.0 Credit

Independent Study in Television Management. This course offers the student the opportunity to undertake an independent student in the area of Television Management. The topic must be approved by a Program Director before the student registers for the course. The course may be repeated for credit.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVMN 700 Television Practicum 3.0 Credits

This course offers hands-on management experience at Drexel's television station or (with Program Director's approval) at other television stations, cable companies, or related media. The assumption is that the student will work a minimum of ten hours per week for ten weeks to receive three credits for the term.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 710 Television Programming 3.0 Credits

Through lectures, case studies and individual and team projects, this course explores the role of programming in television. Students learn about development, financial and legal issues, programming distribution, the role of ratings and advertising support in program scheduling, and career opportunities in the field.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 731 TV Technology and Innovation 3.0 Credits

This is a course for present and future television professionals who want to know what television technology is today, and how will change it tomorrow. The course will introduce, explore and question legacy and innovative television technologies. It will convey not just a new vocabulary of technical terms, but also an understanding of the intersecting concepts and challenges posed by new technological and organizational developments. It will enable students to become conversant with and agile in the application of technology assessment. Students will understand the evolutionary history of legacy media technology and their impact on current and emerging media technology. They will analyze, deconstruct and reconstruct the systems of interrelated technologies that constitute the media ecosystem.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 740 Money and the Media 3.0 Credits

This course will apply the students' required coursework in the LeBow College of Business in areas such as economics and accounting with the specific challenge of managing the finance function within television and new media industries.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 780 Media Research Laboratory 3.0 Credits

Content of the course will include: development of research proposals, hypothesis formulation and testing, research question structuring, methods for analyzing institutional dynamics, content analysis, regulatory and legal research, case study, and data mining linked with big data analytics tools. It will also include an introduction to descriptive and inferential statistics. Laboratories will provide hands-on experience in the research process.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 790 Thesis in TV Management 3.0 Credits

The thesis will demonstrate the competence to identify a problem or create a project germane to the evolving field on television management, and to produce a work product that is executed in a systematic manner using research and management tools. The thesis proposal must be approved by the Program Director.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 791 Thesis Completion 0.5 Credits

This course is designed to engage the degree candidate in the process of research, writing and completing the thesis. Enrollment in the course enables the master's degree candidate in television management to maintain and enhance contact with the thesis advisor during critical stages in the research process; it also enables the student to gain access to the research resources of the university library. This is a half credit (0.5 credit) course that may be repeated for credit as many times as needed within the limits placed on time for completion of the program by the university.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated multiple times for credit

TVMN 795 Capstone Project Seminar 3.0 Credits

This course is designed to lead students through the final stages of the thesis process in order to produce and deliver a draft of the required capstone project by the end of the quarter. This will require weekly analysis and writing and project development and will also require your full attention. Attendance is mandatory. Half of your grade for the capstone project will be determined by how well you perform this quarter.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

TVMN 796 Capstone Project Completion 0.5 Credits

This course is designed to provide faculty advising and library resources as students complete their capstone projects.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Can be repeated 1 times for 1 credits

TVMN I599 Independent Study in Television Management 0.0-12.0 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

TVMN I699 Independent Study in Television Management 1.0-6.0 Credit

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

TVMN I799 Independent Study in Television Management 0.0-12.0 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

TVMN I899 Independent Study in Television Management 0.0-12.0 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

TVMN I999 Independent Study in Television Management 0.0-12.0 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

TVMN T580 Special Topics in Television Management 0.0-12.0 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

TVMN T680 Special Topics in Television Management 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

TVMN T780 Special Topics in Television Management 0.0-12.0 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

TVMN T880 Special Topics in Television Management 0.0-12.0 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

TVMN T980 Special Topics in Television Management 0.0-12.0 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

Visual Studies

Courses

VSST 501 Contemporary Art Issues 0.0-3.0 Credits

Examines critical and topical problems of the art world. Includes comprehensive readings, discussions, and field trips. Requires written analysis of materials.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

VSST 502 Space/Time I 3.0 Credits

Applies contemporary ideas of art making. Explores concepts and how they can be processed within the art genre. Requires continual-process art, idea art, or conceptual art.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

VSST 601 Painting 0.0-3.0 Credits

Investigates painting, including traditional and contemporary attitudes. Encourages students to find a highly regulated approach within the tradition of figure, still life, and landscape painting. Oil or acrylic.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

VSST 611 Graduate Drawing 3.0 Credits

Provides experience in disciplined drawing as a means of educating the eyes to see and as a technique to convey ideas.

College/Department: Antoinette Westphal College of Media Arts Design

Repeat Status: Not repeatable for credit

VSST 865 Advanced Studies in Art and Design 0.5-9.0 Credits

Provides tutorial and original work in interior design, art history, design and construction, furniture design, photography, graphic design, weaving, drawing, painting, and sculpture. 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

VSST I599 Independent Study in Visual Studies 0.0-12.0 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

VSST I699 Independent Study in Visual Studies 0.0-12.0 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

VSST I799 Independent Study in Visual Studies 0.0-12.0 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

VSST I899 Independent Study in Visual Studies 0.0-12.0 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

VSST I999 Independent Study in Visual Studies 0.0-12.0 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

VSST T580 Special Topics in Visual Studies 0.0-12.0 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

VSST T680 Special Topics in Visual Studies 0.0-12.0 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

VSST T780 Special Topics in Visual Studies 0.5-9.0 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 T880 Special Topics in Visual Studies 0.0-12.0 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

VSST T980 Special Topics in Visual Studies 0.0-12.0 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

Westphal Studies

Courses

WEST 500 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

Semester

- Graduate (p. 727)
- Undergraduate (<http://catalog.drexel.edu/coursedescriptions/semester/undergrad/>)

Graduate

Thomas R. Kline School of Law (L)

Law (LAW) (p. 758)

Legal Studies (LSTU) (p. 775)

College of Medicine (MS)

Anatomy (ANAT) (p. 728)

Anesthesiology (ANES) (p. 729)

Biochemistry (BIOC) (p. 730)

Cardiothoracic Surgery (CTSUS) (p. 733)

Communication & Preventative Medicine (CPMH) (p. 738)

Communication & Preventative Medicine (credit) (CPMD) (p. 740)

Critical Care (CRIT) (p. 741)

Dermatology (DERM) (p. 741)

Emergency Medicine (EMMD) (p. 742)

Family Medicine (FAMD) (p. 743)

Histotechnology (MHPP) (p. 751)

Human and Molecular Genetics (GENE) (p. 751)

Interdepartmental (IDPT) (p. 753)

Medicine (MED) (p. 784)

Neurology (NEUL) (p. 797)

Neuroscience (NEUR) (p. 799)

Neurosurgery (NESU) (p. 801)

Obstetrics & Gynecology (OBGY) (p. 801)

Office of Medical Education (OMED) (p. 803)

Orthopedics (ORTH) (p. 804)

Otolaryngology (OTOL) (p. 809)

Pathology (PATH) (p. 811)

Pediatrics (PEDS) (p. 813)

Pharmacology (PHRM) (p. 817)

Physical Med & Rehabilitation (PMRM) (p. 819)

Physiology (PHGY) (p. 819)

Program in Integrated Learning (PILM) (p. 820)

Psychiatry (PSYC) (p. 822)

Radiation Oncology (RAON) (p. 824)

Radiologic Sciences (RADI) (p. 824)

Surgery (SURG) (p. 826)

WOMN (WOMN) (p. 829)

Dornsife School of Public Health (PH)

Public Health (PBHL) (p. 823)

COM School of Biomedical Sciences & Professional Studies (QQ)

Anatomy (ANAT) (p. 728)

Biochemistry (BIOC) (p. 730)

Cancer Biology (CBIO) (p. 732)

Clinical Research (CR) (p. 733)

Clinical Research Health Prof (CRHP) (p. 737)

Drexel Pathway to Medicine (DPMS) (p. 742)

Forensic Criminalistic Analy (FCA) (p. 744)

Forensic Science (MFSP) (p. 745)
 Histotechnology (MHPP) (p. 751)
 IMS Prog. Interdeptmental Sci. (IMSP) (p. 751)
 Interdepartmental (IDPT) (p. 753)
 Interdisciplinary Health Sci (IHS) (p. 756)
 MMS Prog.-Masters in Med. Sci. (MMSP) (p. 778)
 Master of Lab Animal Science (MLAS) (p. 778)
 Medical Science Preparatory (MSPP) (p. 781)
 Medical and Healthcare Simulation (MSMS) (p. 782)
 Microbiology and Immunology (MIIM) (p. 790)
 Molecular & Cell Biology & Genetics (MCBG) (p. 796)
 Neuroscience (NEUR) (p. 799)
 Otolaryngology (OTO) (p. 806)
 Pathologists' Assistant (MSPA) (p. 810)
 Pathology (PATH) (p. 811)
 Pharmacology (PHRM) (p. 817)
 Physiology (PHGY) (p. 819)
 Pre-Medical (PMED) (p. 820)

Anatomy

Courses

ANAT 501S Neurobiology Topics I 2.0 Credits

Neurobiology topics is a "journal club" course required of all Neuroscience graduate students beginning in the second year. Students, faculty and staff from Neuroscience and other programs are also encouraged to attend as registered or non-registered participants. The course is offered in the Fall and Spring semesters. Students choose topics of interest and a faculty member conducting research in this field is invited to introduce the topic, either from Drexel University or another local university. Students then present research papers in this area to the class to refine their presentation skills, practice critical thinking, and learn about recent research. Recent topics chosen by the class have included: Analysis of Somatosensory Systems, Neuroimmunology, Neurodegenerative Diseases, and Axon Guidance.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

ANAT 701S GROSS ANATOMY AND EMBRYOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

ANAT 702S MICROANATOMY AND CELL BIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 703S MEDICAL NEUROSCIENCE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

ANAT 8112S ANATOMY - 2 WEEKS (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 8113S ANATOMY - 3 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 8114S ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 821S APPLIED AND SURGICAL ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 850S HUMAN GROSS ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 851S HISTOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 852S NEUROANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 854S ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 860S HUMAN GROSS ANATOMY REEXAM 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 861S HISTOLOGY REEXAM 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 900S ACAD GROSS ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9094S ELECTIVE - ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 930S ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 932S ANATOMY 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9752S Research - Anatomy* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9754S RESEARCH - ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9756S RESEARCH - ANATOMY -6WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9758S RESEARCH - ANATOMY -8WKS 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANAT 990S GROSS ANATOMY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANAT 992S ADVANCED NEUROANATOMY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANAT 993S ADVANCED HUMAN GROSS ANATOMY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANAT T580S Special Topics in Anatomy 0.0-12.0 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**ANAT T680S Special Topics in Anatomy 0.0-12.0 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

Anesthesiology

Courses

ANES 8210S SR. SUB. IN ANESTHESIOLOGY 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**ANES 8211S CLINICAL ANESTHESIOLOGY - 1WK 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 8212S Clinical Anesthesiology 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 8213S CLINICAL ANESTHESIOLOGY - 3WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 8214S ANESTHESIOLOGY SUBINTERNSHIP 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 8218S Sr. Subinternship in Anes 8-wk 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 821S ANESTHESIOLOGY SUBINTERNSHIP 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 822S ANESTHESIOLOGY SUBINTERNSHIP 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 823S CLINICAL ANESTHESIOLOGY -2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 8312S Acute/Chronic Pain MGMT*** 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**ANES 8314S Acute/Chronic Pain Management 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 8714S Pediatric Anesthesiology 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 895S ELECTIVE/ANESTHESIA 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 902S CLINICAL ANESTHESIOLOGY 2-WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 906S SELECT. CARDIAC ANESTHESIA 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 9092S ELECTIVE-ANESTHESIOLOGY, 2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**ANES 9094S ELECTIVE - ANESTHESIA 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 920S CLINICAL ANESTHESIOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 931S ELECT. CLIN. ANESTHESIOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 951S ACUTE/CHRONIC PAIN MANAGEMENT 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 952S ACUTE/CHRONIC PAIN MGMT-2 WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**ANES 9754S Research-Anesthesiology 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated multiple times for credit

ANES 990S RESEARCH-ANESTHESIOLOGY 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit

Biochemistry

Courses

BIOC 502S Biochemistry 1st Lab Rotation 4.0 Credits

First rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**BIOC 503S Biochemistry 2nd Lab Rotation 4.0 Credits**

Second rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**BIOC 504S Biochemistry 3rd Lab Rotation 4.0 Credits**

Third rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated multiple times for credit**BIOC 505S Biochemical Basis of Disease 2.0 Credits**

This is an advanced graduate course designed to explore the biochemical basis of a variety of diverse diseases, ranging from the diabetes to Alzheimer's. The course format consists of student presentations that will be augmented by specialized lecture.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Prerequisites:** IDPT 521S [Min Grade: C] and IDPT 526S [Min Grade: C]**BIOC 506S Biochemistry Journal Club 1.0 Credit**

A weekly journal club in which students take turns presenting recent papers from the biomedical literature.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 15 times for 100 credits**BIOC 507S Biochemistry Seminar Series 1.0 Credit**

Weekly research seminars on topics in Biochemistry and Molecular Biology. Seminar speakers include both scientists from the Drexel faculty and scientists from outside institutions.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 15 times for 100 credits**BIOC 508S Experimental Approaches to Biochemical Problems 3.0 Credits**

This course provides the student with a thorough understanding of the principles underlying the experimental techniques currently used to tackle biochemical problems. A combination of lecture, discussion, investigation of the primary literature, and demonstrations will be used.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Prerequisites:** IDPT 521S [Min Grade: C] and IDPT 526S [Min Grade: C]**BIOC 509S Biochemical Basis of Disease 3.0 Credits**

This is an advanced graduate course designed to explore the biochemical basis of a variety of diverse diseases, ranging from the Acquired Immunodeficiency Syndrome (AIDS) to Alzheimer's. The course format consists of specialized lectures that are augmented by student presentation. This course is open to all grad students. May be repeated once for credit.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 1 times for 3 credits**BIOC 511S Communication for Researchers 2.0 Credits**

This is a course designed to introduce graduate students to the basics of scientific writing. The course will involve both the discussion of reading assignments and writing assignments for the students, which will be discussed and critiqued in class.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**BIOC 513S Biotechnology Practicum I 4.0 Credits**

The Biotechnology practicum is designed to provide hands-on experience with the techniques encountered in didactic courses and the Biochemistry seminar series. Laboratories for the practicum will be chosen taking into consideration the interests and career goals of the students. The student will carry out directed research in the lab of a faculty member with expertise in the techniques employed.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Corequisite:** IDPT 521S**BIOC 514S Biotechnology Practicum II 4.0 Credits**

The Biotechnology practicum is designed to provide hands-on experience with the techniques encountered in didactic courses and the Biochemistry seminar series. Laboratories for the practicum will be chosen taking into consideration the interests and career goals of the student. The student will carry out directed research in the lab of a faculty member with expertise in the techniques employed.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Prerequisites:** IDPT 521S [Min Grade: B]**Corequisite:** IDPT 526S

BIOC 515S Biotechnology Practicum III 8.0 Credits

The Biotechnology practicum is designed to provide hands-on experience with the techniques encountered in didactic courses and the Biochemistry seminar series. Laboratories for the practicum will be chosen taking into consideration the interests and career goals of the student. The student will carry out directed research in the lab of a faculty member with expertise in the techniques employed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: B] and IDPT 526S [Min Grade: B]

BIOC 516S Biotechnology Practicum IV 4.0 Credits

The Biotechnology practicum is designed to provide hands-on experience with the techniques encountered in didactic courses and the Biochemistry seminar series. Laboratories for the practicum will be chosen taking into consideration the interests and career goals of the student. The student will carry out directed research in the lab of a faculty member with expertise in the techniques employed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: B] and IDPT 526S [Min Grade: B]

BIOC 520S Macromolecular Structure & Function 3.0 Credits

This course is designed to introduce the student to current research topics and latest developments in the area of the structure and function of various types of macromolecules. Topics may include enzyme mutagenesis, protein folding, structure based drug design and structural aspects of receptors, transcription factors and ion channels. Topics may vary in different years.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 521S Introduction to Biochemical Data 2.0 Credits

Modern biochemistry is defined by quantitative analysis of diverse data. While familiarity with tools for data analysis are essential for the modern biochemist, students often have difficulty dealing with numeric information and data tasks when they first encounter them in their own research. In some cases, students need skills that are either never taught formally or are presented only in an abstract sense. This course remedies this by introducing students to common data handling and analysis tasks from biochemistry and related disciplines, in a hands-on and problem-oriented small-group environment.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 522S Biochemistry of Drug Discovery & Design 4.0 Credits

This course will provide in-depth coverage of the preclinical drug discovery and design process, with a special emphasis on the key role of biochemistry at each stage. Biochemical knowledge and skills are required from the early identification of a therapeutic target and hit compounds, through hit-to-lead optimization, to establishing preclinical "absorption, distribution, metabolism, excretion and toxicity" profiles (ADMET) for lead compounds. Discussion of emerging areas in therapeutic design and case studies, both from literature and on-going research programs, will be included to give context to the lecture series. Due to the dynamic nature of many of the aspects of drug discovery, this course will be regularly updated to reflect new trends and technologies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 600S Biochemistry Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department. Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 15 times for 100 credits

BIOC 603S Advanced Topics in Biochemistry and Molecular Biology 1.5 Credit

This course will supplement basic information taught in the biomedical sciences first year graduate core curriculum and provide a comprehensive, in-depth analysis of various topics in biochemistry. The course will include a mixture of lectures and literature-based assignments. Lectures are intended to cover topics deemed important for Biochemistry and MCBG students, but which are not covered in depth in the core curriculum. This will include practical aspects of experimental design and execution.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 701S MEDICAL BIOCHEMISTRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

BIOC 702S MEDICAL NUTRITION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 850S MEDICAL BIOCHEMISTRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 860S MED BIOCHEMISTRY REEXAM 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 970S BIOCHEMISTRY RESEARCH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 9750S RESEARCH-BIOCHEMISTRY-16 WKS 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**BIOC 9752S RESEARCH-BIOCHEMISTRY - 2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**BIOC 9754S RESEARCH-BIOCHEMISTRY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**BIOC 9756S RESEARCH - BIOCHEMISTRY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**BIOC 9758S RESEARCH-BIOCHEMISTRY- 8WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**BIOC 975S STRUCTURAL & MOLECULAR BIOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**BIOC 976S BIOCHEMISTRY OF METABOLISM 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**BIOC 977S PHYSIOLOGICAL CHEMISTRY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**BIOC T580S Special Topics in Biochemistry 0.0-12.0 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**BIOC T680S Special Topics in Biochemistry 0.0-12.0 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

Cancer Biology

Courses

CBIO 500S Core Cancer Topics 2.0 Credits

The overall goal of Cancer Topics is to provide the student with exposure to cancer topics as they relate to topics covered in the core curriculum. In addition, students will get exposure to cancer-related topics not covered in other required courses.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**CBIO 501S Infection, Inflammation and Cancer 2.0 Credits**

This course will be an advanced-level comprehensive survey of infectious agents and inflammatory signals that have been linked to the development of various cancers. The molecular mechanisms that underlie viral, bacterial, and parasite associated human cancers as well as inflammation-mediated cell transformation mechanisms will be the focus of lectures and discussions. Sessions will consist of lectures and discussions of assigned reading.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Prerequisites:** BIOC 510S [Min Grade: B]**CBIO 503S Cancer Biology Journal Club 1.0 Credit**

The overall goal of the cancer journal club is to provide the student with exposure to primary literature of latest high impact research related to cancer research.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 4 times for 4 credits**CBIO 504S Cancer Biology 1st Lab Rotation 4.0 Credits**

First rotation. Guided research is conducted on a part-time basis for 8-10 week period. Student will choose from a list of labs conducting cancer related research; the focus will be on acquisition of specific laboratory/molecular biology skills in cancer-related research. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**CBIO 505S Cancer Biology 2nd Lab Rotation 4.0 Credits**

Second rotation. Guided research is conducted on a part-time basis for 8-10 week period. Student will choose from a list of labs conducting cancer related research; the focus will be on acquisition of specific laboratory/molecular biology skills in cancer-related research. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**CBIO 506S Cancer Biology Thesis Research 9.0 Credits**

Research toward the fulfillment of the masters thesis. Process is monitored by the student's advisor and department, advisory committee or thesis committee.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 8 times for 18 credits**CBIO 508S Cancer Biomarkers and Therapeutics 2.0 Credits**

In this advanced course, students will learn about biomarkers and therapies for human cancers. A topic by topic analysis of key developments and approaches in biomarker discovery and validation along with cancer therapy are presented, with inclusion of pharmacologic, regulatory and basic science perspectives.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit

CBIO 510S Cancer Biology 3.0 Credits

This upper level graduate course is a team-taught lecture-based course on the biology of cancer including: transformation, oncogenes and suppressor genes, cell cycle, DNA damage/repair, cell signaling, oncogenesis, metastasis, and cancer therapies. Faculty from Fox Chase Cancer Center and the Wistar Institute will participate in the teaching. The purpose of the course is to provide a comprehensive understanding of the principles of cancer biology. It has been designed to introduce students to the advanced concepts of cancer biology and latest conceptual, technical and therapeutic advances. The emphasis in this course is to convey the history and fundamentals of the topics to prepare students for CBIO 512S. This course is intended for second year graduate students interested in basic cancer research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CBIO 512S Advanced Cancer Biology 2.0 Credits

The goal of this course is to provide an in-depth understanding of current cancer biology research. This course is designed to introduce students to the advanced concepts of cancer biology and latest conceptual, technical and therapeutic advances. Students will become familiar with the latest research in many topics related to cancer biology, including cancer stem cells, cancer metabolism and cancer microenvironment, as well as with the basic cancer bioinformatics tools. Students will get first-hand experience in hypothesis development based on current cancer research findings and propose aims to test hypothesis. This course is intended for 2nd year graduate students. CBIO 510S is a prerequisite since a basic understanding of cancer biology will be needed. The prerequisite can be waived by Course Director.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: CBIO 512S [Min Grade: B]

CBIO T580S Special Topics in Cancer Biology 0.0-12.0 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

Cardiothoracic Surgery

Courses

CTSU 8112S Cardiac Surgery* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 8114S CARDIAC SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 8124S Cardiothoracic Surgery 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 8134S GENERAL THORACIC SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 8213S CARDIOTHORACIC- SURGERY 3 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 8214S Cardiothoracic Surgery 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 826S CARDIOTHORACIC SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 895S CARDIOTHORACIC SURGERY ELECTIV 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 904S GENERAL THORACIC SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 9094S ELECTIVE - CARDIOTHORACIC SURG 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CTSU 9754S RESEARCH-CARDIOTHORACIC SURG. 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

Clinical Research

Courses

CR 500S Epidemiology 3.0 Credits

Epidemiology is at the core of research professions as it is the study of the distribution, determinants, and the course of health related events in populations, and the efficacy and effectiveness of prevention and intervention strategies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 501S Emerging Trends in Medical Device Regulation 3.0 Credits

The Internet of Things poses an evolving set of challenges to the research and development of both conventional and digital medical devices. For example, equipment once found only in hospitals and doctors' offices are increasingly available to the public. This course examines the social, regulatory and scientific factors that define the development of digital and conventional medical devices even as the distinctions between patient and consumer disappear.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 505S Ethical Issues in Research 3.0 Credits

Students explore ethical issues to sound clinical research, review the foundations of regulations for clinical investigations, and to better understand the operational imperatives of Good Clinical Practices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 508S Medical Device Combination Product Regulation 3.0 Credits

This course provides a comprehensive overview of medical device and combination product (drug-device, drug-biologic) regulation. The primary focus will be how medical devices and combination products are regulated by the U.S. Food and Drug Administration (FDA). Topics that will be covered include: (1) FDA's organizational structure, responsibilities, and resources for medical device and combination product regulation; (2) an overview of the laws, regulations, and regulatory processes that govern medical devices and combination products; (3) regulatory and administrative requirements for medical devices throughout the full product life-cycle, including premarket review, postmarket requirements, and enforcement programs.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 510S Sponsored Projects Finance 3.0 Credits

The study of managing and monitoring external funding sources for research projects. Topics include: rules and regulations, proposal preparation and submission, cost accounting standards, salaries and benefits of staff, direct and indirect costs, the costing of equipment and facility use.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 511S The History of Misconduct in Biomedical Research 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 512S Fundamentals of Academic Research Administration 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 513S Business Processes and Contemporary Concerns in Pharmaceutical R & D 3.0 Credits

Bringing a new compound or device through a successful product launch in the bio-pharma or device industry is hugely expensive. Failures occur when information and business processes are inadequately used or inappropriately applied. This course will provide an overview of the processes most critical to launch from both clinical and business perspectives. Students will understand the R and D process as if they were participating in development and launch of new compounds, devices (including diagnostics), and biosimilars.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 514S World Wide Regulatory Submissions 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 515S Intro to Clinical Trials 3.0 Credits

This course introduces regulatory responsibilities of clinical investigators, sponsors, monitors, IRBs, FDA -all those parties intimately involved in clinical research. Information and exercises are designed to reinforce the elements of Good Clinical Practices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 518S Clinical Trial Budgeting 3.0 Credits

The overall cost of drug development has increasingly become a controversial subject with estimates varying from hundreds of million to over a billion dollars. One of the larger components contributing to this is the cost of clinical trials required for regulatory approval. Accuracy in the development of clinical trial budgets is crucial for both small and large pharmaceutical companies. The budget variance for clinical studies, from forecast to actual costs, averages about 10%. Overestimating the cost of clinical studies is equally problematic and results in wasted resources and a higher opportunity cost.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 520S Applications of Clinical Research Biostatistics 3.0 Credits

Examines role of the statistician in clinical research. Course includes a discussion of the language of statistics to facilitate communication with the clinical research project team, basic methods of describing data, fundamentals of probability, simple models and methods of parameter estimation and statistical software packages for reporting data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 523S Current Issues in Review Boards 3.0 Credits

Review boards form the basis for careful review and oversight of clinical research. This course will look in detail at the regulatory requirements of review boards as related to clinical research, as well as the roles and responsibilities of review boards and other associated topics. The differences between the areas of responsibility of review boards, the Office of Human Research Protections (OHRP), and the Office of Research Integrity (ORI), as well as data safety monitoring, subject compensation and other topics will be covered. The educational elements of this course are based upon the federal regulations, the procedures, and the practices of review boards with particular attention paid to the organization, the research review requirements and continuing review, as well as other pertinent topics.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 525S Scientific Writing and Medical Literature 3.0 Credits

This course teaches the medical professional the ability to read for understanding, and evaluate validity of information a medical or scientific paper. In addition, the student learns how to recognize various types of medical literature and the basics of how to perform a review of the medical literature.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 527S Clinical Data Management 3.0 Credits

This course will provide the student an opportunity to learn and understand the regulatory and scientific components of clinical data management. In addition, the essential documents utilized throughout the clinical data management process will be examined and incorporated into the weekly lectures. This course is vital to understanding and applying the principles and practices of clinical data management as they are applied within the prescribed federal and global regulatory framework. To any company that develops healthcare products, the lifeblood of their product line and corporate existence depends entirely on the quality of the respective clinical data that is generated.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 535S Current Federal Regulatory Issues in Biomedical Research 3.0 Credits

This course explores how the rapid pace of scientific discovery and the changing ways in which patients, researchers, policymakers and the public interact are forcing a never-ending reassessment of how to govern biomedical research. While most core principles remain in place, this course examines where and how innovation requires a new look at existing approaches.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 536S Clinical Project Management 3.0 Credits

Project management has been a well-established practice outside the pharmaceutical industry for many decades. However, with ever-increasing pressures of competitors, regulatory requirements, generic drugs and medical device innovations, its utilization is essential. It is more important than ever to use project management techniques to get products to market because, as we all know, "time is money". This course will explore a strategic approach to pharmaceutical and medical device project management.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 541S Patient Recruitment and Informed consent 3.0 Credits

Clinical trials represent the link between scientific discovery and medical effectiveness. Hundreds of innovative therapies are developed in the laboratories, but few make it past early development, if at all. Clinical trials today can cost hundreds of millions of dollars and take years to research. New clinical research starting for pharmaceuticals and medical devices is on the increase. Investigational New Drugs (IND) submissions have been growing steadily over the past several years. In order to support the increase in research, it becomes more imperative to accelerate patient recruitment and enrollment. However promising new drugs and devices may be, the research cannot move forward without enough subjects who are willing to participate and who will remain for the duration of the study.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 545S Pharmaceutical Law 3.0 Credits

Presents principles and practices of the Federal Food, Drug and Cosmetic Act governing the research and development of pharmaceuticals and biologics for both humans and animals including an analysis of legal and social constructs affecting industry and the academic clinical investigator with emphasis on FDA enforcement actions.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 546S Clinical Outsourcing 3.0 Credits

This course will provide an overview of the pertinent aspects of and current issues in outsourced clinical research and development. The course will identify predominant outsourcing models and strategies, discuss how effective outsourcing relationships may be initiated and maintained through measurement and action on key operational, quality and relationship metrics, and explore perspectives on how the clinical outsourcing landscape will continue to evolve in years to come. While concepts pertaining to procurement, quality and performance management are covered, it is not expected, nor required that students be fluent in these disciplines.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 550S Leadership Skills 3.0 Credits

This course is an in-depth analysis of specific human capital, organizational behavior and project management issues facing research facilities as they pertain to larger, integrated organizations. Selected topics include: high impact communications, negotiating, motivation and recognition.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 551S International Regulatory Affairs 3.0 Credits

Overview & analysis of the medical product regulatory processes within the world's major markets, with an emphasis on pharmaceutical requirements. The key strategies required from preclinical product development & marketing approval - post-approval of medical products in the United States, European Union, & other markets will be compared & discussed. This course will cover the salient features of international regulatory affairs; the World Health Organization & international organizations; international law General Agreement on Tariffs and Trade & Trade-Related Aspects of Intellectual Property Rights & its impact on medical products; international regulatory agencies; & product development, marketing authorization, & post-approval requirements for pharmaceuticals, biologics, medical devices, & food & cosmetics.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 555S Compliance & Monitoring Issues 3.0 Credits

This course focuses on measuring and improving clinical trial performance as a means of saving time and money, while ensuring quality health care, as well as offering to patients both safe and effective therapeutic products. Students are required to develop milestone efficiencies through the use of process-performance data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 565S Contemporary Issues in Human Research Protection 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 570S Principles and Practice of Pharmacovigilance 3.0 Credits

This course is an introduction to the ethical, clinical, and regulatory complexities of medication safety and matters thinking skills for improving the quality and effectiveness of drug safety monitoring for both the pharmaceutical industry and its impact on the public.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 600S Designing the Clinical Trial 3.0 Credits

Designers and ethical, clinical, strategic issues surrounding clinical drug research are the focus of this course. Topics include design of trials for Phases one through four, an overview of the statistical component of a clinical trial, monitoring of the trial, and managing clinical data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: CR 515S [Min Grade: C]

CR 609S Innovative Product Development 3.0 Credits

This comprehensive course provides a solid foundation in new therapeutic product research and development for the subsequent courses in the CROM program. This course focuses on the process of drug and medical device development from early research, discovery, and product formulation, through the federal requirements for proving safety and efficacy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 612S Fundamentals of Compliance 3.0 Credits

The study of the federal bodies and regulations that govern research. Topics include: the rules and regulations surrounding HIPAA and how it affects research on human subjects, the history and current role of the FDA, IACUC, and the IRB within the research arena.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 614S Introduction to Clinical Pharmacology 3.0 Credits

This course will provide a comprehensive overview of clinical pharmacology, pharmacokinetic/pharmacodynamic principles, and translational science as they pertain to drug development in the pharmaceutical industry. The objective of the course is to provide the student with an understanding of how clinical pharmacology principles and regulatory guidance are applied in transitioning a new molecule into human testing, as well as how product labeling for the final product is developed, based on the attributes of the drug.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CR or major is CROM.

CR 617S Informatics in Pharm Res & Development 3.0 Credits

Using a combination of printed materials, case studies, literature reviews, and on-line discussions, this course will cover past and present contributions of computer applications in pharmaceutical research and development. In addition, the student will be challenged to portend where technological advances may prove to be strategically beneficial in the future.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CR or major is CROM.

CR 620S Regulatory, Scientific and Social Issues Affecting Biotech Research 3.0 Credits

Biotechnology is among the most ambitious and controversial areas of medical research. This course delves into how FDA approaches clinical research for this wide range of products at a time when policymakers focus not only on genomics, but on personalized medicine and the use of big data, software and social policy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 625S Health Policy and Economics 3.0 Credits

The study of the development, analysis and communication of economic data in the context of clinical research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 631S Applications of Clinical Research Biostatistics II 3.0 Credits

This course will cover in some in-depth biostatistics topics of interest in clinical trials that are not usually covered in introductory biostatistics courses. The course is designed to focus on learning and understanding biostatistics methods used in the clinical research realm of the pharmaceutical industry. Drug development is the process of finding and producing therapeutically useful pharmaceuticals and of turning them into high-quality formulations of safe and effective medicines, while delivering valuable information about their doses and dosing intervals, anticipated effects and adverse events.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: CR 520S [Min Grade: B]

CR 633S Quality Assurance Audits 3.0 Credits

This course provides the student with an in-depth knowledge of compliance and quality assurance issues as well as the related regulations inherent in the drug development process. Students develop auditing plans and strategies for conducting compliance inspections.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 635S Strategic Planning 3.0 Credits

This course introduces the student to the project management and planning process. Topics include: project communications, leadership, objectives, scope, success criteria, procurement, cost estimating, control mechanisms, developing mission statements and devising strategies that turn vision into reality. May be repeated twice for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR I699S Independent Study in Clinical Research 1.0-12.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

CR T580S Special Topics in Clinical Research 1.0-12.0 Credit

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

CR T680S Special Topics in Clinical Research 1.0-12.0 Credit

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

CR T780S Special Topics in Clinical Research 1.0-12.0 Credit

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

CR T880S Special Topics in Clinical Research 1.0-12.0 Credit

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

CR T980S Special Topics in Clinical Research 1.0-3.0 Credit

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

Clinical Research Health Prof Courses

CRHP 501S Research Health Professions I 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or development/evaluation of new clinical devices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

CRHP 502S Research Health Professions II 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or development/evaluation of new clinical devices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S [Min Grade: S]

CRHP 503S Research Health Professions III 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or development/evaluation of new clinical devices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S [Min Grade: S] and CRHP 502S [Min Grade: S]

CRHP 504S Research Health Professions IV 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or development/evaluation of new clinical devices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S [Min Grade: S] and CRHP 502S [Min Grade: S] and CRHP 503S [Min Grade: S]

CRHP 505S Research Health Professions V 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or development/evaluation of new clinical devices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S [Min Grade: S] and CRHP 502S [Min Grade: S] and CRHP 503S [Min Grade: S] and CRHP 504S [Min Grade: S]

CRHP 506S Research Health Professions VI 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or development/evaluation of new clinical devices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S [Min Grade: S] and CRHP 502S [Min Grade: S] and CRHP 503S [Min Grade: S] and CRHP 504S [Min Grade: S] and CRHP 505S [Min Grade: S]

CRHP 507S Research Health Professions VII 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or development/evaluation of new clinical devices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S [Min Grade: S] and CRHP 502S [Min Grade: S] and CRHP 503S [Min Grade: S] and CRHP 504S [Min Grade: S] and CRHP 505S [Min Grade: S] and CRHP 506S [Min Grade: S]

CRHP T580S Special Topics in Clinical Research for Health Professionals 0.0-12.0 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

Communication & Preventative Medicine (noncredit)

Courses

CPMH 810S History of Medicine* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

CPMH 820S Medical Terms Greek/Latin 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CPMH 821S DEATH AND DYING 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CPMH 822S HISTORY OF MEDICINE (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CPMH 824S Medicine & Art 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CPMH 832S MEDICINE AND RELIGION (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

CPMH 833S MEDICINE AND SOCIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CPMH 834S WOMEN IN MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CPMH 835S Medical Spanish I 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

CPMH 836S Medical Spanish II 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

CPMH 841S CAREGIVER/PARADIGM FOR HLTH CA 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CPMH 843S FOLK & POPULAR HLTH CARE ALT. 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 844S Creative Writing for Physicians 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 845S Practice of Making Abstract Art 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 846S Contemplative Studies 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 847S Trauma & Healing 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 848S Urban Illness Experience 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 849S Women in Medicine 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 921S DEATH AND DYING 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 927S MEDICINE AND LITERATURE (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMH 933S MEDICINE AND SOCIOLOGY (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 935S MEDICAL SPANISH 1 (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 936S Medical Spanish II (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 937S MEDICAL SPANISH WKSP (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 939S Seminars in Women's Health: MSI 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 940S Seminars in Women's Health: MSII 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 941S The Healer's Art 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 942S MODES OF MEDICINE AND SCIENCE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 943S FOLK&POP HLTH CARE ALT II 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 946S MEDICINE & LAW (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 947S ETH.CONSID./NEUR-DISORDERS S/U 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 948S CREATIVE ARTS THERAPIES IN MED 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 949S Cutting Cold Flesh: Perspectives from the Humanities 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 950S ETHNICITY, CULTURE & MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 951S DEATH & DYING (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMH 952S MEDICINE & ART (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMH 953S HISTORY OF MEDICINE II: (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 954S HEALTH LAW HUMANITIES (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 955S MEDICINE & FILM (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 956S HOME CARE ELECTIVE (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMH 957S MEDICINE & SPIRITUALITY (S/U) 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMH 958S HISTORY OF MEDICINE-(S/U) 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMH 959S Ethics Hum Right&Glob Hlt S/U 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 960S Stress Reduc: Mind Per Prof* 0.0 Credits**
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMH 961S Training the Physician Eye* 0.0 Credits**
College/Department: College of Medicine
Repeat Status: Can be repeated multiple times for credit

CPMH 999S Special Topics 0.0-5.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 50 credits

Communication & Preventive Medicine (credit)

Courses

CPMD 700S BIOETHICS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 701S PRINCIPLES OF MEDICAL RESEARCH AND EPIDEMIOLOGY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 9 times for 999 credits

CPMD 702S BIOETHICS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 703S COMMUNITY EDUCATION EXPERIENCE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 751S COMMUNITY AND PREVENTIVE MEDICINE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 9 times for 999 credits

CPMD 752S Business of Healthcare 0.0 Credits
Preparation for the business aspects of today's medical environment is vital to being an effective physician. This course provides future physicians with a practical overview of the policy, financial, legal and service delivery context in which they will practice.
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 790S Epidemiology Journal Club* 0.0 Credits**
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 8214S CLINICAL EPIDEMIOLOGY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMD 8216S CLINICAL EPIDEMIOLOGY - 6 WKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMD 8218S CLINICAL EPIDEMIOLOGY -8WKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMD 821S CLINICAL EPIDEMIOLOGY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 822S RESEARCH IN MEDICAL HUMANITIES 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 824S OCCUPATIONAL & ENVIRONMENTAL HL 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 825S PUBLIC HEALTH PRACTICE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 826S COMM HLTH PROMO&DISEASE PREVEN 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 8314S PUBLIC HEALTH PRACTICE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 8412S COMM HLTH PROMO-DIS.PREVEN 2WK 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMD 8414S COMM HLTH PROMO&DIS PREVENTION 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 8415S COMM HLTH PROMO & DIS PREVENT. 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 8514S RESEARCH IN MEDICAL HUMANITIES 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMD 8614S Medical Informatics 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 8616S MEDICAL INFORMATICS- 6 WKS. 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 8618S MEDICAL INFORMATICS- 8 WKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 8714S OCCUPATIONAL&ENVIRONMENTL HL 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 895S FAMILY/COMM. MEDICINE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 9094S ELECTIVE - FAMILY & COMNTY MED 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 9096S ELECTIVE-FAMILY&COMM MED-6WKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMD 9098S ELECTIVE-FAMILY & COMM MED 8WK 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

CPMD 974S MEDICAL INFORMATICS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CPMD 999S Special Topics 0.0-5.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 2 times for 12 credits

Critical Care

Courses

CRIT 8214S SURGICAL INTENSIVE CARE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

CRIT 821S SURGICAL INTENSIVE CARE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

Dermatology

Courses

DERM 8111S CLINICAL DERMATOLOGY - 1 WEEK 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 8112S Clinical Dermatology 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 8113S CLINICAL DERMATOLOGY - 3 WEEKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 8114S Clinical Dermatology 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 8212S Dermatopathology 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 8214S DERMATOPATHOLOGY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 855S CLINICAL DERMATOLOGY - 1 WEEK 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 856S CLINICAL DERMATOLOGY -2 WEEKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 857S CLINICAL DERMATOLOGY - 3 WEEKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 858S CLINICAL DERMATOLOGY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 895S DERMATOLOGY ELECTIVE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 9092S ELECTIVE-DERMATOLOGY-2WKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

DERM 9093S ELECTIVE-DERMATOLOGY 3WKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 9094S ELECTIVE - DERMATOLOGY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 970S DERMATOPATHOLOGY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 9746S Research - Dermatology 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

DERM 9754S Research - Dermatology 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

Drexel Pathway to Medicine

Courses

DPMS 500S Medical Science Preparation 1.0 Credit

This course is an introduction and integration of biochemistry, medical physiology, and microanatomy from the medical school curriculum. Other course objectives include the active development of time management and study skills specific for each individual student.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

DPMS 501S Critical Thinking and Scientific Communication Seminar 2.0 Credits

This is a 2 credit course designed to introduce students to the use of biomedical literature. Students will be instructed in the use of actual and virtual library resources and search engines in order to acquaint them with the resources available to locate information relevant to their studies. Through the use of assigned readings of articles from medical journals and in-class presentations, discussions, and quizzes, students will learn how to critically evaluate the biomedical literature. The course will also provide students with the basics of scientific writing.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

DPMS 502S Accelerated Introductory Medical Biostatistics 3.0 Credits

This 3 credit web-based course is an introductory biostatistics course designed to focus on learning and applying the statistical methods most often used in clinical trials and medical field. Biostatistics has become increasingly important in the pharmaceutical and health care industry, from the process of molecule screening, clinical trials, launch of products to post-marketing data. Clinicians participating in or directing research projects will find knowledge about biostatistics indispensable. When reading articles in medical journals, health professionals must understand biostatistics in order to decide whether they can believe the results presented in the literature, how the study results apply to patient care, or how to interpret information about drugs. Biostatistics covers the development and application.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

DPMS 503S Neurobiology of Mental Illness 4.5 Credits

This is a 4.5 credit course designed to introduce students to the neurobiological mechanisms underlying mental illness. Students will learn the structure and function of the cortical and limbic circuitry responsible for processing thought and emotion. They will learn the basics of psychiatric diagnosis and discuss various treatment strategies. Students will also be exposed to strategies for how research is conducted in the field of mental illness.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

DPMS 504S Functional Neuroanatomy 4.5 Credits

This is a 4.5 credit course designed to introduce students to the neuroanatomy of the human body. It will provide extensive information regarding structure and function relationships in the central nervous system. It will also provide introductory information on neurophysiology, cellular neuroscience and systems neuroscience topics.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

DPMS T580S Special Topics in Drexel Pathway to Medical School 0.0-12.0 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 8112S Advance elective in Emergency 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8114S ADV ELECT IN EMERG MED SVCS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

EMMD 8124S Critical Care Subinternship 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8132S Emergency Medicine*** 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8133S EMERGENCY MEDICINE - 3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8134S EMERGENCY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8136S EMERGENCY MEDICINE- 6 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

EMMD 8144S RESUSCIT & EMERGENCY MED RESEA 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8152S MEDICAL TOXICOLOGY - 2WKS(S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8154S Medical Toxicology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8214S EMERGENCY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

EMMD 821S CRITICAL CARE SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 822S EMERGENCY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 824S EMERGENCY MEDICINE/RESUSCITATI 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8252S ED Ultrasound & Toxicology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

EMMD 8254S ED Ultrasound and Toxicology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 825S RESUSCIT & EMERGENCY MED RESEA 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 826S MEDICAL TOXICOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8312S EMERGENCY MEDICINE - 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

EMMD 8414S Wilderness Medicine 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8503S EMERGENCY MED SUBINTERN-3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 8504S Emergency Med Subinternship 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

EMMD 895S EMERGENCY MEDICINE-ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 897S ADV ELECT IN EMERG MED SVCS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 9092S ELECTIVE-EMERGENCY MED 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 9094S ELECTIVE - EMERGENCY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 960S RESEARCH ELEC. IN EMERG MED. 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 9752S RESEARCH-EMERGENCY MED 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

EMMD 9754S RESEARCH - EMERGENCY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Family Medicine

Courses

FAMD 8010S Family Medicine 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD 8015S Family Medicine 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD 801S FAMILY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD 8112S Family Medicine* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD 8113S FAMILY MEDICINE - 3WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD 8114S FAMILY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD 822S MANAGED CARE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD 828S FAMILY PRACTICE/AMBULATORY CAR 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD 829S FAMILY PRACTICE/SPECIAL INTERE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

FAMD 8311S PRIMARY CARE SPORTS MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 8312S Sports Med for Primary Care* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 8313S PRIMARY CARE SPORTS MED-3WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 8314S Primary Care Sports Medicine 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 8324S Geriatrics 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated multiple times for credit

FAMD 843S FAMILY MEDICINE - 3 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 844S FAMILY MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 846S INDIAN HEALTH SERVICE-6 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 847S INDIAN HEALTH SERVICE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 8612S FAMD MED/SPORTS MED - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

FAMD 8614S Family Med/Sports Medicine 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

FAMD 8744S INDIAN HEALTH SERVICE-4WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

FAMD 8745S INDIAN HEALTH SERVICE - 5 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 8746S INDIAN HEALTH SERVICE-6WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 8748S INDIAN HEALTH SERVICE-(8WKS) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

FAMD 895S ELECTIVE/FAMILY MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 9090S FAMILY MEDICINE - ELECTIVE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 9092S FAMILY MEDICINE - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

FAMD 9093S FAMILY MEDICINE - 3WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 9094S Elective-Family Medicine 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 9095S FAMILY MEDICINE - 5 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 9096S FAMILY MEDICINE - 6 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 9750S RESEARCH-FAMILY MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

FAMD 9752S RESEARCH - FAMILY MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

FAMD 9754S RESEARCH-FAMILY MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

FAMD 9756S RESEARCH-FAMILY MEDICINE 6WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

Forensic Criminalistic Analysis

Courses

FCA 505S Physical Aspects of Forensic Science 3.0 Credits

This course is designed to present students with a snapshot of each of the criminalistics disciplines and how they interrelate with each other and with the criminal system. The student will learn the structure of the crime laboratory and how it interrelates to both the criminal investigation and the criminal justice system. Proper investigative techniques and scientific protocols are presented and examined.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

FCA 506S Medico-legal Death Investigation 2.0 Credits

Students will learn the history of pathology as well as the principles of manner, mode and cause of death from a medical standpoint. Postmortem changes after death, along with death from blunt force injury, sharp force injury, asphyxia, gunshot injury and traffic crash injuries will also be studied. Case studies will be presented and discussed to illustrate the lectures in this course.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

FCA 507S Gross Human Skeleton I 1.0 Credit

This course provides students with an in-depth familiarity with the gross human skeleton – its bones, their features, and how it develops. Through numerous laboratory exercises, students will be able to handle skeletal material in order to become proficient in the identification of human skeletal remains and differentiate them from those of non-human animals for application. This course focuses on the skull and dentition, whereas FCA-508 focuses on the post-cranial skeleton.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

FCA 508S Gross Human Skeleton II 0.0-3.0 Credits

Gross human skeleton is a study of the human skeletal system: its bones, their major parts and features, and development. Through lecture and hands-on laboratory examinations of human osteological material, students learn to identify the bones of the body quickly and be able to easily discriminate between human and non-human skeletal remains whether adult or immature. This course is a direct continuation of FCA-507 (Gross Human Skelton I), and deals with the post-cranial portion of the skeleton.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: FCA 507S [Min Grade: C] or MFSP 581S [Min Grade: C]

FCA 510S Gross Human Skeletal Biology 3.0 Credits

This course provides students with an in-depth understanding of human skeletal biology. Students will use the biocultural perspective to study the biology, evolution and variation of the human skeleton and place it in anthropological context by examining the interaction between biology, behavior, and the natural environment. By the end of the semester, students will be proficient in the identification, reconstruction, examination, and analysis of complete and fragmentary human skeletal remains, including conducting a description and inventory of the human skeleton, creating a biological profile of the human skeleton, recognizing taphonomic effects on human skeletal remains, and recognize and describe evidence of pathology, trauma, and anomalies in the human skeleton.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

FCA T580S Special Topics in Forensic Criminalistic Analysis 0.0-12.0 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

Forensic Science

Courses

MFSP 540S Basic Laboratory Techniques and Quality Assurance/Quality Control 3.0 Credits

This course is designed to introduce students to essential laboratory techniques, concepts, and procedures commonly used in chemistry and molecular biology labs. An essential component of the course is an introduction to the concepts of quality assurance and quality control (QA/QC).

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 9 credits

MFSP 541S Fundamentals of Forensic Chemistry 3.0 Credits

This course is designed to introduce students to the principles of laboratory techniques that will give them a command of concepts, practices and language. Through lectures and laboratory exercises, students will learn essential laboratory techniques, concepts, and procedures commonly used in forensic chemistry labs. The course will cover foundations of forensics investigation, proper and safe procedures for laboratory use, Quality Assurance and Quality Control of forensic investigation and integrative investigation lab techniques to work within a multidisciplinary field.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 542S Foundations of Physical Evidence 3.0 Credits

This course provides the necessary foundation for gaining specialized training, analytical skills, and practical experience needed in order to conduct an adequate crime scene investigation. Students will learn the process of event reconstruction by developing critical thinking skills when identifying, documenting, collecting, and analyzing physical evidence through scientifically valid field and laboratory methods. Students will also become familiar with different types of tools and instrumentation utilized in the processing of the evidence. Finally, students will use oral and written communication skills in order to conduct interviews and provide written and expert testimony of investigative procedures and conclusions.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 550S Biological Aspects of the Forensic Sciences 2.0 Credits

This course provides an overview of the biological science of forensic pathology, toxicology, anthropology, serological techniques and molecular biology; methods of human identification, time, cause and manner of death; study of the pathology of trauma, sudden and unexpected death; child abuse; acquisition, identification and quantitation of drugs from biological materials.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 551S Human Function 3.0 Credits

This course is designed to provide students with an understanding of the functions and processes required to maintain the stable internal environment required for normal cell function. Several key themes will be examined throughout the course, including homeostasis and various feedback mechanisms. Each organ system of the body is examined from a physiological standpoint, building upon concepts illustrating how these systems are functionally integrated. This course is closely coordinated with MFSP-552S (Structure of the Human Body), to facilitate an understanding of physiology as it relates to human anatomy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 552S Structure of the Human Body 3.0 Credits

This course is designed to provide students with a solid basis in human anatomy. The structural basis of the body's organ systems are examined and discussed – from the cellular to the tissue to the gross level. This course is closely coordinated with MFSP-551S (Human Function), enabling students who simultaneously matriculate into both to enjoy an integrated presentation of the structure and function of the human body. Anatomic complexes and key structural details of relevance to forensic science are discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 553S Human Structure Lab 1.0 Credit

The Human Structure lab enables students taking MFSP-522S (Structure of the Human Body) to examine human anatomical specimens including gross anatomical dissections and microscopic images. Structures of particular importance to the forensic professional are emphasized.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 554S Principles of Forensic Pathology 3.0 Credits

This course will provide a review of forensic pathology, including human identification, time of death, sudden death, injury causation and analysis, child abuse and neglect, suicidology, genocide studies and determination of cause and manner of death. Included will be the pathology of natural disease and sudden death, and the application of related fields such as forensic toxicology, anthropology and odontology. There will be integration of scene evidence to allow for a mock scene reconstruction in the latter portion of the course.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 555S Forensic Sciences Summer Practicum 3.0 Credits

The practicum will be conducted at a variety of sites where students will be able to get "hand's on" exposure to a broad variety of forensic and/or clinical medicine venues in which forensic science principles are applied.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 556S Forensic Anthropology and Topics in Human Identification 3.0 Credits

Discussion of human osteological remains for the purpose of distinguishing human from non-human skeletal identification, injury causation, time of death, and natural disease. Excavation techniques, site reconstruction, taphonomy, and human paleopathology are introduced.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

Prerequisites: (MFSP 581S [Min Grade: C] and MFSP 582S [Min Grade: C]) or (FCA 507S [Min Grade: C] and FCA 508S [Min Grade: C])

MFSP 557S Drug Chemistry 2.0 Credits

Review of the chemistry, biology and pharmacodynamic principles associated with forensic toxicology, with emphasis upon the forensic aspects of alcohol (ethanol), illicit drugs and selected prescription/over-the-counter pharmaceuticals. Separation techniques, means of drug identification and qualitative vs. confirmatory quantitative analytical procedures are discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 558S Instrumental Analysis 2.0 Credits

A continuation of MFSP 557S (Drug Chemistry). Review of the chemistry, biology and pharmacodynamic principles associated with forensic toxicology, with emphasis upon the forensic aspects of alcohol (ethanol), illicit drugs and selected prescription/over-the-counter pharmaceuticals. Separation techniques, means of drug identification and qualitative vs. confirmatory quantitative analytical procedures are discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

Prerequisites: MFSP 557S [Min Grade: C]

MFSP 559S Criminal Law and the Court: Use of Evidence I 0.0-3.5 Credits

A discussion of those procedural rules affecting the collection and use of physical evidence in a court of law, with emphasis upon court opinions defining search and seizure and admissibility of evidence. Court opinions are illustrated through the introduction of relevant case studies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MFSP 575S [Min Grade: C]

MFSP 560S Criminal Law and the Court: Use of Evidence II 3.0 Credits

A continuation of MFSP 559S. A discussion of those procedural rules affecting the collection and use of physical evidence in a court of law, with emphasis upon court opinions defining search and seizure and admissibility of evidence. Court opinions are illustrated through the introduction of relevant case studies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MFSP 559S [Min Grade: C]

MFSP 561S Techniques of Crime Scene Investigation 3.0 Credits

Introduction to the crime scene, with emphasis upon scene protection, means of documentation and evidence identification/collection. Chain-of-custody procedures, evidence submission/retention. Biohazard issued and legal considerations are addressed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 562S Arson and Explosive Analysis 3.0 Credits

Chemistry of fire and relevant terminology for fire scene investigation. Points of origin, detection of accelerants, collection preservation of arson evidence, flammable residues are addressed. Introduction to the science of explosives, review of the collection and analysis of explosive residues/debris. Case students and techniques used in arson/explosion scene reconstruction.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 563S Latent Fingerprint Analysis 3.0 Credits

This course reviews the fundamental principles of fingerprinting, with discussion of the history, means of fingerprint classification, and the utilization of Automated Fingerprint Identification Systems. Techniques utilized in the development of fingerprints at the crime scene and fingerprint preservation are addressed, as are relevant case studies and probability analysis applications.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 564S Forensic Comparative Science 3.0 Credits

This course focuses on the basic principles of the forensic comparative sciences or "pattern evidence". The disciplines of friction ridge analysis; firearms and toolmarks analysis; footwear and tiretrack analysis; along with fractures, tears and separations will be presented through a more modern view of how the human sensory system sees, recognizes and compares and identifies patterns and like objects. How unique and persistent surfaces, details and characteristics are perceived. The major themes include the history and physiology of each of these disciplines as a whole and what each discipline uses as their basic premises' as a foundation for the science.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 9 credits

Restrictions: Can enroll if major is CRSC or major is FS.

MFSP 565S Firearms and Tool Mark Analysis 3.0 Credits

The study of class and individualizing characteristics of surface features of inanimate objects and their impressions. The course will examine firearms analysis, including bullet and cartridge comparisons, analysis of gunpowder residues, and the collection and preservation of such evidence. Presentation of such evidence in a court room setting is addressed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 566S Techniques of interview and interrogation 3.0 Credits

The current principles used in the art of interviewing and interrogation are examined and discussed. The most popular principles and schools of thought on the topics are presented to provide students with a multifaceted background. The polygraph and criminal personality profiling are covered.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 567S Basic Techniques for the Analysis of Biomolecules 0.0-3.0 Credits

This course introduces students to basic laboratory techniques used in the analysis of biomolecules. Lectures will reinforce students' understanding of the biochemistry of the major classes of macromolecules, techniques used in their analysis, and applications of those techniques with some emphasis on forensic applications. In addition, students will gain hands-on experience with molecular techniques used to quantify and characterize DNA and proteins.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 568S Vehicle Accident Reconstruction and Analysis 3.0 Credits

This course is designed to give the student a practical understanding or crash investigation, simple speed analysis, crash scene mapping, and other factors involving motor vehicle crash investigations. The course will include topics such as Newtonian Mechanics, pedestrian & pedacyclist crashes. Hands-on at-scene investigation techniques will be expanded upon utilizing staged crashes. At the end of the semester, the student will be able to grasp the actualities of the requirements of basic at-scene investigative parameters and be familiar with the data to be obtained from the crash scene.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 569S Footwear and Tire Track Analysis 3.0 Credits

Utilization of the study of class individualizing characteristics of surface features as applied to footwear patterns and tire track impressions. means of documentation, recovery and analysis as they pertain to the totality of the crime scene are emphasized utilizing relevant studies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 570S Nuclear/Biological/Chemical Terrorism 3.0 Credits

Identification of and historical precedents for nuclear, biological and chemical agents utilized as terrorist weapons are examined and discussed, along with the development and current accessibility of nuclear weapons for terrorist purposes. Monitoring/detection of equipment/personnel and protective equipment are addressed. The multi-agency concept in responding to terrorist incidents is examined as are the international implications.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 571S Bloodstain Pattern Analysis 3.0 Credits

Provides a background in the terminology, pattern recognition, and physical principles involved in bloodstain analysis. Documentation and proper collection of stain samples are covered along with the ability to accurately reconstruct the events that occur at a crime scene involving bloodshed. There will be discussion/application of contemporary serologic techniques to case studies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 572S Forensic Research Project I 1.0 Credit

This is the first of a three-part course series representing a progression in fulfilling the research project requirement for graduation from the Master of Science in Forensic Science program. During this first course, students will actively begin their research. Weekly conferences with an advisor will assist students in troubleshooting any problems as they arise early in the project. It is anticipated that the research project will be well underway and that a large portion of the data necessary to complete the project will have been obtained by the completion of this first course.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FS.

MFSP 573S Forensic Research Project II 3.0 Credits

This is the second of a three-part course series representing a progression in fulfilling the research project requirement for graduation from the Master of Science in Forensic Science program. During this second course, students will complete all data collection and should have conducted a large proportion of their data analysis. Weekly conferences with an advisor will monitor student progress and mentor completion of this phase of the research project.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FS.

Prerequisites: MFSP 572S [Min Grade: C]

MFSP 574S Forensic Research Paper 1.0 Credit

Will assist students in organizing, writing, and preparing research paper which represents the culmination of an original research project in the forensic and/or biomedical sciences, required for graduation from the MFS program.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MFSP 573S [Min Grade: C]

MFSP 575S Introduction to Criminal Law and Trial Process 3.0 Credits

Students learn the principles to substantive criminal law. After exploring preliminary issues such as: why we have criminal law; where the rules of criminal law come from; how to find the rules; and how the statutes containing the rules must be written; elements of all crimes are studied – actions, means, reasons, and causation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 576S Ethics for the Forensic Scientist 2.0 Credits

Ethics for the Forensic Scientist will cover the requirements and the implementation of the ethical behavior in the daily work place, legal system, and law enforcement.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 577S Genetics for the Forensic Scientist 2.0 Credits

This course provides an understanding of the fundamental concepts of genetic science with an emphasis on the molecular basis of genetic traits, patterns and mechanisms of inheritance of genetic traits including human diseases, and the analysis of gene frequencies in populations. Particular attention given to how the forensic scientist uses genetic information and probabilities of inheritance in the identification of individuals based on DNA evidence.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 578S Forensic Photography 0.0-3.0 Credits

Students will learn and apply principles of photography in both the film and digital form. Within the field of forensic science, the use and understanding of photography is essential. The areas of aerial, underwater and macro photography as used to document and present criminal investigations are complex and complicated. A full understanding of light and photographic equipment is accomplished through practical exercises.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 579S Forensic Microbiology 2.0 Credits

This lecture based course introduces various aspects of the emerging field of microbiology. The first section will cover basic virology, bacteriology, fungal and protozoa. The second section will focus on the most important organisms and toxins for biocrimes and bioterrorism. Lastly, modern methodology in forensic microbiology will be discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 580S Principles of Immunology 2.0 Credits

This lecture addresses the immune system. The first section will provide an overview of basic immunologic concepts, such as cellular and soluble components, their interaction and crucial methodology. The second part will discuss how the immune system reacts to specific challenges with a special focus on infectious disease.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 581S Human Osteology and Calcified Tissue Biology I 0.0-3.0 Credits

This course consists of the study of cartilage, bone, dental and other related tissues and the human skeletal system they comprise. Lectures and laboratories provide students with a detailed knowledge of the gross and microscopic structure of the human skeleton and the tissues interfacing directly with it throughout life.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP 582S Human Osteology and Calcified Tissue Biology II 2.0 Credits

A direct continuation of MFSP-581S, this course continues the study of cartilage, bone, dental and other related tissues and the human skeletal system they comprise. Lectures and laboratories provide students with a detailed knowledge of the gross and microscopic structure of the human skeleton and the tissues interfacing directly with it throughout life.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MFSP 581S [Min Grade: C]

MFSP 583S The Autopsy in Clinical Forensic Medicine 2.0 Credits

This course will address the origins of the autopsy, its historical and contemporary importance in medical practice, and its use both as a means of medical quality control and for facilitating medico-legal death investigation. Systemic anatomy/pathology, relevant autopsy techniques and the "virtual autopsy" will be highlighted.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MFSP 554S [Min Grade: C]

MFSP 584S Introduction to Forensic Radiology 2.0 Credits

Course provides a foundation of the history of radiology and basic technological advancements within the field. Subsequent lectures will address radiologic approaches to the assessment of child abuse, elder abuse and various types of inflicted trauma. Applications to human identification challenges and other forensic concerns will be presented.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MFSP 552S [Min Grade: C] and (MFSP 581S [Min Grade: C] and MFSP 582S [Min Grade: C] or FCA 507S [Min Grade: C] and FCA 508S [Min Grade: C])

MFSP 585S Clinical Forensic Emergency Medicine and Traumatology 2.0 Credits

This course bridges forensic techniques and knowledge to the care of living patients. Lectures and skills sessions will provide students with knowledge about abuse and injury as well as the forensic considerations of these patients when caring for them in the emergency department/trauma center. The course will also review the presentation and management of the trauma patient in the resuscitation area.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 586S Introduction to Forensic Pediatrics 0.0-3.0 Credits

Introductory lectures will focus upon general pediatrics, neonatal and infant assessment and normal child development. Subsequent topics will address the evaluation, treatment and prevention of child abuse and neglect, with emphasis upon diagnosis of inflicted trauma, sexual abuse, psychological abuse, medical neglect and Munchausen by proxy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 587S Introduction to Forensic Psychology 2.0 Credits

Initial lectures will address clinical psychiatry foundations, its history and recent neurological, biochemical and pharmacologic innovations. Subsequent topic areas will focus upon competency to stand trial issues, defenses based on psychiatric illnesses, approaches to sentencing recommendations, risk assessment and management of repeat offenders and assessment of the learning disabled offender.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 588S Advanced Topics in Cell Biology 2.0 Credits

This course covers advanced topics in cell biology by student presentations and discussions of journal articles covering current research in the field. In addition to presentations, students will write a paper reviewing one of the topics discussed during the course.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 589S Forensic DNA Analysis 4.0 Credits

This course combines scientific background with hands-on technical training for DNA analysis in the forensic context. Lectures will cover the science underlying techniques employing DNA. Through laboratory work, students will familiarize themselves with techniques essential for modern forensic science, such as DNA isolation, quantification, qPCR and STR-PCR.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FS or major is IHS.

MFSP 590S Homicide Investigation 3.0 Credits

This course examines, discusses and reviews the protocols and methodologies of investigation of the most serious of all crimes. The student will learn the tactics, procedures and forensic techniques involved in a competent, professional and scientific death scene investigation involving the manner, mode and course of death.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 591S Criminal Investigative Analysis I 3.0 Credits

This course will review the nature of criminal behavior and the factors that tend to lead to the common behaviors that can be identified. Analysis of the crime scene will be developed and applied to a wide variety of violent crimes including murder, rape and arson. The role of the Criminalist in the identification of behavioral markers will be discussed through case studies. Typologies of offenders will be presented that will include the organized and disorganized patterned behavior of offenders as is exhibited through crime scene markers.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MFSP 559S [Min Grade: C]

MFSP 592S Forensic Graduate Seminar 2.0 Credits

This seminar provides students with the opportunity to engage in scholarly discourse involving core topics in the forensic sciences. Each week, a student will focus on a specific aspect of the week's topic, conduct literature research on that topic, assign a peer-reviewed article to the rest of the class, and moderate a discussion based on the selected area of interest. This experience allows students to develop and refine research and public speaking skills. At the end of the semester, students will use the skills honed throughout the seminar to deliver a professional presentation based on their chosen capstone project.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FS.

MFSP 593S Cyber Crime 3.0 Credits

Principles of handwriting analysis, printing, and duplication procedures, with discussion of paper manufacture, fiber analysis, and techniques utilized to assess document alterations will be covered. Discussion will cover computer technology, principal means of cyber crime and identity theft, and techniques for detection and prevention of the same.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 595S Criminal Investigative Analysis II 3.0 Credits

This course is a continuation of MFSP 592S Criminal Investigative Analysis I. This course will continue to delve deeper into the nature psychological nature of criminal behavior and the factors that tend to lead to the common behaviors that can be identified. Analysis of the crime scene combined with the overall investigative material will be developed and applied to a wide variety of violent crimes including murder, rape and arson. The role of the Criminalist in the identification of behavioral markers will be discussed through case studies. Typologies of offenders will be presented that will include the organized and disorganized patterned behavior of offenders as is exhibited through crime scene markers.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MFSP 591S [Min Grade: C]

MFSP 597S Forensic Serology 3.0 Credits

This course will provide an insight into the world of forensic serology and highlight how important forensic serological evidence is to criminal investigations and legal proceedings. Biological fluids discovered at a crime scene tell a story and it is the ultimate goal of a forensic serologist to determine the identity of questioned stains. Students will understand how a single drop of blood, saliva from a straw, and semen stains on a dress can link a criminal(s) to a scene of a crime. Students will learn about the important terms and characteristics of forensic serological evidence through a series of lectures and laboratory exercises.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is FS or major is IHS.

MFSP 598S Forensic Research Project III 4.0 Credits

This is the culmination of a three-part course series that fulfills the research project requirement for graduation from the Master of Science in Forensic Science program. Students will complete by the deadline and submit for a grade a final draft, 40-80 pages in length, of a research project that is scholarly in scope, that is well-researched, organized and professional, and that contributes to the knowledge base or improves practice in the forensic sciences.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MFSP 573S [Min Grade: C]

MFSP 599S Special Topics 0.0-10.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MFSP 602S Professional Courtroom Testimony & Moot Court 3.0 Credits

Providing effective testimony in a courtroom is a critical part of being an expert witness. Developing effective communication skills, both verbal and written, are crucial to the success of an expert. In addition, understanding the differing roles of attorneys will allow students to develop professional relationships with members of the legal community. This class will help students understand how the legal system functions, how lawyers and juries will interact with them, and how to develop personal strategies for providing ethical and competent testimony. It will also provide hands on case studies for students to explore the confluence of law and science and to provide opportunities for students to experience practical applications of science in the courtroom.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 9 credits

Restrictions: Can enroll if major is CRSC or major is FS or major is IHS.

MFSP T580S Special Topics in Forensic Science 0.0-12.0 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

Histotechnology

Courses

MHPP 500S Advanced Histotechnology 4.0 Credits

In depth study of routine and advanced techniques associated with the histology laboratory.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSPA 540S

MHPP 501S Anatomy for Histotechnologists 4.0 Credits

Provides students with a comprehensive introduction to human gross anatomy. The structure of the human body is explained from a systematic standpoint with emphasis on how structures form complexes of clinical importance.

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MHPP 502S Histotechnology Capstone Project 3.0 Credits

This course will give students the opportunity to integrate the theory and the practical experiences from the previous semesters. Students will investigate a new technology technique or current issue involving histotechnology and apply the knowledge and skills developed in courses and practicum to produce a paper or technical project that supports their position. This course is the culmination of the programs courses and the practicum and will be considered the official written comprehensive examination.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSPA 540S

MHPP 503S Histotechnology Practicum 9.0 Credits

The clinical Practicum is designed to allow the students to apply knowledge and techniques learned during their didactic courses in a clinical hospital setting. It allows the student the opportunity to perform routine as well as specialized histotechnology techniques under the supervision of a qualified histotechnologist.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSPA 540S and MSPA 520S and MSPA 590S and MLAS 545S and MHPP 500S and MSPA 580S and MHPP 502S

MHPP T580S Special Topics in Histotechnology 0.0-12.0 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

Human & Molecular Genetics

Courses

GENE 895S GENETICS ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

GENE 9094S ELECTIVE - GENETICS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

GENE 9754S RESEARCH - HUMAN GENETICS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IMS Prog. Interdepartmental Sciences

Courses

IMSP 502S Medicine and Society 3.0 Credits

IMS, MBS, and MMS program students take a Medicine & Society course in medical ethics. Issues having a broad social, ethical, and economic impact are selected for review and discussion. These include major research breakthroughs and technological innovations, ethical consideration of biomedical research, major ethical issues related to medicine, medical care delivery systems and their socio-economic impact, demographic changes in U.S. populations, world health issues, social expectations for health care professionals and related subjects. In a lecture format with small and large group discussions, students are presented topics relating to current issues that have a broad impact in the health sciences and health professions.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 506S Medical Professionalism and Leadership 3.0 Credits

This course provides an understanding of the US health care environment that students studying to become future health care practitioners will be working in. It is designed to engage thoughtful discussions about the unique challenges and opportunities for the health care workforce of the future. Students will learn about the structure and components of the US health care delivery landscape; how that structure evolved and continues to change over time; what impact the political, economic / business, and legal climates will continue to have on the careers of health care professionals; and who and what influences how health care will be delivered.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 513S Medical Biochemistry 8.0 Credits

This course is a study of the basic principles and regulatory processes governing the chemistry of life with a special emphasis on changes that occur as a result of a pathologic condition. The purpose of the course is to provide rigorous training in the biochemical systems and pathways needed to understand clinical medicine. The pace and content-level of the course is designed to be similar to that given to a first year medical student; in fact many of the large group lectures will be taken from an actual first year medical biochemistry course. We will compare and contrast normal biochemical pathways/systems to a wide variety of different pathologic conditions, ranging from lead poisoning to inherited metabolic disorders.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 522S Medical Physiology I 3.5 Credits

This course is designed to provide you with the fundamental concepts in human physiology for your future as a healthcare professional. This information will be categorized into seven sections across two semesters. In the spring term Pulmonary, Gastrointestinal, Renal, and Reproductive Physiology will be covered. We will primarily focus on normal physiological function of the major human organ systems but will introduce pathophysiology when it reinforces or highlights a particular physiological mechanism. To accomplish our goal of helping you help yourself learn and integrate this material, we use various approaches including lectures, lecture notes, learning objectives, readings from textbooks and primary sources, group conferences, clinical case examples, and formal self-studies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 523S Medical Physiology II 3.5 Credits

This course is designed to provide you with the fundamental concepts in human physiology for your future career as a health professional. This information will be categorized into seven sections across two semesters. In the fall term Cell & Muscle Physiology, Endocrine Regulation of Body Systems, and Autonomic & Cardiovascular Physiology will be covered, and in the spring term Pulmonary, Gastrointestinal, Renal, and Reproductive Physiology will be covered. We will primarily focus on normal physiological function of the major human organ systems but will introduce pathophysiology when it reinforces or highlights a particular physiological mechanism. To accomplish our goal of helping you help yourself learn and integrate medical physiology, we use various approaches including lectures, lecture notes, etc.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IMSP 522S [Min Grade: C]

IMSP 542S Medical Microanatomy I 5.0 Credits

This course describes the tissues of the body with an emphasis on the structure of normal cells, their specializations and methods of acting together to form tissues and organs. The normal structure-function relationships at the subcellular, cellular and tissue levels are emphasized. This course provides students with a framework for recognizing and interpreting the changes seen in disease states.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 543S Medical Microanatomy II 3.0 Credits

This course describes the tissues of the body with an emphasis on the structure of normal cells, their specializations and methods of acting together to form tissues and organs. The normal structure-function relationships at the subcellular, cellular and tissue levels are emphasized. This course provides students with a framework for recognizing and interpreting the changes seen in disease states.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IMSP 542S [Min Grade: C]

IMSP 544S Medical Immunology I 1.5 Credit

This course is designed to provide a foundation in the basic concepts of immunology and then illustrate the role of the immune system in clinical medicine. It commences with the important components (cells, tissues, antibodies, immunoglobulins, and cytokines) involved in regulation and host defense against infectious agents. Introductory lectures serve to describe and differentiate between innate mechanisms and adaptive immunity mediated by functional B and T lymphocytes and their products. B cell and T cell activation, regulation, and tolerance will be described. Cellular interactions between cells and the cytokines made by helper T cell subsets and other components of the immune system (B cells, CTL., NK cells, macrophages, eosinophils etc.) will be integrated.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 545S Medical Immunology II 1.5 Credit

The Basic Immunology course is designed to provide a foundation in the basic concepts of immunology and then illustrate the role of the immune system in clinical medicine. It commences with the important components (cells, tissues, antibodies, immunoglobulins, and cytokines) involved in regulation and host defense against infectious agents. Introductory lectures serve to describe and differentiate between innate mechanisms and adaptive immunity mediated by functional B and T lymphocytes and their products. B cell and T cell activation, regulation, and tolerance will be described. Cellular interactions between cells and the cytokines made by helper T cell subsets and other components of the immune system (B cells, CTL., NK cells, macrophages, eosinophils etc.) will be integrated.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IMSP 544S

IMSP 552S Medical Nutrition 1.0 Credit

The goal of the course is to introduce some of the basic concepts of nutrition, to familiarize the student with the complexities of the issues with in-depth considerations of selected nutrients, and to consider the role of nutrition in a few clinical situations. This is intended to be a base upon which to build a more complete understanding of nutrition as topics with nutrition content arises formally and informally in the student's future. It is impossible even to introduce the entirety of the science of Nutrition in so short a time. Hence, a modest number of important topics have been chosen to be studied in detail, in the hope that if the student knows these well, the student will be able to deal more easily with the complexities of other areas.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 562S Medical Neuroanatomy 6.0 Credits

This course will provide extensive information regarding structure and function relationships in the central nervous system. It will also provide introductory information on neurophysiology, cellular neuroscience and systems neuroscience topics.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP T580S Special Topics in Interdepartmental Medical Science 0.0-12.0 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

IMSP T680S Special Topics in Interdepartmental Medical Science 0.0-12.0 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

Interdepartmental

Courses

IDPT 500S Responsible Conduct of Research 2.0 Credits

This two credit course is offered twice a year, one evening a week. It is presented using lecture, discussion and problem-based curriculum approaches, with associated required readings in texts. Some topics additionally require web-based exercises and quizzes. Graduate students, postdoctoral researchers and faculty discuss current issues of scientific integrity that all scientists encounter in their research. Solutions to hypothetical and real research challenges and ethical dilemmas are discussed and debated by trainees and faculty. Course sessions and discussions are led by a team of faculty leaders, including department head, deans and provosts. Grades are based on quizzes, class participation, web-based exercises, a term paper and a PowerPoint presentation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 4 credits

IDPT 501S Biostatistics I 2.0 Credits

Introduction to the theory of probability, frequency distribution, correlation's and regression analysis, probability, chi-square and analysis of variance, applications of statistics in the laboratory.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 9 times for 999 credits

IDPT 502S Learn Early As Professionals I (LEAP I) 1.0 Credit

LEAP (Learn Early As Professionals) is the first part of a professional development program that extends throughout graduate education and training in the Division of Biomedical Science Programs. It is a required course for all first year graduate students in the Division of Biomedical Science Programs. LEAP covers topics that graduate faculty, senior graduate students, and postdocs feel are important for early graduate training and future professional success.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 2 credits

IDPT 503S Searching Biomedical Literature 1.0 Credit

This course surveys information sources in the library (books, journals, computer "finding tools"), with primary focus on finding biomedical journal articles via MEDLINE. Search planning is emphasized, including points on using Medical Subject Headings and precautions when searching title/abstract words. Resources for keeping up with the literature and maintaining personal files are briefly mentioned.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 504S Learn Early and Practice (LEAP II) 1.0 Credit

LEAP II (Learn Early as Professionals II) is the second part of a formal, lecture-based professional development program. Professional development is part of the training offered in graduate education by the Division of Biomedical Science Programs. The objective of this course is to extend our discussions on topics in professional development for beginning scientists. These topics are critical for second semester graduate students as they transition through their first year of graduate school. This course covers topics that graduate faculty, senior graduate students, and postdocs feel are important for early graduate training and future professional success. Professional development is one of the core competencies required by all graduate students in the Division of Biomedical Sciences programs.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 2 credits

IDPT 505S BIOMEDICAL RESEARCH 9.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 506S Biostatistics II 2.0 Credits

Graduate Biostatistics II picks up where Biostatistics I leaves off. It teaches applications of commonly-used techniques in greater depth, with the intended audience being individuals who will be using statistics considerably in their work. This course includes one and two-way ANOVAs (and post hoc tests), multivariate techniques, power analysis, and other methods. The basic of the SPSS computer program is taught as well.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 507S Teaching Practicum I 1.0-4.0 Credit

The goal of this practicum is to provide mentored teaching experiences for graduate students enrolled in the biomedical science programs of the COM. Graduate students in COM programs can meet practicum requirements in a variety of teaching venues including but not limited to tutoring, laboratory instruction, conferences, and lectures in medical school and graduate program-specific courses. Eligible teaching experiences also include instruction for high school and undergraduate students. Credits for each practicum will be awarded according to preparation time and contact hours. 1 credit hr = 16hrs of instruction.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 508S Teaching Practicum II 1.0-4.0 Credit

The goal of this practicum is to provide mentored teaching experiences for graduate students enrolled in the biomedical science programs of the COM. Graduate students in COM programs can meet practicum requirements in a variety of teaching venues including but not limited to tutoring, laboratory instruction, conferences, and lectures in medical school and graduate program-specific courses. Eligible teaching experiences also include instruction for high school and undergraduate students. Credits for each practicum will be awarded according to preparation time and contact hours. 1 credit hr = 16hrs of instruction.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 509S Teaching Practicum III 1.0-4.0 Credit

The goal of this practicum is to provide mentored teaching experiences for graduate students enrolled in the biomedical science programs of the COM. Graduate students in COM programs can meet practicum requirements in a variety of teaching venues including but not limited to tutoring, laboratory instruction, conferences, and lectures in medical school and graduate program-specific courses. Eligible teaching experiences also include instruction for high school and undergraduate students. Credits for each practicum will be awarded according to preparation time and contact hours. 1 credit hr = 16hrs of instruction.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 521S Molecular Structure and Metabolism 5.0 Credits

Introduction to the fundamental concepts of biochemistry and molecular biology. Topics covered include the structure and function of biomolecules such as proteins, nucleic acids, carbohydrates, and lipids; enzymes; membrane transport phenomena; second messenger signaling; prokaryotic and eukaryotic DNA replication; transcription and translation; protein processing and trafficking; and intermediary metabolism.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 526S Cells to Systems 5.0 Credits

Cells to Systems provides a foundation in cell biology, with topics in cytoskeleton, cell adhesion, membrane biology, endocytosis, intracellular signaling, cell cycle, cell growth (cancer), cell senescence, cell death (apoptosis), and genetic methodologies. A final section covers integrative topics on complex biological systems operating in intact organisms.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 532S SUMMER MAKE-UP MED BIOCHEM 7.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 550S Biochemistry and Biophysics 5.0 Credits

This course includes the fundamentals of metabolism, enzymology, protein synthesis and structure, and molecular biology taught from neuroscience perspective. In addition, there are lectures on biophysics of ion channels, and neuronal circuits.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 600S Thesis Defense 9.0 Credits

Students who have complete all course work and research requirements, but have not defended their thesis, may carry a status of "Registered for Thesis Defense Only". This registration carries no credit, has no fee and students receive no grade. Students may only be registered for thesis defense for no more than two semesters. Students may not be registered for this category if they are registered for any other graduate courses.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 9 times for 999 credits

IDPT 601S Optional Rotation 4.0 Credits

Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 7001S Professionalism in Medicine 1 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 7002S Professionalism in Medicine 2 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 7003S Professionalism in Medicine 3 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 7004S Professionalism in Medicine 4 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 703S HUMAN SEXUALITY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 9 times for 999 credits

IDPT 706S PHYSICIAN AND PATIENT 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 710S PIL FALL SESSION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 720S PIL WINTER SESSION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 730S PIL SPRING SESSION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 740S PIL SUMMER SESSION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 750S PIL FALL SESSION II 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 751S INTR TO GERIATRICS/GERONTOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 752S INTRODUCTION TO AMBULATORY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 760S PIL WINTER SESSION II 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 770S PIL SPRING SESSION II 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 790S Spanish for Medical Professionals 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 800S Register for Degree Only 9.0 Credits

This is a course designated to allow students who recently defended the opportunity to finish up any loose ends while maintaining the graduate student status. Students can only register for this course after they have defended their thesis.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 801S CLINICAL PRACTICE EXAM (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 802S FOURTH YEAR RESEARCH COURSE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 821S INTERDEPT. ELECT.-NUTRITION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 822S ACADEMIC ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 823S MD/MPH RESEARCH 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**IDPT 824S MD/Ph.D RESEARCH 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**IDPT 850S Literature Review Non-Thesis MS 4.0 Credits**

Literature Review of a specific topic directed at fulfillment of the degree requirement for a scholarly paper by non-thesis master's students.

Progress is monitored by student's advisor and advisory committee.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 2 times for 8 credits**IDPT 901S CLINICAL EXAM PREP 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**IDPT 990S INDEPENDENT STUDY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**IDPT 991S INDEPENDENT STUDY 2 0.0 Credits****College/Department:** College of Medicine**IDPT 992S INDEPENDENT STUDY 3 0.0 Credits****College/Department:** College of Medicine**IDPT 997S SUMMER ENRICHMENT PROGRAM 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**IDPT 998S TERM ACTIVATOR 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**IDPT T580S Special Topics in Interdepartmental 0.0-12.0 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**IDPT T680S Special Topics in Interdepartmental 0.0-12.0 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**IDPT T780S Special Topics in Interdepartmental 0.0-12.0 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**IDPT T880S Special Topics in Interdepartmental 0.0-12.0 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**IDPT T980S Special Topics in Interdepartmental 0.0-12.0 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

Interdisciplinary Health Science

Courses

IHS 500S Career Development in the Health Sciences Seminar I 1.0 Credit

This is the first of two seminar courses that will expose students to a variety of professions in the healthcare field. Presentations will be conducted by professionals in their respective fields. Students will also participate in group research projects investigating different healthcare professions, with the goal of examining team-based healthcare. This course will also examine effective tools to further professional development, and students will be required to complete an Individualized Development Plan (IDP).

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Restrictions:** Can enroll if major is IHS.**IHS 501S Career Development in the Health Sciences Seminar II 1.0 Credit**

This is the second of two seminar courses that will expose students to a variety of professions in the healthcare field. Presentations will be conducted by professionals in their respective fields. Students will also participate in group research projects investigating different healthcare professions, with the goal of examining team-based healthcare. This course will also examine effective tools to further professional development, and students will be required to complete an Individualized Development Plan (IDP).

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Prerequisites:** IHS 500S [Min Grade: C]**IHS 502S Neuropharmacology 3.0 Credits**

This course will introduce students to neurotransmitters and their role in nervous system function. Course readings and lectures will provide: Anatomy and physiology basic elements; drug research and treatment of nervous system disorders; and explore environmental factors that affect nervous system function.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**IHS 503S Special Topics 3.0 Credits****College/Department:** COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit

IHS 505S Healthcare in Spanish I 3.0 Credits

This course will permit students with an existing knowledge of Spanish to develop a rich medical vocabulary through reading, writing and class discussions. Information regarding cultural subtleties and differences between various hispanic subcultures will further enhance students' ability to communicate with hispanic patients. Various public health & socio-political issues impacting the treatment & management of hispanic patients will be examined & hispanic healthcare scholars invited for selected guest lectures.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IHS or major is MIHS.

IHS 506S Healthcare in Spanish II 3.0 Credits

The course is designed to build cultural competency in numerous hispanic subcultures to assist future healthcare professionals in treating and interacting with patients of hispanic heritage. Course sessions will be conducted in spanish to further enhance students' communication skills with lecture and discussion emphasizing topics of significant interest to healthcare delivery and medicine.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IHS 505S [Min Grade: C]

IHS 507S Initiating Biomedical Research 0.0-2.0 Credits

Designed to assist students with the process of initiation biomedical research. Students will be provided with a structured series of steps which guide them in independently exploring and, ultimately, identifying a research topic and developing a sound research proposal in a logical, satisfying manner.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 508S MIHS Research Project 1.5 Credit

Will involve student investigation of a biomedical research problem on a topic approved by the IHS Program Director in order to complete the research component for the research/journal paper graduation requirement. Acceptable topics may be based on library research; the analysis of retrospective clinical, laboratory, archival, or descriptive data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IHS 507S [Min Grade: S]

IHS 509S MIHS Research Paper 1.5 Credit

Will assist students in organizing, writing, and preparing a 15-page double-spaced, typewritten document on a topic approved by the MIHS Program Director in order to meet the research journal paper graduation requirement.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IHS 508S [Min Grade: C]

IHS 510S Introductory Biostatistics 3.0 Credits

This web-based course is an introductory biostatistics course designed to focus on learning the statistical principles most often used in medicine and clinical research. Biostatistics has become increasingly important in clinical research and health care professionals participating in or directing research projects find knowledge about biostatistics indispensable. When reading articles in medical journals, clinicians must understand biostatistics in order to decide whether they can believe the results presented in the literature, how the study results apply to patient care, or how to interpret information about drugs. Biostatistics covers the development and application of statistical techniques to clinical scientific research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 511S Biology of Cancer 3.0 Credits

This course is a comprehensive overview of cancer, the goal is to provide students with general knowledge of cancer biology. Tumor development will be discussed as a multi-step process dependent upon changes of underlying molecular and cellular events. Additionally, the role of growth factors, oncogenes, and tumor suppressor genes will be included. Specific cell signaling pathways, cell cycle controls, and apoptosis resulting in metastasis will also be discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 513S Scientific Writing for Healthcare Professionals 2.0 Credits

This course will introduce students to the basic guiding principles of scientific writing, and to the writing techniques necessary to effectively and efficiently communicate scientific information to professionals in the science and healthcare communities. Referencing, plagiarism, and the elements of science journal articles will also be discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 514S Molecular Biology & Biochemistry of the Cell 3.0 Credits

Modern cell biology combines genetics, biochemistry, and molecular biology with traditional morphological descriptions to study how cells function at the molecular level. This course will introduce students to the dynamic relationships between the structure of cellular organelles and the numerous biochemical reactions that are necessary for cell growth, development, communication, motility, and survival with an emphasis on eukaryotic cells.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 515S Exploring Diversity in Healthcare 2.0 Credits

In a face-to-face format, this course is designed to introduce students to diversity through the examination of beliefs and practices. Culturally competent healthcare workers can reduce disparities through the provision of unbiased care. Students will discover ways to engage and support diverse populations through self-awareness and critical thinking. Current initiatives that encourage diversity will be discussed along with the practical application of culturally competent skills. Students will participate in individual and group assignments to encourage the development of cultural competence. Each class will include a lecture, pertinent activity and dialogue.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 516S Strategic Communication and Professional Development 2.0 Credits

The Strategic Communication and Professional Development course is a one semester long class to assist students in developing their academic and professional skills for careers and graduate student in the health sciences. The course will focus on graduate scholarship and interpersonal skill development.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 522S Enhanced Laboratory Investigation I 2.0 Credits

This course is designed to offer an enhanced research experience to students enrolled in the Laboratory Techniques concentration track of the Interdisciplinary Health Sciences (IHSP) Master's Program. Students will declare their interest in this track at the end of the year 1 Spring term. They will then use the summer semester between years 1 and 2 to develop and formulate their research interests with the help of the Program Director. During this time, students will also investigate potential research opportunities in local laboratories whose research interests parallel those of the student. By the end of the summer semester, students will have chosen a laboratory in which to work, and have begun the process of developing a research project with the primary investigator (PI) of the laboratory.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IHS.

Prerequisites: IHS 500S [Min Grade: C] and IHS 501S [Min Grade: C] and MSPP 525S [Min Grade: C] and IHS 502S [Min Grade: C]

Corequisites: IHS 507S, IHS 508S

IHS 523S Enhanced Laboratory Investigation II 2.0 Credits

Enhanced Laboratory Investigation I (ELI II) is the second of two courses designed to provide an enhanced laboratory research experience for students interested in pursuing this career option. Successful completion of this course is a requirement for the Laboratory Techniques concentration track of the Interdisciplinary Health Sciences Program (IHSP) Master's degree from Drexel University, College of Medicine. Students will work closely with a Principal Investigator to complete a 1 year hypothesis-driven research project.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IHS.

Prerequisites: IHS 500S [Min Grade: C] and IHS 501S [Min Grade: C] and MSPP 525S [Min Grade: C] and IHS 502S [Min Grade: C] and IHS 522S [Min Grade: C]

Corequisites: IHS 507S, IHS 508S

IHS 525S Human Nutrition 3.0 Credits

This online course presents the concepts and rationale of nutrition in the context of personal, cultural and world aspects of human nutrition. Students will examine roles of nutrients in health and disease, digestion, diets, eating disorders, and other topics related to nutrition and life cycle stages. While the course has no prerequisites, the scientific rationale is developed with a minimum of assumptions and scientific terminology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 900S Registered for Degree Only 0.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS T580S Special Topics in Interdisciplinary Health Science 1.0-10.0 Credit

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

Law

Courses

LAW 514S Banking and Finance Law and Regulation 3.0 Credits

A significant sector of the legal profession provides advice to the banking industry, to government regulators, and, of course, to individuals, corporations and other institutions in connection with banking transactions. This course will provide an introduction to the regulatory environment of the banking industry and the roles of bank regulators and central banks. Attention will be given to systematic risk and the response to that risk by way of prudential regulation, including capital and liquidity requirements. The financial crisis of 2007-8 and previous regulatory failures will be examined as will the legislative steps taken by governments to reduce risks of bank failure.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 515S Ethics and Social Responsibility: The Lawyer as Ethical Gatekeeper 3.0 Credits

We will examine, through cases, problems, discussions and readings, issues of ethics and social responsibility that arise in real life contexts and decide what principles to apply to ethical problems. Lawyers have a special responsibility in both the public and private sectors to ensure ethical behavior and to establish systems for preventing unethical behavior. Issues of concern to lawyers will be integrated into each class discussion. Particular focus will be given to the nexus between law and ethics. Another part of the course will be devoted to a study of professional values and responsibility and legal ethics. Running throughout the course is the theme of the lawyer as ethical gatekeeper.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 516S Foreign and Domestic Investment in Africa's Natural Resources: Law, Policy, and Sustainability 3.0 Credits

Foreign and domestic investment in extractive and other natural resource industries in Africa can contribute significantly to national development through tax revenue, transfer of capital and technology, job creation, linkages with local industries, infrastructure development, community development and the elimination of poverty. At the same time, the history of natural resource development in Africa sends up a warning signal that these benefits do not come without careful planning and without careful drafting. Governments need carefully crafted policies and regulatory and legal frameworks for natural resource development. Parties to natural resource agreements need skilled negotiators to achieve their goals. This course will give students the skills they need to develop these frameworks.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 517S International Commercial Arbitration 3.0 Credits

The purpose of this course is to provide an understanding of the history, process, and intricacies of international commercial arbitration. This course is especially interested in examining the practical realities faced by lawyers as they navigate the complex world of international arbitration on behalf of their clients. While the course provides basic history and context to situate international commercial arbitration in the proper legal framework, the course topics, which range from drafting arbitration agreements to enforcement of awards, are aimed at providing concrete strategies for practitioners or future practitioners in this field.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 518S International Trade and Investment: Practice and Law 3.0 Credits

Transnational trade and investment is a major and growing phenomenon in the 21st century. This course will examine the legal and regulatory frameworks of transnational trade and investment, with particular attention to developing regions in Asia, Latin America and most especially in Africa.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 520S Project Finance for Infrastructure Development in Africa 3.0 Credits

Finding a means of financing major infrastructure projects is a key to the project's ultimate success in Africa and elsewhere. "Project finance" is a favored means of enabling governments of emerging market countries and others across the world to build roads, ports and airports; provide power to their people; exploit natural resources; build medical facilities; and finance a myriad of other public works. We will examine how infrastructure projects are structured and negotiated and how related risks are allocated and mitigated. We will examine the ways in which major projects are financed, focusing on the key legal features of the financing and the various parties who bring infrastructure projects to life.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 550S Torts 3.0-5.0 Credits

This course examines the general theories of civil liability for injuries to persons or property. Topics include liability for intentional misconduct, an introduction to the law of negligence, and a strict liability as well as defenses to claims of tort liability.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 552S Contracts 3.0-5.0 Credits

This course examines the enforcement of promises and bargains. Topics include contract formation, the doctrine of consideration, formalities including the Statute of Frauds and the parol evidence rule, performance and breach, defenses, remedies.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 554S Civil Procedure 3.0-5.0 Credits

This course examines the civil litigation process with an emphasis on the federal courts. Topics include remedies, pleadings, pre-trial motion practice, discovery, motions for summary judgment, trial procedure, appellate review, and issue and claim preclusion.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 555S Legislation and Regulation 3.0 Credits

This course is intended to introduce the student to lawmaking through statutes and agency regulation in the modern regulatory state. The course will examine the reasons why we have developed into a regulatory state. It will consider the roles and relationships of Congress and administrative agencies within the three branches of government. It will look at how statutes are created and passed. The course is also designed to provide the student with an introduction to the theory and practice of statutory interpretation, including how to read and understand a statute. In addition, the course will introduce students to how agencies create and enforce regulation, including some of the requirements placed on agencies by the Administrative Procedures Act, and the judicial review of regulations.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 556S Property 3.0-5.0 Credits

This course examines the basic elements of the law of real and personal property. Topics include ownership and possession of property, gifts, the rights of bona fide purchasers, adverse possession, estates and future interests in real property, and co-ownership and concurrent interests.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 558S Criminal Law 3.0-5.0 Credits

This course examines the principles that underlie liability for criminal conduct. Topics include the definition of crimes and the principles of punishment, the required acts and mental states necessary for liability, and defenses to and justifications for conduct. Specific crimes will be discussed including conspiracy and intentional murder and manslaughter.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 560S Constitutional Law 3.0-5.0 Credits

This course examines the basic issues in federal constitutional law. Topics include the role of the courts in interpretation of the Constitution, the scope of legislative and executive powers, the limitation of the powers of state and local governments, and an introduction to concepts of equal protection.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 565S Legal Methods I 2.0-4.0 Credits

This course provides instruction in the fundamentals of predictive writing and legal research, including LEXIS and Westlaw training.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 566S Legal Methods II 2.0-4.0 Credits

This course continues Legal Methods I. Students will learn additional legal research skills and will be introduced to persuasive writing techniques.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 565S

LAW 568S Intro to Interviewing, Counseling, and Negotiations 1.0 Credit

This course develops the practical lawyering skills of interviewing and counseling. Students will also be introduced to negotiation theory and practice.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 600S Constitutional Law II 3.0 Credits

This course covers issues in substantive and procedural due process and equal protection under the law. It also introduces issues related to personal rights, as embodied by the First Amendment.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 602S First Amendment 3.0-4.0 Credits

This course examines speech and religion clauses of the First Amendment. It considers the philosophical and historical foundation of free expression; analytical problems in First Amendment jurisprudence; and the relationships between free exercise of religion and the separation of church and state.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 603S Media Law 2.0-3.0 Credits

This course will consider media law and the practical implications of representing media clients. Topics will include: who is "the media" in a digital age; statutory and constitutional protections; prior restraints and criminal liability; civil liability arising out of publication (including defamation and other tort liability); problems of newsgathering; reporter's privilege; and advising the media client.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 604S Advanced Constitutional Law 3.0-4.0 Credits

This course takes an in depth look at individual rights under the Constitution with a particular emphasis on substantive and procedural due process and equal protection under the law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 606S Civil Rights Law 2.0-3.0 Credits

This course explores the principles of civil rights law and practice. It will also review both the history and current development of this area of law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 608S Marshall-Brennan Constitutional Lit Sem 1.0-2.0 Credit

This is the required companion course for students participating in the Marshall-Brennan Constitutional Literacy Project. It is designed to prepare law students to teach constitutional law in local high schools and to supervise these high school students as they compete in regional and national constitutional moot court competitions.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 610S Reproductive Rights Law 2.0-3.0 Credits

Reproductive rights have been a central and sometimes divisive topic in our country's recent history. This seminar will explore the legal regulation of human reproduction through caselaw and a variety of theoretical frameworks. It will consider constitutional, bioethical, moral, religious, and social issues around birth control, abortion, cloning, and embryonic selection.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 611S Sex, Gender, & the Law 2.0-3.0 Credits

This course will explore the law and theory of sex and gender. Looking to a wide variety of legal doctrines and theorists, students will gain an understanding of how the law was developed, where it is going, and what it should be. The course will also address other identity characteristics and how they intersect with sex and gender.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 612S Sexual Orientation and the Law 2.0-3.0 Credits

The course will focus on the interaction between sexual orientation and the law. Students will study how the transformation of social attitudes around sexual orientation plays out in various doctrinal areas.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 614S Supreme Court Seminar 3.0 Credits

This seminar will introduce students to the history and function of the United States Supreme Court. Students will study several active cases, draft simulated Supreme Court opinions, and practice oral argument. Where possible, students will actually attend one day of Supreme Court argument.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 620S Administrative Law 3.0-4.0 Credits

This course studies the law governing administrative agencies in the task of carrying out governmental programs; interrelations of legislative, executive and judicial agencies in development of public policy; decision-making processes and internal procedures of administrative agencies, and legislative, executive, and judicial controls on them.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 621S Federal Courts 3.0 Credits

This course considers the constitutional, statutory, and judicial rules that determine whether a case is tried in state or federal court.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 622S Employment Discrimination 3.0 Credits

This course studies the federal and state statutes and case law that prohibit employment discrimination on the basis of race, color, gender, religion, national origin, age, disability, and sexual orientation. This course covers substantially different material than Employment Law and students may productively take both courses.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 623S Election Law 3.0-4.0 Credits

This course considers the ways in which state and federal law regulate elections and the political process. Students will gain a perspective on both practical aspects of election regulation and the power relationships that motivate these rules.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 624S Environmental Law 3.0 Credits

This course surveys the federal and state statutes and regulatory programs which attempt to limit water pollution, air pollution, environmental degradation, species extinction, hazardous waste, and chemical regulation problems.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 625S Energy Law 2.0 Credits

This course will provide an overview of energy law. Topics will include: (1) an overview of U.S. energy policy; (2) introduction to Administrative Law and Regulatory Economics; (3) public utility regulation and deregulation; (4) preemption; (5) climate change; (6) electricity; (7) traditional fossil fuels: coal and oil; (8) nuclear power; (9) natural gas and the Marcellus Shale; (10) renewable energy; (11) conservation and storage; (12) oil and gas law; and (13) developing a revised U.S. energy policy.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 626S Animal Law 2.0 Credits

This course will encourage students to consider the philosophical and jurisprudential bases for the current status of animals in our legal system. The course will examine both the history of, and future trends regarding, that status.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 627S Admiralty Law 2.0 Credits

This is an introductory level course covering basic principles including sources of maritime law, federal and state law jurisdiction over maritime claims, special maritime remedies (arrest and attachment), carriage of goods by sea, maritime torts (collisions, allisions, pollution, personal injury claims, seamen's rights/remedies), maritime contract disputes and liens, and marine insurance. The course will cover these subjects from both a historic and pragmatic perspective.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 628S Civil Litigation Remedies 2.0-3.0 Credits

This course will help students gain an understanding of the law and policies relating to equitable remedies (specific performance and injunctions), damages at common law (compensatory and punitive damages), and restitution.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 630S Class Actions/Other Complex Litigation 3.0 Credits

This course builds on the first year civil procedure course by examining the rules and practice that apply in sophisticated litigation settings. Students will learn about representative (class) actions; how to address related cases pending in different courts and other case management issues; the application of claim and issue preclusion principles; and other issues often faced in complex litigation. The course will cover a number of recent Supreme Court cases affecting civil procedure and will provide students with the working knowledge of the procedures they will likely need in cases of any significance.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 632S Conflict of Laws 3.0 Credits

The course focuses on cases involving multi-jurisdictional elements. Three primary areas are covered: choice of the law approaches; enforcement in a forum of judgments rendered in another state; and jurisdiction over an out-of-state party. Both relationships among American states and issues involving state and federal law are addressed.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 634S Evidence 3.0-4.0 Credits

This course studies the law governing proof of disputed factual matters in criminal and civil trials, including issues of relevancy, competency, hearsay, and other exclusionary rules, and the privilege of witnesses.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 636S Legislation 2.0-4.0 Credits

This course examines theories of legislative behavior, beginning with an examination of the process by which statutes are generated. It then considers theories of representation and interpretation and their implications for issues that arise in the implementation of statutes.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 637S Advanced Evidence 2.0-3.0 Credits

This course will provide in-depth investigation of evidentiary issues relevant to trial lawyers.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 634S [Min Grade: D]

LAW 638S State and Local Government Law 2.0-3.0 Credits

This course examines state and local governments, their role in setting public policy, and the interrelationship between them. Areas to be explored may include forms and structures of state and local governments, selection of public services, taxing and spending powers, home rule, zoning law, and general powers and immunities.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 640S Education Law 2.0-3.0 Credits

This course will cover constitutional and statutory law and policy issues relating to public schools, including rights of parents, teachers and students, school discipline, religion, speech, discrimination, and disability rights.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 642S Special Education Law 2.0-3.0 Credits

This class considers the law governing education of students with disabilities, with a particular focus on the Individuals With Disabilities Education Act (IDEA). Students will study the evaluation and planning process, procedural due process provisions, substantive issues such as use of least restrictive environment and school discipline, and remedies under the law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 643S Children and the Law 2.0-3.0 Credits

This course examines the relationship between children, family and the state.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 644S Family Law 3.0-4.0 Credits

This course will examine the legal and policy issues relating to the family. Topics will include marriage, including barrier to marriage and the legal relationships between spouses; parents and children; divorce and its incidents, including child support and custody, and jurisdictional issues.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 645S Pennsylvania Family Law Practice 2.0 Credits

The course will teach students the practical side of practicing family law in Pennsylvania from the initial client contact through final dissolution of the marriage or custody issues and will cover the essentials of divorce, equitable distribution, child support, alimony pendente lite, alimony, custody and special relief. Students will be divided into groups of "Plaintiff's Attorney" and "Defendant's Attorney" and will learn and be expected to determine strategy in equitable distribution, support and custody and be able to perform support calculations and spot issues related to these matters.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 646S Mediation and Arbitration 2.0-3.0 Credits

This course explores the theory, practice and law of mediation and arbitration, with an emphasis on the roles lawyers play in these processes. The course will include simulated mediations and arbitrations to foster a deeper understanding of the material and to develop lawyering skills in resolving disputes without litigation.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 648S Representing the Regulated Client 2.0 Credits

Using a practical approach, this course will cover the complex issues involved in representing clients who are subject to administrative regulation. Although it addresses issues relevant to a wide variety of regulated clients, it will have a particular focus on environmental regulation matters.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 650S Regulation Seminar 2.0-3.0 Credits

This seminar considers why we regulate and ways in which to make existing regulation more effective. Students review and critique the dominant economic regulation paradigm as well as other theories of regulation based on mortality and risk. It concludes with an investigation of the role of politics in regulation.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 652S Pennsylvania Practice 2.0-3.0 Credits

This course explores unique issues related to civil litigation in Pennsylvania.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 653S Entrepreneurial Law Clinic Seminar 1.0 Credit

The Entrepreneurial Law Clinic Seminar will meet once a week, allowing participants in the Clinic to discuss various issues they encounter in their work in a seminar setting.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 2 times for 2 credits

Prerequisites: LAW 713S

Corequisite: LAW 924S

LAW 654S Lawyering Practice Seminar 2.0 Credits

This seminar focuses on learning from experiences, both in the Co-op and in later professional practice. Students will study the roles being played by lawyers and the institutions where lawyers work. They will discuss their fieldwork experiences, make formal class presentations, and listen to practicing attorneys. Enrollment is by permission only.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 655S Lawyering Practice Seminar II 1.0 Credit

This is a professionalism course designed to support students' second co-op experience as they continue to build skills and develop professional identity. Students will continue to focus on the study of lawyers and their roles and obligations within the context of their co-op and later professional practice. Course meetings will revolve around student presentations, engagement with practicing attorneys and developing a professional development plan and personal writing portfolio.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 654S

LAW 656S Justice Lawyering Sem 1.0-3.0 Credit

This course, which is a co-requisite of the field clinics, is a critical look at law and social justice.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 2 times for 3 credits

LAW 658S Labor Law 3.0 Credits

This course focuses on the laws governing collective bargaining by unions and employees, and the laws regularity the relationship between individuals and their unions.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 660S E-Discovery & Digital Evidence 2.0 Credits

This course intends to prepare law students for modern-day litigation practice, which has become increasingly dependent on the understanding and use of technology. Doctrinally, this course covers the identification, preservation, collection, review, and production of electronically stored information ("ESI") in civil litigation. Practically, this course covers the organization, use and presentation of ESI from the very beginning of the case through trial preparation.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 670S Criminal Procedure: Investigations 3.0 Credits

This course considers the Fourth Amendment's protection against unreasonable search and seizure, the Fifth Amendment's right to Due Process and against compulsory self-incriminations, and the Sixth Amendment's right to counsel, all with particular emphasis on the application of these constitutional provisions within the context of criminal investigation.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 671S Criminal Procedure: Prosecution & Adjudication 3.0 Credits

This course will study the basic rules of criminal procedure, beginning with the institution of formal proceedings. It will emphasize prosecutorial discretion, preliminary hearings, the grand jury, criminal discovery, guilty pleas and plea bargaining, jury selection, pretrial publicity, double jeopardy, the right to counsel, and pretrial release and sentencing.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 672S Sentencing Law 2.0-3.0 Credits

This course examines theories of sentencing, sentencing regimes, use of guidelines, and constitutional limits on sentencing.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 673S Crime and Community 2.0 Credits

In this course, students will study how various communities are affected by crime and criminal justice policies. Issues that may be considered include the war on drugs, large-scale incarceration, and sexual offender regulations.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAW.

LAW 674S Health Care Fraud and Abuse 2.0-3.0 Credits

This course examines the major federal and state legislation for providers who seek reimbursement under governmentally funded health care programs including the Medicare and Medicaid Anti-Kickback statute, the False Claims Act, and the Stark I and Stark II legislation and regulations.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 675S Federal Criminal Law 2.0-3.0 Credits

This is a broad survey course on current federal criminal law and practice. Students will become familiar with a wide range of federal criminal statutes, theories of criminal liability and culpability, federal sentencing law, federal jurisdictional issues, and federal practice from the investigative through trial stages.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 676S White Collar Crime 2.0-3.0 Credits

This class will present an overview of white collar criminal litigation. The course will emphasize federal law and focus on liability for corporations and corporate executives, fraud, obstruction of justice, and related matters.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 678S Juvenile Justice Law 2.0-3.0 Credits

This course will conduct an in-depth study of juvenile justice jurisprudence, doctrine, and policy in the United States. It will consider particular constitutional issues as they relate to children in the juvenile justice system. It will also consider the major differences between the criminal justice and the juvenile justice systems.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 680S Death Penalty Law 2.0-3.0 Credits

This course will focus on the substantive and procedural issues presented in cases where prosecutors seek the death penalty. It will also consider the legal issues arising in collateral challenges to death sentences, particularly through the Federal habeas corpus process.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 682S Criminal & Civil Rights Litigation Strategies 2.0 Credits

This advanced litigation course is designed to train students in how to create a strategy for handling a criminal or civil rights matter. Students will begin with substantial factual material. With this base, they will move through the processes of developing a case theory, designing an investigation and discovery strategy, targeting relevant court motions, and preparation of the case for trial.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 670S [Min Grade: D] and LAW 634S [Min Grade: D]

LAW 699S Special Topics in Law 1.0-5.0 Credit

This course covers topics of current interest to faculty and students; specific topics for each term will be announced prior to registration. May be repeated for credit if topics vary.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 3 times for 8 credits

LAW 700S Business Organizations 3.0-4.0 Credits

This class studies the legal attributes of corporations, partnerships, and limited liability companies. It examines the rights, duties and liabilities of managers, owners, and agents. It also focuses on formation issues, operational powers and fundamental changes in business forms such as dissolution, merger, or acquisition.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 701S Federal Income Tax 3.0-4.0 Credits

This course is intended to give students an understanding of the fundamental legal and policy concepts underlying the federal individual income tax. The course will focus on the statutory framework of U.S. tax laws, particular judicial authorities, and selected Treasury Department regulations and rulings.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 702S Enterprise Tax 3.0-4.0 Credits

This course will survey the differing federal income tax treatments of the various forms of business and investment activities, including both corporations and partnerships.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 701S

LAW 703S Law and Entrepreneurship 3.0 Credits

This course will examine the entrepreneurial process and the role of law in entrepreneurship. In context of a start-up formation, the course will consider intellectual property, tax, and employment law, business regulation, and the formation and financing process. Students will develop a basic understanding of the substantive legal regimes affecting these areas and assess the impact of these regimes on entrepreneurial activity and economic growth.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 704S Corporate Finance 2.0-3.0 Credits

This course is designed to familiarize law students with the principles of corporate finance. In the world of corporate finance, the distinction between lawyers and investment bankers has blurred. Whether issuing new securities, taking a firm public via an IPO or securing a credit facility, corporate lawyers and investment bankers work side-by-side. Lawyers without an appreciation of corporate finance are at a distinct disadvantage. This course will provide the framework of these types of financings and offer students chances to test their knowledge with a series of simulated transactions during the course of the semester.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 706S Secured Transactions 3.0 Credits

This course provides an introduction to the law governing contractually created interest on personal property used to secure payment or performance of obligations. Students will study the creation, perfection, priority, and enforcement of security interests in personal property under Article 9 of the Uniform Commercial Code.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 708S Payment Systems 3.0 Credits

This course introduces the student to the law of negotiable instruments, primarily checks and promissory notes. The course focuses on Articles 3 (Negotiable Instruments) and 4 (Bank Deposits and Collections) of the Uniform Commercial Code.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 710S Bankruptcy 3.0-4.0 Credits

This course will examine both state law remedies and priorities and the federal Bankruptcy Code. Topics will include elements common to all bankruptcies, as well as Chapter 7 liquidations in the consumer context, and Chapter 8 and 13 wage-earner payout plans.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 711S Sales 3.0 Credits

This course reviews contract formation issues from the perspective of Uniform Commercial Code Article 2 and focuses on significant commercial contractual issues such as formation, performance (delivery and payment), title to goods, third party rights, warranty, and remedies.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 712S Private Equity and Venture Capital Law 2.0-3.0 Credits

This course examines the legal and financial aspects of venture capital and private equity transactions. Subjects include venture capital financing, leveraged buyout transactions, management equity incentive structures, and related tax topics. Students will also be introduced to the venture capital and private equity fund industry.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 700S

LAW 713S Transactional Lawyering 4.0-5.0 Credits

This hands-on skills course places students in the role of dealmakers. Students must anticipate legal problems and create agreements that avoid those pitfalls.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 700S [Min Grade: D]

LAW 714S Securities Regulation 3.0 Credits

This course examines securities market regulation, including registration, exemption, and remedies under the Securities Act of 1933; reporting and accounting standards under the 1934 Act; the proxy system; and the regulation of broker-dealers, specialists, and self-regulatory organizations.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 716S Antitrust 3.0 Credits

This course focuses on antitrust law, with emphasis on how modern technology might challenge traditional antitrust principles. Topics include Rules of Reason vs. per se analysis, monopolies, mergers, joint ventures, tying arrangements, exclusive dealing, predatory pricing, and other business behaviors that have arisen in a variety of industries and markets.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 718S E-Commerce 2.0-3.0 Credits

The advent of the Internet and the integration of electronic technologies into business has had an enormous impact on the way that commerce is carried out. This course will examine the legal challenges faced by businesses as they migrate to an electronic environment, and the extent to which the law must adapt to the changing landscape.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 722S Employment Law 3.0 Credits

This course studies the law regulating the employer-employee relationship. Topics include the process of establishing employment, and its terms; employers legal obligation to employees; termination; and compliance with existing regulatory regime.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 724S Nonprofit Organizations 2.0-3.0 Credits

This course will provide an overview of the legal environment of nonprofit organizations. Emphasis will be upon examining the law as it affects various aspects of nonprofits including incorporation, governance, fundraising and solicitation, employment, political activities, and tax status. Students will learn how the law regulates and structures nonprofit entities.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 726S Sports Law 2.0-3.0 Credits

This course will involve application of various legal doctrines (including contracts, labor, antitrust, intellectual property, tax, torts, remedies, arbitration and constitutional law) to a broad range of sports-related activities.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 728S Entertainment Law 2.0-3.0 Credits

The course will provide an overview of legal issues arising in the entertainment industry. Topics include acquisition of rights, talent agreements, project financing and structures, and distributor and licensing agreements. The course will also survey contracts, business organizations, securities, labor, copyright, trademark and rights of privacy/publicity law impacting the entertainment industry.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 730S Legal Regulation of Global Financial Crimes 3.0 Credits

This course covers a broad scope of global financial crimes and their intersection with the US financial system. Students will learn about a variety of types of financial crimes; what laws and regulations come into play; which regulators enforce them; the consequences for individuals and financial institutions who enable such crimes (whether intentionally or otherwise); the latest data breach issues, laws, and regulations (including GLBA, GDPR, and others); and how current events, politics, and technological advances intersect with these criminal enterprises.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 731S Workers Compensation 2.0 Credits

This course will address the history, statutory construction, and evolving nature of workers compensation law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 733S Employee Benefits Law 2.0-3.0 Credits

This course considers the legal, economic, and social welfare aspects of benefits provided through an individual's ties to the employment market. The course will consider mandatory benefit regimes in which all employers and employees must participate, such as Social Security and Medicare; and voluntary benefit programs, which employers may choose to adopt or not adopt for their employees.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 734S Legal Regulation of Investment Advisers 3.0 Credits

This course will thoroughly review the Investment Advisers Act of 1940 and how it laid the foundation for present day regulation. It will explore the various legal and regulatory schemes that govern investment companies and look at the key policies that drive them.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 735S Legal Regulation of Investment Companies 3.0 Credits

This course will thoroughly review the Investment Company Act of 1940 and how it laid the foundation for present day regulation. It will explore the various legal and regulatory schemes that govern investment companies and look at the key policies that drive them.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 736S Broker/Dealer Regulation 3.0 Credits

This course will discuss the legal and regulatory frameworks that govern broker-dealers. It will explore the multiple legal and regulatory regimes that govern broker dealers and affiliated institutions.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 737S Banking Law 3.0 Credits

This course will explore the development of banking law and how that development shapes our current banking regulatory regime. It will also compare the US banking regulatory scheme comprised of state and federal bodies with the more uniform systems operating in many foreign jurisdictions.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 740S Trusts and Estates 3.0-4.0 Credits

This course will survey the law of gratuitous transfers and inheritance. The class will cover the creation, execution, alteration and interpretation of wills as well as the creation, revocation and interpretation of trusts and trust instruments of various types.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 742S Real Estate Transactions 2.0-3.0 Credits

This upper-level property course studies the legal aspects of residential and commercial real estate sales, development and finance.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 746S Land Use Law 2.0-3.0 Credits

This course studies the principal methods of public control of private land use. It will consider issues relating to nuisance, eminent domain, taxation and zoning.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 760S Copyright 3.0 Credits

This course surveys the law of copyright. Topics to be discussed include the subject matter of copyright; ownership and transfer of copyrights; the rights afforded to copyright owners; duration of copyright rights; infringement; and remedies. Related areas of law such as author's moral rights, unfair competition, and contractual protection.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 761S Patents 3.0 Credits

This course provides an introduction to patent law, focusing upon the requirements of patentability (patentable subject matter, utility, novelty and non-obviousness), infringement, and defenses to infringement. Other topics include the economics of information and innovation competition, claims drafting, licensing, patent misuse and antitrust violations.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 762S Patent Prosecution 2.0 Credits

This course focuses on drafting patents, strategy and tactics before the United States Patent and Trademark Office, and standards for patentability in the context of business effectiveness and ethical requirements.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 761S [Min Grade: D] (Can be taken Concurrently)

LAW 763S Patent Litigation & Strategy 2.0-3.0 Credits

This course will delve more deeply into the questions of patentability, infringement, licenses, and assignments. Also, it will focus on the special aspects of patent litigation arising from its technical nature.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 761S [Min Grade: D]

LAW 764S Trademarks & Unfair Competition 3.0 Credits

This course analyzes the law of unfair commercial practices. It covers trademarks, service marks, trade names, trade dress, infringement, interference with contractual relationships, appropriation of intellectual property created by another, defamation, disparagement, false advertising, unfair methods of competition, unfair or deceptive acts or practices, and remedies.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 765S Essentials of Intellectual Property Law 3.0 Credits

The purpose of this course is to provide an overview of intellectual property for those preparing to be civil or criminal attorneys who do not specialize in the field. Over the past century, the creation of new solutions and content has become a primary foundation of the U.S. economy. As such, it has become integral to the practice of business law. Some types of protection, including anti-hacking legislation, trade secrets, copyright, and trademark law, are becoming increasingly important in criminal law as well. Those interested in technology and business law will benefit from this foundational course that outlines the basics of intellectual property law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 768S Internet Law 2.0-3.0 Credits

This course addresses a variety of legal issues that relate to the Internet. Areas covered include intellectual property, electronic privacy, constitutional rights, and commercial law issues.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 770S European Union Data Privacy and Protection 3.0 Credits

This course explores the law governing information privacy, data protection, and data security in the European Union. Topics may include an introduction to the EU Data Protection Directive and the new General Data Protection Regulation (2018), the Data Protection Authorities and cybersecurity in Europe. Students will also explore the so-called "Right to Be Forgotten," and how EU law affects US companies doing business in Europe or with European entities.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 780S Health Care Quality Regulation 3.0 Credits

This course examines all aspects of medical errors and quality in health care, including malpractice suits, licensing, staff privileging of doctors, and current regulatory approaches. It will also look at issues of patient rights and autonomy, including consent, medical information, clinical research, and issues in death and dying.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 781S Health Care Cost and Access Regulation 3.0 Credits

This course examines the history of the American health care system and will consider the tensions between costs and the access to care. Topics will include the federal Medicare and Medicaid systems, cost controls through health insurance and federal regulation, antitrust issues, ERISA, EMTALA, and other federal regulatory regimes.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 782S Health Policy Colloquium 2.0 Credits

This course will use case studies to examine regulatory choices in health care. The course will first examine the tools available to regulators in the U.S. health care system. The course will then consider regulatory strategies that a regulator might consider to handle several case studies.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 780S

LAW 783S Bioethics 2.0-3.0 Credits

This class explores the legal and ethical issues surrounding the development of new biological technologies. Topics may include the research bioethics, assisted reproductive technology, genetics, issues surrounding death and dying, and organ transplantation.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 784S Health Care Finance 2.0-3.0 Credits

This class will consider basic economic concepts related to health care finance and private insurance.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 785S Legal Regulation of Pharmaceutical and Medical Device Research and Development 3.0 Credits

This course explores the regulatory entities and schemes governing the research and development, management, financing, and reporting requirements of clinical trials in the pharmaceutical and life sciences sectors. Topics include the role of the Institutional Review Board, compliance with Good Clinical Practice standards, informed consent, pharmacovigilance and the protection of human research subjects, payments and financial transparency, conflicts of interest, ethical considerations in designing and executing clinical trials, and reporting requirements.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 786S Products Liability 3.0 Credits

This course focuses on the theories and scope of liability arising from the distribution and sale of harm-producing products. Topics include concepts of defectiveness, design problems, duty to warn and problems with causation.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 787S Legal Regulation of Pharmaceutical and Medical Device Sales and Marketing Practices 3.0 Credits

This course explores the law governing pharmaceutical and medical device sales and marketing practices, including product pricing, advertising, labeling, promotion and distribution. Topics may include identification of the entities regulating pharmaceutical and medical device manufacturers, disclosure and transparency requirements, payments to doctors and institutions, fraud and abuse, anti-bribery laws, direct-to-consumer advertising including internet advertising, off-label marketing and promotion, labeling over-the-counter (OTC) drugs, and limitations on the government's ability to regulate commercial speech.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 788S Law of Medical Malpractice 2.0-3.0 Credits

This course covers medical liability issues arising from the treatment relationship between health care providers and their patients. Topics include the history of the medical malpractice tort, its evolution as a "crisis," informed consent, the framework for a medical malpractice lawsuit, and an analysis of proposals for medical malpractice reforms.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 790S Toxic Torts 2.0-3.0 Credits

This course will consist of an in-depth study of mass tort litigation of all kinds, at both the state and federal level, focusing primarily on the manufacture and distribution of defective and toxic products and pharmaceuticals. Class actions will be studied as a remedial tool.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 791S Regulating Patient Safety 2.0-3.0 Credits

This seminar will look at the problem of medical errors in American health care, the emerging Patient Safety movement, and regulatory strategies for reducing errors and improving quality in hospitals, drug delivery systems, and physician office practices.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 792S Food and Drug Law 2.0-3.0 Credits

This course considers the federal regulation of products subject to FDA jurisdiction, including food, human prescription and nonprescription drugs, animal feed and drugs, biologics and blood products, medical devices, and cosmetics. The course examines the public policy choices underlying the substantive law, FDA enforcement power, and agency practice and procedure.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 793S Mental Health Law 2.0-3.0 Credits

This course introduces students to the legal doctrine related to the treatment and right of people with mental illness. It will also consider the role of mental health professionals in the functioning of law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 794S Advanced Torts 2.0-3.0 Credits

Advanced Torts will cover areas of tort law particularly relevant to business, including tortious interference with contract, commercial defamation, breach of fiduciary duty and fraud, and spoliation liability.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 796S Insurance Law 2.0-3.0 Credits

This course will survey the basic types of individual and corporate insurance policies, legal principles of insurance law and the role insurance plays in society. Topics may include insurance industry regulation, policy structure, risk management and interpretation, insurance marketing, insurance intermediaries, claims, and potential insurer defenses.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 802S Reflections on Practice 1.0 Credit

This course is designed to accompany a CPT work experience. Working in the U.S. in law can be a challenging experience. The goal of this course is to help students learn from their work experience by the use of reflection and feedback.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 3 times for 4 credits

LAW 810S Adv Probs in Mental Hlth Law 2.0 Credits

The goal of this seminar is to identify and challenge commonly accepted principles or precedents in mental health law. Students will be responsible for choosing, presenting, and leading a discussion on an issue of their choice.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 811S Expert Witnesses 2.0-3.0 Credits

This course will examine the legal, policy, and practice considerations relating to the use of expert witnesses in civil and criminal cases. The course will examine the various roles of expert witnesses in civil and criminal cases, the rules of evidence that govern the recognition of experts and admissibility of expert testimony, techniques for effective direct examination and cross-examination of experts, and the ethical guidelines most relevant to expert testimony. This course will emphasize how attorneys can work effectively with experts (across disciplines) in the context of litigation.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 812S Behavioral Science Applications to the Law 2.0-3.0 Credits

This seminar is designed to inform law students and selected doctoral students in psychology about the usefulness of social science information in the practice and scholarship of law while at the same time indicating the problems and pitfalls of using such information particularly at the appellate level. Thus, this seminar explores the interplay and conflict between law and psychology and the many ways in which social science research can or should have an influence on legal decision making.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 819S Transactional Competition Team 1.0-6.0 Credit

This course is restricted to students who have been approved by the instructor to participate as team members in a transactional lawyering competition approved by the instructor, such as the Transactional LawMeet®. Students are required to participate fully as a team member and to compete effectively in the selected competition under the supervision of the instructor or a senior practitioner selected by the instructor to serve as the team's coach.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 2 times for 18 credits

Prerequisites: LAW 713S [Min Grade: D] (Can be taken Concurrently)

LAW 820S Immigration Law 3.0-4.0 Credits

This course covers issues in immigration law including inadmissibility and deportability, relief from removal, asylum and refugee status, citizenship, nonimmigrant and immigrant visas, and administrative and judicial review.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 821S European Union Law 2.0-3.0 Credits

This course will cover an analysis of the Treaty of Rome and other relevant legal instruments and the major institutions and characteristics of European Union law, including basic freedoms of the treaty (free movement of persons, goods, services, and capital), the Commission, the European Parliament, the European Council, the Council of the European Union, and the Court of Justice of the European Union.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 822S Comparative Constitutional Law 2.0-4.0 Credits

Focusing on constitutional structure and law in a variety of countries, this course will address comparative approaches to issues as judicial review, judicial appointment, separation of powers, federalism, and fundamental rights. The course will also explore fundamental, underlying questions about the nature of constitutions and constitutionalism, processes of constitution design, political constraints on constitutional rights and constitutional courts, and constitutional culture.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 823S Chinese Law 2.0 Credits

This seminar will focus on the legal history and contemporary law of China. Subjects to be discussed include the Chinese legislative process and judicial system, recent developments in several areas of law, and the challenges that exist in reforming the current court system.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 824S International Law 3.0-4.0 Credits

This course will examine the nature and sources of international law; international organizations, including the United Nations and the International Court of Justice; and the developing law of human rights. Other topics include the role of international law in the United States courts; the law relating to the use of military force; and international trade law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 825S International Human Rights Advocacy & Practice 2.0-3.0 Credits

This seminar explores the use of international human rights strategies to advance social justice advocacy in the United States. On issues ranging from racial disparities in the criminal justice system to access to housing, U.S. lawyers increasingly use the human rights mechanisms of the United Nations and Inter-American Human Rights System, draw on international human rights and comparative foreign law in litigation before U.S. courts, and engage in broader advocacy such as documentation, organizing, and education. The course will examine the growing movement to incorporate international human rights strategies into U.S. social justice lawyering, explore the relevance of U.S. human rights advocacy in the current political landscape, and develop practical approaches to thoughtfully engage these tools.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 826S Refugee and Asylum Law 2.0-3.0 Credits

This course explores the treatment of foreign refugees and political asylees, with particular emphasis on relevant statutes, regulations and treaties.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 827S Immigration Litigation 2.0 Credits

The course will focus on handling cases before the immigration court. Beginning with an overview of the immigration court system and pertinent parts of immigration law, this course will also examine grounds of removal and of inadmissibility, bond motions, grounds to challenge the Notice to Appear, three of the most common forms of relief, adjustment of status and fear of return to home country. The course will be geared to a practical handling of these problems, but with a firm grounding in the legal authorities.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 828S International Business Transactions 2.0-3.0 Credits

This course examines the legal framework of private international business transactions including: sales of goods and services, foreign investment, technology transfer and government regulation.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 830S Professional Responsibility 2.0-3.0 Credits

This course will examine the ethical duties of lawyers toward clients, courts, and society. The course emphasizes the Model Rules of Professional Conduct, the Model Code of Professional Responsibility, and relevant case law. Topics covered include confidentiality, conflicts of interest, competence, fee arrangements, and the unauthorized practice of law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 832S Contract Theory Seminar 2.0-3.0 Credits

This course is designed to get students thinking more creatively and deeply about the ideas animating contract law and policy. While the first-year Contracts course is about mastering the technical aspects and doctrines of contract law, this course is about taking those skills to another level. The overarching course goal is to consider and discuss the ideas which undergird and give life to contract law. The course will cover the basics of contract theory, surveying some different ideas about "the grand unifying theme of contract," examining the strengths and weaknesses of these different ideas and theories of particular doctrines in contract law (this could include consideration, promissory estoppel, efficient breach, and/or special problems of form contracts).

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 833S Race and the Law 2.0-3.0 Credits

This course considers the role of race in American law and examines the role of law in constructing notions of race.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 834S Jurisprudence 3.0 Credits

This course addresses essential questions about the nature of law and its role in society. What is law? What is its source of legitimacy? How does it function? Readings will consider major texts in Western jurisprudential philosophy.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 836S Legal History 2.0-3.0 Credits

This course surveys Anglo-American legal history from the origins of the common law through the 20th century. The course will focus on the development of both legal institutions and substantive law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 838S Foundations of Legal Analysis 2.0 Credits

This course is designed to develop and refine the skills necessary for legal analysis and writing. The course will be taught using a hands-on, experiential approach largely driven by written classroom exercises and written assignments submitted for evaluation and feedback by faculty. The course is based on three principles: varied and frequent writing practice; faculty feedback on written assignments; and analysis of writing models.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 840S Literature and The Law Seminar 2.0-3.0 Credits

This seminar will explore the role of law, legal institutions, and legal actors in literature. It will also consider the ways in which literature and literary theory can be used in practice.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 842S Law and Mind Sciences 2.0-3.0 Credits

Much of law and legal theory is based on commonsense assumptions about human behavior: criminals are evil; contracting parties act freely and with full knowledge; and workplace discrimination results from conscious prejudice. This seminar will explore evidence from social psychology, social cognition, cognitive neuroscience, and related fields that challenges these and similar conceptions.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 844S Law and Social Movements 2.0-3.0 Credits

This course studies the various ways in which law succeeds - or fails - to bring about changes in the allocation of rights to groups and individuals. The class will focus on particular legal and social change movements, considering the effectiveness of strategies such as litigation and law reform.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 846S Law and Economics 2.0-3.0 Credits

This course examines the law through the economist's lens. We will see whether a cohesive economic theory can be applied to explain the law, and examine the efficiency of current legal provisions. Students will gain an understanding of the economic rationale - or lack thereof - that underlies the law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 848S Courts and Public Policy 2.0-3.0 Credits

This course explores how public policy is created, interpreted, and implemented through various governing agencies including courts, legislatures, administrative agencies, and "street-level" bureaucrats. Readings will examine the practical concerns about the capacity and competence of these different institutions to make and enforce laws. The course will engage theoretical questions, considering both the powers and limitations of courts in a democratic society.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 870S Business Law Legal Research 1.0-2.0 Credit

This course covers business law-related resources, in both print and electronic format, including primary and secondary sources; company information and demographics; SEC and tax information and documents; and current awareness tools. Students will learn how to locate, use and evaluate these resources.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 565S and LAW 566S

LAW 871S Intellectual Property Legal Research 1.0-2.0 Credit

The goal of this course is to provide students with grounding in the materials essential to performing introductory intellectual property research, enabling them to complete complex IP research assignments, whether for coursework or practice. Classes will contain an overview of research tools, explanations on how to use them effectively and assignments demonstrating their proper use. This course will augment current and future IP course offerings.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 565S and LAW 566S

LAW 872S Health Law Legal Research 1.0-2.0 Credit

The goal of this course is to provide students with the tools necessary to perform effective legal research in all areas of health care law. Students will learn how to use electronic and print resources and techniques to research health law statutes, legislative history, case law, regulations, and literature, as well as medical and health sciences information. Overviews and explanations of research tools and sources will be given.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 565S and LAW 566S

LAW 873S Foreign and International Legal Research 1.0-2.0 Credit

This class will give students a working knowledge of research methods, in traditional print sources and in electronic formats, for conducting research in the laws of foreign countries and international law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 565S and LAW 566S

LAW 874S Pennsylvania Legal Research 1.0 Credit

In this course, students will become familiar with Pennsylvania primary resources (including cases, statutes, regulations, court rules, etc.) and Pennsylvania secondary legal resources (including practice guides, treatises, and CLE materials.) The class will cover all available resources, including print resources, free electronic resources, and subscription database resources. Grading is Credit/No Credit.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 565S [Min Grade: D] and LAW 566S [Min Grade: D]

LAW 876S Tax Law Legal Research 1.0-2.0 Credit

The goal of this course is to introduce students to the concepts of tax research and the sources of tax authority. The learning outcomes for this class include giving students familiarity with statutory interpretation and legislative history, regulations, administrative decisions and letter rulings, case law, and secondary sources on tax law. There will also be discussion of the authoritative weight of various types of tax materials. The course focuses on Federal tax law, but includes an overview of state tax research—with an emphasis on Pennsylvania law—as well as international tax research.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 565S [Min Grade: D] and LAW 566S [Min Grade: D]

LAW 877S Criminal Law Legal Research 1.0-2.0 Credit

This course covers basic criminal law research resources, in both print and electronic formats. Main topics include the following: primary and secondary resources of criminal law and procedure; interdisciplinary research; criminal law reports and statistics; and current awareness resources. This class covers both federal and state criminal law resources.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 565S [Min Grade: D] and LAW 566S [Min Grade: D]

LAW 880S Advanced Legal Research 1.0-2.0 Credit

This course provides students a thorough grounding in the research skills needed by today's lawyers. Students will learn how to use advanced electronic and print resources and techniques to research case law, statutes, legislative histories, administrative law, and other practice-based research tools.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 882S Litigation Drafting 2.0 Credits

This course explores technical and strategic issues in the drafting of litigation documents such as complaints, answers, written discovery, motions, affidavits, discovery schedules, pretrial orders, jury instructions, releases and correspondence. Students will complete a number of drafting assignments in and out of class.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 884S Contract Drafting 2.0 Credits

In this course, students will develop basic skills needed to draft and revise contracts. Through a variety of writing assignments, students will learn the component parts of typical contracts and their purpose, as well as the ways in which the substantive content can be customized to satisfy a particular client's needs and concerns. This involves translating deal points into contract concepts, as well as revising legal boilerplate to enhance and protect their client's interests. The course is designed to be helpful for students who plan to be litigators, as well as students who plan to do transactional work.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 886S Writing Strategies for the Bar 2.0 Credits

This course will prepare students for the written portions of the bar exam - essays and performance test questions.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 888S Writing for Judicial Clerkship 2.0 Credits

This is an upper level writing course designed to prepare students seeking judicial clerkships for their particular writing tasks.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 890S Improvisation for Lawyers 1.0 Credit

In this intensive course, students will hone their legal performance skills by studying improvisational theater techniques. The course will involve extensive hands-on performance.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 891S Communicating for Success 2.0 Credits

The goal of this interactive seminar is to assist students in becoming practice-ready when they graduate from law school. The course will explore the array of skills and values that lawyers need to be effective in working with their clients using a relationship-centered model. Participants will draw upon their real world experiences in and out of law school to develop concrete tools and techniques to communicate with clients in a wide variety of contexts and to achieve better outcomes. Grading is Credit/No Credit.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 892S Starting & Managing Law Pract 1.0-2.0 Credit

This course is designed to equip students with the knowledge, skills, and resources required to establish or manage a law firm. Topics will include marketing, case management, and ethical considerations.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 893S Accounting for Lawyers 2.0 Credits

This course will introduce students to financial statements and accounting concepts that will facilitate law practice with corporate clients and in other matters where financial auditing is involved.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 894S Moot Court Board 1.0-6.0 Credit

Students will be selected by the faculty supervisors to serve on the moot court board. Students will develop an intra-scholastic moot court competition and will be eligible to compete in interscholastic competitions.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 4 times for 6 credits

LAW 895S Legal Decision Technology 3.0 Credits

This course explores how legal decision technology can be used to expand public access to legal information. Students will learn about cutting edge legal decision technologies, hone their statutory interpretation skills, and build interactive apps that answer specific legal questions. This is a hands on, lab-style class, but no prior programming experience is required.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 896S Alternative Dispute Resolution Competition Team 1.0-6.0 Credit

Students who have been selected for one of the Alternative Dispute Resolution competitions will enroll in this course and complete all required work in order to earn co-curricular credit for competition.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 899S Special Topics in Law 1.0-5.0 Credit

This course covers topics of current interest to faculty and students; specific topics for each term will be announced prior to registration. May be repeated for credit if topics vary.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 3 times for 8 credits

LAW 900S Pre-Trial Advocacy 2.0-3.0 Credits

Students will learn the major steps in the pretrial litigation process including theory development, client interviewing, informal fact, investigation, pleading, discovery, depositions, pretrial motions, jury selection, and the settlement process.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 902S Intro to Trial Advocacy 0.0-3.0 Credits

This course will teach students to perform trial skills based on strategic themes and theories. The students will conduct direct and cross-examination of lay, party and expert witnesses, opening and closing statements, make objections and introduce exhibits. The course will culminate with each student performing in a mock trial.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 634S (Can be taken Concurrently)

LAW 904S Advanced Trial Advocacy: Civil 2.0-3.0 Credits

This course is a continuation of Introduction to Trial Advocacy and is an advanced civil trial skills class which teaches students advanced trial skills; evidentiary issues; and case development. Students will perform exercises and develop case theories using mock civil cases.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 902S

LAW 906S Advanced Trial Advocacy: Criminal 2.0-3.0 Credits

This course is a continuation of Introduction to Trial Advocacy and is an advanced criminal trial skills class which teaches students advanced trial skills; evidentiary issues; and case development. Students will perform exercises and develop case theories using mock criminal cases. The course will culminate with a criminal mock trial.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 902S

LAW 907S Advanced Trial Advocacy: Courtroom Technology & Advocacy 2.0-3.0 Credits

This advanced course focuses on analyzing both criminal and civil cases and preparing those cases for a presentation before a jury. The course is specifically designed to expand the skills already developed during the Introduction to Trial Advocacy course. The course methodology combines lectures, demonstrations and individual student performances, during which students will be responsible for conducting all aspects of a trial. There will be extensive critique and feedback by instructors experienced in the art of effective trial advocacy. The course culminates with each of the students conducting a complete mock trial. The course requires that all aspects of the students' trial presentations be given while utilizing technology, which may include TrialPad for the iPad, Power Point, Timeline 3d, iThoughts, etc.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 902S [Min Grade: CR]

LAW 908S Adv Trial Ad: Trials/Century 2.0 Credits

This course will teach students to understand, develop and perform advanced trial skills based on strategic themes and theories used throughout the trial process. Students will analyze actual trial transcripts and exhibits, and movie vignettes of advocates from famous "Trials of the Century."

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 902S

LAW 910S Appellate Advocacy 2.0 Credits

This course provides students with advanced training in appellate advocacy, including the study of the rhetoric of persuasion, the preparation of appellate briefs and effective oral advocacy, and will include an introduction to appellate procedure. This course is required for students serving on the moot court board.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 912S Deposition Skills & Technology 2.0 Credits

Students will receive instruction through focused lectures, demonstrations and feedback from the professors on in-class performances. Students will spend a significant amount of time analyzing civil case files, preparing witnesses for depositions, learning questioning techniques and performing depositions of lay witnesses, parties and experts. Students will also use iPads with loaded deposition software to learn how to prepare and take depositions. Students will also use iPad technology to prepare post-deposition analysis of the depositions.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 918S Trial Team 1.0-6.0 Credit

Students will compete in inter-scholarship mock trial competition.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 4 times for 6 credits

LAW 920S Drexel Law Review 1.0-6.0 Credit

Students will receive credit for their work in preparing and contributing to, the Drexel Law Review.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 4 times for 6 credits

LAW 923S Pennsylvania Innocence Project Practicum 3.0 Credits

This is a practicum in which students work on behalf of individuals claiming they were wrongly convicted of a crime and seeking exoneration. Each student will be assigned cases under the supervision of an attorney. In the course of investigating factual claims and researching legal issues, students will review criminal files, interact with investigators, contact other attorneys, interview the client and witnesses, gather documentation, and prepare legal documents and memoranda. Students will also learn the law relevant to both innocence claims and legal issues in their cases.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 924S Entrepreneurial Law Clinic 5.0-6.0 Credits

The Clinic will offer business and intellectual property law counseling to entrepreneurial start-ups based in the Greater Philadelphia area. These services will range from entity formation, founders' agreements, and employment law counseling to trademark and patent registrations and general intellectual protection counseling.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 2 times for 12 credits

Prerequisites: LAW 713S

Corequisite: LAW 653S

LAW 925S Field Practicum 1.0-3.0 Credit

This is an immersive real-world experiential course designed to support students as newcomers to legal practice. Students will focus on the study of lawyers and their roles and obligations, and also have the opportunity to examine legal institutions within the context of a directed field experience into which the student has previously been accepted.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 21 credits

LAW 931S Law Co-op 3.0-9.0 Credits

The Co-op is a field placement in a corporation, law firm, judicial office, public interest organization, or government agency. Students must attend a pre-placement orientation and will work a set number of hours per week and satisfy the supervisor's expectations.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 2 times for 27 credits

Corequisite: LAW 654S

LAW 933S Co-op Intensive 9.0-10.0 Credits

The Co-op is a field placement in a corporation, law firm, judicial office, public interest organization, or government agency. Students must attend a pre-placement orientation and will work 35-40 hours per week and satisfy the supervisor's expectations.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 2 times for 14 credits

Corequisite: LAW 654S

LAW 937S Advanced Co-op 2.0-3.0 Credits

This course is for students who have already taken a two-quarter Co-op and want to extend that placement by one semester. Students must apply to their Co-op professor with a written proposal for a specific project developed with, and approved by, their field supervisor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 654S and LAW 931S

LAW 941S Criminal Litigation Clinic I 5.0-6.0 Credits

This clinical program places students in a criminal practice setting. Students will represent criminal defendants in all phases of pre-trial and trial activity. Students must enroll in both semesters of the clinic.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Corequisite: LAW 656S

LAW 942S Criminal Litigation Clinic II 5.0-6.0 Credits

This course is a continuation of LAW 941S.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 941S

Corequisite: LAW 656S

LAW 943S Civil Litigation Clinic I 5.0-6.0 Credits

This clinical program places students in a civil practice setting. Students will learn varied litigation skills in the context of direct representation of clients. Students must enroll in both semesters of the clinic.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Corequisite: LAW 656S

LAW 944S Civil Litigation Clinic II 5.0-6.0 Credits

This course is a continuation of LAW 943S.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 943S

Corequisite: LAW 656S

LAW 947S Federal Litigation and Appeals Clinic 5.0-6.0 Credits

This clinic provides intensive training in appellate advocacy by involving students in cases before the state appellate and federal courts. Students provide research; develop strategies; draft briefs; and engage in oral arguments. Students must enroll in both semesters of the clinic.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Corequisite: LAW 656S

LAW 948S Federal Litigation and Appeals Clinic II 5.0-6.0 Credits

This clinic provides intensive training in appellate advocacy by involving students in cases before the state appellate and federal courts. Students provide research; draft briefs; engage in oral arguments; and assist in case selection, the development of substantive legal positions, and the creation of appellate strategy. Students must enroll in both semesters of the clinic. A grade will be assigned at the end of the Spring semester.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 947S

LAW 950S Community Lawyering Clinic I 5.0-6.0 Credits

The clinic offers students the unique opportunity to employ a variety of strategies including litigation, legal reform, community education, media advocacy, and even international advocacy to support the mobilization efforts of community groups working on the ground to achieve social justice. During the second semester, students, in collaboration with community leaders and guided by their ground-level work in the first semester, will design and implement projects aimed at addressing the systemic challenges facing the community, such as improving access to justice. The goal of the clinic is to build students' capacity as lawyers, leaders, advocates, policy analysts, and community organizers, while at the same time empowering and serving the community.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAW.

Corequisite: LAW 656S

LAW 951S Community Lawyering Clinic II 5.0-6.0 Credits

This is a continuation of LAW 950S. Students must enroll in both semesters of this year-long clinic.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAW.

Prerequisites: LAW 950S

LAW 970S Introduction to United States Legal Systems 2.0-3.0 Credits

This course is an introduction to legal and ethical principles driving the U.S. legal system in the context of the history and jurisprudence of American law. It is designed to familiarize the student with the relevant and governing legal principles which are used in American jurisprudence. It will combine both an inquiry into these matters, and a more detailed study of legal issues, through special, current topics. The course seeks to develop a professional level of understanding in the student of a comprehensive approach to legal issues and the relevance of that methodology to professional ethics and life of the law in the United States.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AMLP.

LAW 971S English for International Lawyers: Working with Legal Texts 1.0-3.0 Credit

This course is designed to provide non-native English speakers with an introduction to working with legal texts to strengthen written and verbal communication skills.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is AMLP.

LAW 981S Litigation Technology 2.0-3.0 Credits

This course will primarily focus on teaching students how to master pre-trial and trial advocacy skills through the use of the latest litigation technology.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 982S Jury Selection 2.0 Credits

This course will primarily focus on the substantive law relating to jury selection and the strategic skills that students will need to master the art of jury selection. Students will learn both the Federal and PA statutes that govern jury selection as well as analyzing the leading case law relating to the constitutionality of jury selection. Students will also watch skilled lawyers and judges conduct voir dire and practice the skill themselves.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 998S Thesis I – Scholarly Legal Writing: Planning and Preparation 3.0 Credits

This course will introduce you to research and writing techniques commonly used in legal scholarly writing. Specifically, this course will help you identify and develop an original thesis topic and will provide you with the foundation needed to draft, edit, and present an original scholarly work of publishable quality in Thesis II.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LAW 999S Thesis II – Scholarly Legal Writing: Writing, Refining, and Presentation 3.0 Credits

Following Thesis I, this course will provide faculty-guided oversight and mentorship for the drafting, editing, and presentation of an original piece of publishable-quality legal scholarship akin to a law review article. Students will confer with a faculty advisor weekly, either live or via real-time video conference, submit interim drafts as assigned, and receive meaningful faculty feedback. Students will submit a final scholarly paper and present it to colleagues in a workshop format.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Prerequisites: LAW 998S

LAW I599S Independent Study in LAW 1.0-6.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LAW I699S Independent Study in LAW 1.0-6.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LAW I799S Independent Study in LAW 1.0-6.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LAW I899S Independent Study in LAW 1.0-6.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LAW I999S Independent Study in LAW 1.0-6.0 Credit

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LAW T580S Special Topics in LAW 1.0-5.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

LAW T680S Special Topics in LAW 1.0-8.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

LAW T780S Special Topics in LAW 1.0-5.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

LAW T880S Special Topics in LAW 1.0-5.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

LAW T980S Special Topics in LAW 1.0-6.0 Credit

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

Legal Studies

Courses

LSTU 500S Introduction to the Legal System 3.0 Credits

This course will begin to help students "think like lawyers" by providing an overview of the United States legal system. It will explain the legislative and judicial processes, so that students will gain an understanding of where the power to regulate originates and the basis of federal law and regulations. The course will then focus on substantive areas of the law, such as torts, contracts, and criminal law.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 1 times for 6 credits

LSTU 501S Compliance Skills: Auditing, Investigation & Reporting 2.0-3.0 Credits

This is a skills course that provides students opportunities to develop internal audit skills and strategies, conduct internal investigation work plans, and draft executive level communications. The skills taught will include work plan development, investigative techniques, interviewing methods, class presentations, and drafting of projects plans and board/executive level reporting.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHCC or major is CHEC or major is CHRC or major is CNCA or major is CRMM or major is LSTU.

LSTU 502S Ethics and Professional Standards 2.0-3.0 Credits

Students will be exposed to fundamental issues and current best practices in managing issues of ethical/legal compliance, corporate social responsibility and business ethics. Topics cover business issues, including anti-corruption, environmental crimes/compliance, child labor, employment discrimination, crisis management, whistleblowing, retaliation, fraud, privacy, sustainability and social enterprise. Special attention is given to preparing students to understand and manage the demands on corporations making complex business decisions in the face of increasing expectations for transparency and accountability.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LSTU.

LSTU 503S Legal Research and Analysis 2.0-3.0 Credits

Students will learn how to research topics and distill their research in written form through a series of exercises. They will also be expected to complete numerous written communications of increasing length and complexity. Detailed feedback will be provided on all written exercises by the professor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHCC or major is CNCA or major is LSTU.

LSTU 504S Health Care Rules and Regulations 3.0 Credits

This course is designed to provide students with an understanding of the laws and regulations encountered by compliance professionals. The course will equip students to apply statutory and regulatory principles to situations that they will encounter in their work.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LSTU.

LSTU 505S Health Care Quality, Patient Safety and Risk Management 3.0 Credits

This course will examine methods and tools for managing quality in health facilities, physician practices, managed care, and public health; including developments in quality assurance and improvement, utilization review, risk management, and patient satisfaction.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHCC or major is CNCA or major is LSTU.

LSTU 506S Patients and Privacy: HIPAA and Related Regulations 2.0-3.0 Credits

The focus of this course will be the privacy and security provisions of the Health Insurance Portability and Accountability Act of 1996 (HIPAA), the foundation for federal protections of health care information. Additionally, the course will examine the interplay between HIPAA and other federal and state health privacy laws and the application and enforcement of those laws in a variety of health care settings. The class will incorporate discussions about the close and evolving relationships among health care policy, evolving social norms, and health privacy laws.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHCC or major is LSTU.

LSTU 507S Risk Assessment and Management 3.0 Credits

Risk assessment and management has become a crucially important field for private sector business as well as government sector agencies and organizations, particularly over the past decade following the passage of laws such as Sarbanes-Oxley and Dodd-Frank. This course will examine regulatory compliance and risk management issues that impact various corporate and governmental entities, providing students the opportunity to explore risk analysis and compliance in a variety of legal environments. This course will help familiarize students with issues that might arise in corporate risk management departments, contracts departments, risk management consulting, and the regulatory compliance departments of financial services industries, banking, insurance, credit, risk assessment, and benefits management.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHCC or major is CHEC or major is CHRC or major is CNCA or major is CRMM or major is LSTU.

LSTU 510S NCAA Governance Process 3.0 Credits

This course will allow students to examine whether the increasing intensification of college sports might support or detract from higher education's core mission. Students will begin to understand the NCAA legislative process, and understand the tradeoffs between the intensification of sports programs and educational policy at higher education institutions.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CNCA or major is LSTU.

LSTU 511S NCAA Rules I and Infractions Cases 3.0 Credits

This course will cover NCAA Division I rules and regulations. Students will also examine the impact of intercollegiate athletics on undergraduate education, particularly at large public research universities with high-profile football and men's basketball teams playing at the top National College Athletics Association level.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CNCA or major is LSTU.

LSTU 512S NCAA Rules II and Enforcement Process 3.0 Credits

This course will continue to cover NCAA Division I rules and regulations, the impact of intercollegiate athletics on undergraduate student athletes and non-athletes, and the funding of academic departments.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CNCA or major is LSTU.

LSTU 513S Sports Agents and Athletes 2.0-3.0 Credits

This course examines the history of the sports agent business and the rules and laws developed to regulate the profession. Students will also learn about the recommendations for reform, including uniform laws that would apply to all agents, redefining amateurism in college sports, and stiffening requirements for licensing agents. The passage of the federal Sports Agent Responsibility and Trust Act will also be covered.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHCC or major is CNCA or major is LSTU.

LSTU 515S Information Privacy Law 3.0 Credits

This course will introduce students to the development of information privacy law in the United States. It will focus on legal regulations limiting government access to private information as well as laws regulating the ability of third parties to access such information. It will conclude with an introduction to the privacy regulatory regime imposed by the Federal Trade Commission and European Union regulators.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LSTU 517S The Law and Strategies Surrounding Cybersecurity 3.0 Credits

This course will introduce students to the legal and regulatory frameworks governing US cybersecurity. It will examine topics including domestic cybersecurity standards, data breach notification and response, and the creation of compliance programs to manage cybersecurity risks.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LSTU 520S Legal Issues in Employee Hiring and Termination 3.0 Credits

Legal issues in hiring and termination of employees are at the core of human resources responsibilities. This course will examine regulatory compliance and management issues that arise in the context of hiring and terminating employees with special consideration of federal law and its continued developments. This course will help familiarize students with issues that arise in human resource departments, particularly as they pertain to those points of entry and exit and where the need to document becomes a critical duty of those managing the hiring, evaluation and termination process.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 1 times for 6 credits

Restrictions: Can enroll if major is CHRC or major is LSTU.

LSTU 521S Human Resources Compliance: Managing the Employer/Employee Relationship 3.0 Credits

This course is designed to introduce students to the fundamentals of human resource compliance and regulation and to provide an overview of the skills necessary to manage human resources effectively. The course will examine why human resource management matters in today's business world and will show how employee performance and legal compliance serve as intermediary processes that connect human resource practices to organizational performance and effectiveness. Students will discuss the various ways in which the employer/employee relationship can be harnessed in positive ways rather than be seen in an adversarial light. This course will highlight issues that might arise in human resource departments, compliance departments and benefits management departments.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHRC or major is LSTU.

LSTU 522S Human Resources in Practice: Negotiation, Mediation, and Alternative Dispute Resolution 3.0 Credits

Human resource managers deal not only with laws, rules and regulations, but also and foremost, with people. This course explores the practical reality of working in human resources and provides the necessary skills to ensure competency and success. The course focuses on negotiation with subordinates, peers and supervisors; mediation, because human resource workers often act as informal mediators between employees and supervisors; and alternative dispute resolution, as more employers require their employees to submit their complaints to some form of resolution process as an alternative to a formal lawsuit. This course will familiarize students with issues that arise in human resource departments and provide them with concrete tools to analyze, understand, and implement the best possible path to resolution.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHRC or major is LSTU.

LSTU 530S Corrections Law 2.0-3.0 Credits

This course is designed to introduce students to the constitutional rights of prisoners and the implications of those rights for prison management. In particular, students will gain a working knowledge of the role of the First Amendment in regulating inmate mail, associational rights, religious practice, and visitation. They will learn how the Fourth Amendment relates to searches of both inmates and visitors. Students will discover how the Fifth and Fourteenth Amendment Due Process rights control inmate transfer, classification and discipline. They will also learn how the Eighth Amendment controls prison policy with respect to the conditions of confinement and provision of health care.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRMM or major is LSTU.

LSTU 539S Compliance Communications 3.0 Credits

This course serves as an introduction to the fundamentals of writing specific to the growing area of compliance and addresses why compliance writing is different than general business writing. Assignments are drawn from the various types of writing that are typical of compliance professionals in various industries. Topics include writing for different audiences (various corporate departments, c-suite executives, boards of directors, regulators, the public, etc.), policy and procedure writing, the complexities of communicating with a diverse global audience, investigation memos and evaluation/communication of metrics-based data.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

LSTU 540S MLS Masters Capstone 3.0-4.0 Credits

This course will provide students with faculty and peer support and guidance in preparing a capstone research project in completion of the Master of Legal Studies. Students will prepare a major written project which may consist of a novel legal claim supported by a substantial literature review or an experientially-based study grounded in a substantial literature review.

College/Department: Thomas R. Kline School of Law

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CHCC or major is CHRC or major is CNCA or major is LSTU.

LSTU 580S Special Topics in Legal Studies 1.0-5.0 Credit

This course number will be used for special topics offerings within the Master of Legal Studies program.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

Restrictions: Can enroll if major is CHCC or major is CNCA or major is LSTU.

LSTU I599S Independent Study in LSTU 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LSTU I699S Independent Study in LSTU 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LSTU I799S Independent Study in LSTU 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LSTU I899S Independent Study in LSTU 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LSTU I999S Independent Study in LSTU 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated 6 times for 6 credits

LSTU T580S Special Topics in LSTU 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

LSTU T680S Special Topics in LSTU 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

LSTU T780S Special Topics in LSTU 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

LSTU T880S Special Topics in LSTU 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

LSTU T980S Special Topics in LSTU 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

College/Department: Thomas R. Kline School of Law

Repeat Status: Can be repeated multiple times for credit

MMS Prog. - Masters in Med. Science

Courses

MMSP 501S Research in Medical Science I 6.0 Credits

Research in Medical Science is a two-semester sequence that partners with MMSP-503S and MMSP-504S to extend and enrich the research experience for second year MMS students. Students will engage in original, hands-on research under the guidance of a mentor scientist. A Research Proposal will be developed in collaboration with the Research Mentor and submitted for timely review and approval to the Oversight Committee, comprising faculty within the Graduate School. Once approved, the student will pursue the research project proposed under the direct supervision of their research mentor.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 12 credits

MMSP 502S Research in Medical Science II 6.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MMSP 503S Research Seminar I 3.0 Credits

Research seminar is a two-semester sequence that partners with MMSP-501-S to extend and enrich the research experience for MMS students. In seminar, students will have a forum to discuss their ongoing research projects in a rigorous but supportive environment. Students will be challenged to present their research in several formats as described below. Further, students will be expected to provide constructive but critical peer-reviews of each other's in-class presentations.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 9 credits

MMSP 504S Research Seminar II 3.0 Credits

Research seminar is a two-semester sequence that partners with MMSP# 502#S to extend and enrich the research experience for MMS students. In seminar, students will have a forum to discuss their ongoing research projects in a rigorous but supportive environment. Students will be challenged to present their research in several formats. Further, students will be expected to provide constructive but critical peer-reviews of each others in-class presentations.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 9 credits

Prerequisites: MMSP 503S [Min Grade: C]

MMSP 510S Lab Tech In Bioc & Molec Biol 2.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MMSP 520S Medical Pathology I 6.0 Credits

This course serves as a bridge between the basic sciences and clinical material. The course material enables the student to learn the language of human disease and provides a knowledge base relating to the mechanisms of disease and the approach to a pathologic diagnosis. Following several introductory sessions, where basic pathological processes are introduced, the course is taught in an organ system approach.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MMSP 521S Medical Pathology II 4.0 Credits

The purpose of the course in Pathology and Laboratory Medicine is to serve as a bridge between the basic sciences and clinical material. With this in mind, the course attempts to enable the student to recognize and understand the diseases that are encountered in clinical practice.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

Prerequisites: MMSP 520S [Min Grade: C]

MMSP 530S Selected Topic in Pharmacology 7.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MMSP T580S Special Topics in Medical Science 1.0-6.0 Credit

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

Master of Lab Animal Science

Courses

MLAS 500S Animal Nutrition 3.0 Credits

This course will provide an overview of the basic principles of animal nutrition including nutrition concepts and related historical/current research. Upon completion, each student should understand the digestion, absorption and metabolism of the various food nutrients, characteristics of the nutrients, measurement of body needs, and ration formulation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 501S Laboratory Animal Seminar 2.0 Credits

This course is open to second year MLAS students. The seminar allows students to network with other laboratory animal professionals in preparation for their career in the field. Each week, a different guest speaker will present information about state-of-the art equipment, animals and techniques.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MLAS 530S, MLAS 610S (Can be taken Concurrently)MLAS 535S

MLAS 502S Occupational Safety and Health in Laboratory Animal Care and Use Programs 3.0 Credits

The role of an occupational safety and health program is to recognize health risks and hazards associated with the care and use of research animals. The goal of this course is to assist the laboratory facility manager and/or supervisor with the development or re-evaluation the occupational safety and health program within their individual animal care and use program.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 503S The Institutional Animal Care and Use Committee's (IACUC) Role in Animal Research 3.0 Credits

The Institutional Animal Care and Use Committee (IACUC) is responsible for overseeing and evaluating all aspects of an animal care and use program. This course will introduce students to the origin, authority, membership, and functions of the IACUC. Specific functions such as: oversight, review of animal use proposals, animal care and use concerns, and record keeping will be addressed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 504S Public Outreach for Animal Research 2.0 Credits

This course will provide a solid foundation about animal research and its role in producing new knowledge and discoveries that benefit the public, other animals, and the environment. Students will learn about the range of outreach tools and techniques for engagement with the broader public, including how to speak about the important role they play in the laboratory animal environment.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

MLAS 510S Clinical Orientation In Laboratory Animal Facilities 1.0 Credit

Two hours per week of hands-on experience working in the university's laboratory animal facilities. Students do most of the daily work performed by the animal technicians, such as cage washing, placing animals into new cages, environmental sanitation, treatments (if necessary), tuberculosis testing of primates and the like. Species usually housed include rats, mice, rabbits, guinea pigs, dogs, cats, primates, swine, etc. The goal of the course is to provide the necessary skills and exposure to allow students to become familiar with many of the examples that will be used in later courses by their instructors. It also provides an introduction to the Practicum experience of the second year.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 513S Biochemical Basis of Disease (Upenn) 2.0 Credits

Lecture at the University of Pennsylvania veterinary school. Biochemical and molecular basis of disease. In-depth biochemical examination of specific aspects of selective diseases.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MLAS 512S and PHGY 503S

MLAS 514S Hematopoiesis (Upenn) 1.5 Credit

Lecture at the University of Pennsylvania veterinary school. Correlates clinical and basic science in comparative hematology. Recent developments in clinical medicine and basic research of disorders of blood cells. A paper on a hematology topic makes up part of the grade.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 520S Financial Mgmt In Lab Anim Sci 3.0 Credits

Animal facility managers and veterinarians must understand more about financial management than they realize. It is not unusual for budgets and cost-accounting methods to be poorly understood, and therefore left to others. The manager is at the mercy of somebody else's numbers, yet he or she may be held responsible for hundreds of thousands of dollars.. The instructor, an animal facility manager with an M.B.A. degree, gives a strong background in many aspects of financial management, not just those that are core to animal facility and veterinary practice management.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 521S Arch Eng & Plan For Anim Fac 4.0 Credits

The course of instruction, presented by one of the nations leading architectural and engineering firms, encompasses general design considerations, working with architects and engineers, reading and producing drawings, proximity considerations, control systems, heating, ventilation, air conditioning, etc. The goal is to give the student a unique background, not only in facility design and engineering, but also in understanding why things are the way they are. Students are expected to develop and present a floor plan.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 523S Organizational Management 3.0 Credits

Organizational management provides the theoretical background necessary for the practical application of managerial skills especially in laboratory animal facilities.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 525S Animal Anatomy 2.0 Credits

An introductory independent study course that will provide a background in gross animal anatomy. Students will learn comparative anatomy by comparing the anatomical structures in several species of laboratory animals using synthetic models.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 529S Molecular Genetics 3.0 Credits

The focus of this course is to expose students to "cutting edge" molecular genetic concepts as they apply to laboratory animal science. The course provides a description of DNA structure, an overview of its replication and function in gene expression, an overview of the structure and function of nuclei & chromosomes, a sampling of tools used for genome analysis and a sampling of the basic techniques used in a molecular genetics laboratory. Various genome-sequencing projects are discussed along with the information they provide about the organization of a complex genome.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 530S Biostats In Vet Science 3.0 Credits

This course will cover biostatistical methods and principles and their application in the field of veterinary science-both in clinical setting and in research. The application of biostatistics in veterinary epidemiology will also be discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 531S Embryology 3.0 Credits

Embryology is the study of anatomy from the time of fertilization through the time of birth. The course discusses the "hows" and in part the "whys" concerning the development of the morphology and structure of the body. Knowledge of embryology is essential for understanding gross anatomy and the developments of birth defects.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 535S Biology & Care Of Lab Animals 4.0 Credits

Many specialists in laboratory animal science teach this course. Part of this course is devoted to discussions of the ethics of using animals in biomedical research. The remainder of this team taught course discusses the care, use and husbandry of rodents, lagomorphs, primates, farm animals, carnivores, etc., as well as presentations on sanitation and other pertinent subjects. The primary goal is to provide the student with the information needed to properly care for the physical and psychological needs of laboratory animals.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MLAS 510S

MLAS 536S Animal Models for Biomedical Research 1.0 Credit

In this course university investigators will discuss their research using animal models, emphasizing why they chose the animal model they are using and how the model helps them understand basic biological processes. Grading is based on a single term paper.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 545S Fundamentals of Histology 3.0 Credits

This course is a survey of the basic tissues of the body with an emphasis on the structure of normal cells, their specializations and methods of acting together to form tissues and organs. The normal structure-function relationships at the subcellular, cellular and tissue levels are emphasized. This course provides students with a framework for recognizing and interpreting the changes seen in disease states.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 546S Special Topics in Anatomy 4.0 Credits

Cross listed course given concurrently with students from other programs. This course is mostly human oriented. MLAS students who have gone on to veterinary school have commented on how valuable it was. It provides a systemic review of the entire body. Human prosections are included in the course work.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 547S Special Topics in Anatomy Lab 2.0 Credits

Discussions on and gross anatomical dissections of common laboratory animals. Comparisons with human anatomy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

Prerequisites: MLAS 546S

MLAS 606S Clinical Laboratory Techniques and Concepts 1.0 Credit

Hands-on and theoretical laboratory work. Teaches animal handling and injections, serological testing, microbiology techniques, hematology and urinalysis. There is an emphasis on correct specimen handling and preparation as part of a quality control program. Your instructors will expect you to do independent reading and be able to extrapolate your knowledge to various case reports.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 610S Diseases of Laboratory Animals 3.0 Credits

Reviews the major diseases of laboratory animals, and provides information on surgery, anesthesia and radiology. Unlike clinical veterinary medicine where a common objective is to make a sick animal healthy, in laboratory animal medicine the objective is to prevent a healthy animal from becoming sick. The goal of the course is to have the student understand means of disease prevention and recognition. This course will be taught, as much as possible, in a modified problem based learning format.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

Prerequisites: MLAS 535S

MLAS 800S Registered for Degree 0.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 801S Laboratory Animal Practicum 12.0 Credits

The practical application of what was learned in class. The entire final MLAS semester is spent in one of many animal facilities in the Philadelphia area or around the nation. To the extent possible, time is divided between basic animal care, management, laboratory techniques, and research. S/U grading.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS I599S Independent Study in Master of Laboratory Animal Science 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 0 times for NaN credits

MLAS T580S Special Topics in Laboratory Animal Science 0.0-12.0 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

MLAS T680S Special Topics in Laboratory Animal Science 0.0-12.0 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

MLAS T780S Special Topics in Laboratory Animal Science 0.0-12.0 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

MLAS T880S Special Topics in Laboratory Animal Science 0.0-12.0 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

MLAS T980S Special Topics in Laboratory Animal Science 0.0-12.0 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

Medical Science Preparatory

Courses

MSPP 505S Laboratory Techniques in Biochemistry & Molecular Biology 2.0 Credits

This is a laboratory course that is designed to introduce students to essential concepts, contemporary techniques and procedures used in biochemistry and molecular biology research laboratories.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 511S Concepts in Biochemistry and Cell Biology 4.0 Credits

This course introduces structure and function of the major groups of biomolecules (proteins, nucleic acids, lipids and carbohydrates) and essential structures that constitute a cell. Also discussed are basic biochemical and molecular mechanisms/pathways that contribute to homeostasis, such as protein synthesis, cellular energetics, signal transduction, and techniques to study cells and their constituents.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 512S Psychosocial and Behavioral Factors in Health and Medicine 3.0 Credits

This course will provide a foundation of information regarding the psychosocial, cultural and behavioral determinants of health and wellness specific to the practice of medicine. Topics will address psychological, sociological and biological concepts from the extant literature and how these concepts relate to best practices and standards of care in health settings.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 513S Advanced Human Anatomy 4.0 Credits

This course provides extensive exposure to select organ systems at the gross anatomical, microscopics, and ultrastructural levels. Structural and functional relationships are considered in depth. The format of the course is slide-show and lecture-based. Please note: this is not a cadaver based dissection course.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 515S Advanced Human Physiology 4.0 Credits

Topics covered in this course include: homeostasis, cellular physiology, membrane and neuronal physiology, central and peripheral nervous systems, muscle physiology, cardiac physiology, blood vessels and blood pressure, blood and body defenses, respiratory systems, urinary system, fluid and acid base balance, and the endocrine system.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 525S Community Dimensions of Medicine 2.0 Credits

This course introduces students to the community dimensions of medicine in an effort to provide skills and insight that will expand their cultural competence as they move towards a career in healthcare. The curriculum is designed to integrate key principles of health and healthcare inequities with concrete experiences had while volunteering with local health service sites. Students will be challenged to reflect on individual, societal and institutional factors that contribute to their own health as well as their surrounding community. Through a cohort-wide project that consists of planning and managing a health symposium, students will have the opportunity to network with public health researchers and healthcare professionals.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 550S Research Project 2.0 Credits

This course involves conducting an independent bench-top, or clinical research project under supervision of an advisor within or outside the university. The research can be conducted at a clinical site, basic science research lab, or as a community project in psychology or public health and requires a minimum time commitment of 80 hrs. Students are expected to identify an advisor and, in conjunction with the advisor, to develop a hypothesis that is to be tested during this 80 hour period. The advisor must have a PhD, MD or DO, or other terminal degree ONLY. Upon completion of the project, students will submit a paper summarizing their project. A grade of S (satisfactory) or U (unsatisfactory) will be assigned based upon the completion of the required 80 hours, as evaluated by the advisor, and a paper.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP T580S Special Topics in Medical Science Preparatory 0.0-12.0 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

Medical and Healthcare Simulation

Courses

MSMS 501S Simulation Curriculum and Design I 3.0 Credits

This is a required course in the Master of Science in Medical and Healthcare Simulation Program. This course will introduce methods of curriculum/instructional design for simulation based education. Students will learn how to conduct needs assessments, create goals and objectives, and plan for implementation of educational strategies and assessments. Students will participate in group discussions regarding these topics and develop a simulation curriculum that addresses an approved identified need.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSMS 503S Biostatistics in Healthcare Literature 3.0 Credits

This course introduces the basic concepts and techniques in statistical methods as used in educational research and any data analytic setting. It includes techniques for describing and summarizing observations, for assessing associations among variables, and for determining the extent to which chance may be explaining and/or influencing the observed results.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSMS 504S Principles of Assessment: Measurement Theory, Assessment Principles & Tools 3.0 Credits

This course introduces the basic concepts and techniques of assessment in healthcare. Assessment can be described as a process used to discover what, how, and which students learn with regard to expected learning outcomes. Assessment forms the foundation for comparative evaluation. This course will provide an understanding of measurement theory and introduce educators to the principles and tools of assessment. Examination of the comprehensiveness, validity, precision, feasibility and educational considerations of select assessment methods of learners in health professions education will be explored. Normative and mastery models of learning and implications for the quality of assessment tools under each model will be discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSMS 505S Standardized Patient Course 3.0 Credits

This is an elective course in the Master of Science in Medical and Healthcare Simulation Program. Standardized Patients (SP) have been used for 50 years to teach and assess clinical skills. Today they are used in virtually every medical school in the United States and are part of U.S. national licensing examinations for both MDs and DOs. This course will explore the varied uses of Standardized Patients both from the perspective of scenario content creation and training as well as assessment of simulated encounter using Standardized Patients.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

MSMS 506S Debriefing in Simulation 3.0 Credits

This course will explore the underlying theories of debriefing in relation to experiential learning and reflective practice. The role of the simulation facilitator will be investigated in providing emotional support and educational benefits for learners.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSMS 507S High Fidelity, Low Fidelity and Task Trainers 3.0 Credits

Student will investigate the various types of tools that can be used for medical simulation. Educational objectives and outcomes will be correlated to the necessary level of fidelity tools used in specific simulation education lessons.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSMS 508S Interprofessional Education 3.0 Credits

This course introduces the student to the team building approach to medical simulation through engagement of health professionals within various areas of the medical setting.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSMS 509S Fundamentals of Simulation Program Administration 3.0 Credits

This is an elective course in the Master of Science in Medical and Healthcare Simulation Program. This course will introduce fundamental concepts required for administration of a Simulation Program. Students will learn how the integration of financial management, strategic communications, negotiation strategies, and human resources management, impact the success and sustainability of a Simulation Program. Students will implement these concepts in developing a comprehensive business plan relevant to their own program.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

MSMS 511S Patient Safety and Simulation 3.0 Credits

The course will investigate the impact of healthcare simulation on patient safety. Participants will develop non-technical skills including: identifying, training and assessing safe behaviors and improve skills to disseminate patient safety skills to others. Individual and group training simulation methods will be identified and analyzed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSMS 600S Adult Learning in Healthcare 3.0 Credits

This course will enable the understanding of the learning methods of adult students. Components of adult teaching include focus on hands-on learning, management of sessions, clear delivery of information and attention the different students' needs and learning styles.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSMS 701S Simulation Laboratory Practicum I 4.0 Credits

This is an intensive introduction course that is a required curriculum component in the Master of Science in Medical and Healthcare Simulation program. Participants will collaborate in interactive simulation exercises to practice technical and non-technical simulation skills. The session will consist of interactive simulation sessions, lectures, discussions, small-group exercises, a group project, and individual assignments.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSMS 702S Simulation Laboratory Practicum II 4.0 Credits

The content of this course spans over a semester, in which the curriculum is divided into an online portion and an in person seminar requirement for one full week during the course. Successful completion of MSMS 701 is a mandatory pre-requisite prior to enrollment. Participants will build upon the content acquired during the previous online courses in this program and apply knowledge in simulation-based education during interactive simulation exercises to practice technical and non-technical simulation skills. Students will be required to draft, revise, implement and critique a simulation exercise as a group and as an individual project. The session will consist of interactive simulation sessions, lectures, discussions, small-group exercises, a group project, and individual assignments.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSMS 701S [Min Grade: B-]

MSMS 703S Simulation Laboratory Practicum III 4.0 Credits

This course is a semester long curriculum divided into an online portion and an in person seminar requirement for one full week during the course. MSMS 701S and 702S are mandatory prior to enrollment in this course. Participants will build upon experience acquired in the practical application of the MSMS and collaborate in interactive simulation exercises. Students will choose one of the following practical areas of study to complete the required final practicum course: 1) assessment via simulation, 2) simulation research, 3) Interprofessional simulation or 4) faculty development via simulation. Students will be required to implement and present their final project. The goal of the final practicum is to transform the knowledge learned in the MSMS into practical application and research in simulation education.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSMS 702S [Min Grade: B-]

MSMS 801S Capstone 1.0 Credit

This course serves as formation for the design of the culminating activity required for graduation. Students will leverage all the knowledge and skills acquired throughout the courses in this program to design the capstone project. The implementation of that Capstone is a separate course. This class is a prerequisite to the Capstone Project Implementation three-credit course.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSMS 802S [Min Grade: B-] (Can be taken Concurrently) MSMS 701S [Min Grade: B-]

MSMS 802S Capstone Project Implementation 2.0 Credits

This course serves as the culminating activity and synthesis, for all the knowledge and skills students have acquired throughout the courses in this program. The general focus of the course is to provide students with an opportunity to demonstrate how they will effectively integrate curriculum development, educational theory, appropriate use of technology and assessment into their simulation setting. This course will focus on a single healthcare simulation project. Although the theme of the project must be simulation based, the topic and final product of the project is for the student to decide.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSMS 701S [Min Grade: B-], MSMS 801S [Min Grade: B-] (Can be taken Concurrently)

MSMS I899S MSMS Independent Study 1.0-3.0 Credit

Students in the MSMS program may choose to complete an Independent Study (IS) for course credit, with a limit of 3 credit hours of Independent Study allowed toward the degree. Students must propose a topic and plan of study with their advisor prior to enrollment in Independent Study. The Independent Study is an agreement between a student and a MSMS faculty member to pursue a course of study. These courses are restricted to students who: 1) want to study a topic beyond an offered course, 2) want to take a course that is not offered but that falls within the area of expertise of a faculty member, or 3) need additional credit hours to complete a CAPSTONE requirement with the intent to publish their CAPSTONE work.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

Prerequisites: MSMS 801S [Min Grade: B-] and MSMS 802S [Min Grade: B-]

MSMS T580S Special Topics in Medical & Healthcare Simulation 1.0-12.0 Credit

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

MSMS T680S Special Topics in Medical & Healthcare Simulation 1.0-12.0 Credit

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

MSMS T780S Special Topics in Medical & Healthcare Simulation 1.0-12.0 Credit

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

MSMS T880S Special Topics in Medical & Healthcare Simulation 1.0-12.0 Credit

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

MSMS T980S Special Topics in Medical & Healthcare Simulation 1.0-12.0 Credit

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 751S INTRODUCTION TO CLINICAL MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8010S Medicine 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 801S MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8112S Allergy/Immunology-2wks 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8114S Allerby, Asthma and Immunology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8122S GEN INTERN MED/COMMUN MED 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8124S GENERAL INTERNAL MED/COMM. MED 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8126S GENERAL INTERNAL/COMM. MED 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8128S MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8132S Women's Hlth Ambulatory* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8134S Women's Health-Ambulatory 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8142S Women's Health-Academic* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

MEDI 8144S Women's Hlth Education 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8154S Ambulatory Rheumatology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8162S Women's Hlth in the Community 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8164S Women's Hlth in the Community 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8174S College Women's Health 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8182S Women's Health & Public Policy 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8184S Women's Health & Public Policy 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8194S Clinical Cardiology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8224S Ambulatory Nephrology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8234S Ambulatory Endocrinology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8244S Pulmonary Elective 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8272S AMBULATORY CARE - 2 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8274S AMBULATORY CARE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8312S CLINICAL CARDIOLOGY - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8313S CLINICAL CARDIOLOGY - 3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8314S CLINICAL CARDIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8322S CORONARY CARE UNIT 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8324S Coronary Care Unit Subintern 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8334S HEART FAILURE/TRANSPLANT 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 833S CRITICAL CARE SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8342S Cardiology:Consult. 2wks (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8344S CLINICAL CONSULT CARDIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8352S ECG READING - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8354S ECG READING 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8362S CARDIAC ELECTROPHYS & ARRY 2WK 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8363S CARDIAC ELECTROPHY & ARRHY-3WK 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8364S Cardiac Electrophys & Arrhythm 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8372S ECG-INTERP/NON-INVASCARDIO 2WK 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8373S ECG Non Invasive Cardiology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8374S ECG INTERP/NON-INVASIVE CARDIO 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8412S Endocrinology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8413S ENDOCRINOLOGY - 3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8414S ENDOCRINOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 846S INDIAN HEALTH SERVICE ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8502S MEDICINE SUBINTERNSHIP - 2 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8504S MEDICINE SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 850S MEDICINE SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8512S GENERAL INTERNAL MEDICINE 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8514S GENERAL INTERNAL MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 851S CLINICAL CARDIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8524S MEDICAL CONSULTATION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 852S CLINICAL CARDIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 854S GENERAL CARDIOLOGY-2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 857S CORONARY CARE UNIT SUBINTERN 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 859S ENDOCRN.,DIABETES & METABOL. 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 860S ENDOCRINOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 861S ENDOCRIN/DIABETES/METABOL-2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8622S Ambulatory Gastr&Hepatology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8624S Ambulatory Gastro & Hepatology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8632S CLINICALGASTROENTEROLOGY- 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8633S CLINICAL GASTROENTEROLOGY-3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8634S CLINICAL GASTROENTEROLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 863S CLINICAL GASTROENTEROLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8642S Clin Gastro & Hepatology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8644S Clin Gastro & Hepatology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 864S CLINICAL GASTROENTEROLOGY-2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 8652S Clin Gastro & Hepatology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8654S Clin Gastro & Hepatology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 865S CLIN GASTRO & HEPATOLOGY 2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 866S CLIN GASTRO & HEPATOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 868S GERIATRIC MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 869S RESEARCH IN HUMAN GENETICS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 870S HEMATOLOGY & MED ONCOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8712S PHYSICAL & REHAB MED 2WKS(S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8714S PHYSICAL & REHAB MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 872S HEMATOLOGY AND MEDICAL ONC. 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8746S Indian Health Services-6 weeks 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 876S INFECTIOUS DISEASES 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 877S INFECTIOUS DISEASES - 2 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 880S TROPICAL MED&INFECT DIS-8WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8812S PULMONARY MEDICINE - 2 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8813S Pulmonary Medicine 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8814S PULMONARY MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

MEDI 881S TROPICAL MED& INFECT DIS-6 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8822S Pulmonary and Critical Care* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8824S Pulmonary Med/Intensive Care 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 882S MED INTENSIVE CARE UNIT-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8832S MED INTENSIVE CARE UNIT-2WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8833S Medical Intensive Care Unit 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated multiple times for credit

MEDI 8834S MEDICAL ICU/CCU SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 883S MEDICAL INTENSIVE CARE UNIT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 884S MEDICAL ICU/CCU SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 885S PULMONARY MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 886S MICU/PULMONARY-SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 888S PULMONARY MED./ INTENSIVE CARE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 889S PULMONARY MEDICINE - 2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 890S CLINICAL NEPHROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8912S INFECTIOUS DISEASES- 2WKS(S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

MEDI 8913S Infectious Disease 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8914S Infectious Diseases 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8926S TROPICAL MED &INFECT DIS-6 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8928S TROPICAL MED & INFECT DIS-8WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 892S RHEUMATOLOGY-2 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8932S Hospitalist Medicine* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 8934S Women's Health in Surgery 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 893S RHEUMATOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 894S HOSPICE/PALLIATIVE CARE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 895S MEDICINE-ELECTIVE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 896S MEDICINE - ELECTIVE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 902S AMBULATORY HEMATOLOGY/ONCOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 903S BUS OF MEDICINE - MANAGED CARE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9092S ACTING INTERNSHIP IN PM&R-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9093S ELECTIVE-MEDICNE -3WKS. 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

MEDI 9094S MEDICINE - ELECTIVE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9096S MEDICINE - ELECTIVE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9112S RHEUMATOLOGY - 2 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

MEDI 9114S RHEUMATOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9124S RHEUMATOLOGY/IMMUNOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 914S RHEUMATOLOGY/IMMUNOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 915S CLIN GASTROENTEROLOGY AT ACDH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 920S OCCUPATIONAL MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9212S GERIATRIC MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9214S Geriatric Medicine 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 921S OCCUPATIONAL MEDICINE - 2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9222S Palliative Care - 2 wks 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9224S Clin Elect - Palliative Care 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

MEDI 9234S HOSPICE/ PALLIATIVE CARE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 927S PHYSICAL & REHAB MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

MEDI 9312S Hematology & Oncology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9313S HEMATOLOGY & ONCOLOGY - 3 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9314S HEMATOLOGY & MED ONCOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9322S AMBULATORY HEMATOLOGY/ONCOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9324S Ambulatory Hematology/Oncology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 9332S BONE MARROW TRANSPLANT 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9334S BONE MARROW TRANSPLANT 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9342S Hematology/Med Onc Inpt* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9344S Hematology/Med Onc Inpt Cnslts 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9412S BUS. OF MED.,MANAGED CARE 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 9414S BUS OF MEDICINE - MANAGED CARE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 945S CLINICAL CONSULT CARDIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 947S HEMATOLOGY/MED ONC INPT CNSLTS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9482S HIV MEDICINE - 2WKS (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9484S HIV Medicine 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 948S HIV MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 950S ELECTIVE CLINICAL CARDIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9512S CLINICAL NEPHROLOGY - 2 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 9513S Nephrology - 3 Weeks 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9514S Clinical Nephrology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 951S CLINICAL NEPHROLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 952S ALLERGY,ASTHMA, AND IMMUNOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 953S CLINICAL NEPHROLOGY, SERVICE A 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 954S NEPHROLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9612S OCCUPATIONAL MEDICINE- 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

MEDI 9614S OCCUPATIONAL MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 961S CARDIOLOGY - B 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9634S Clinical Informatics 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 965S HEART FAILURE/TRANSPLANT 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 971S MEDICAL RESEARCH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MEDI 9752S RESEARCH- MEDICINE- 2WKS 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**MEDI 9754S RESEARCH - MEDICINE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**MEDI 9764S RESEARCH - HUMAN GENETICS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**MEDI 984S MEDICAL CONSULTATION 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**MEDI 990S AMBULATORY CARE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**MEDI 991S AMBULATORY MEDICINE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**MEDI 992S CARDIAC CARE UNIT 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**MEDI 993S CARDIAC ELECTROPHYS & ARRHYTHM 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**MEDI 995S CORONARY CARE UNIT 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**MEDI 996S ECG READING 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**MEDI 997S PEDIATRIC-ADULT ALLERGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**MEDI 998S ECG READING - 2 WEEKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit

Microbiology and Immunology

Courses

MIIM 500S Medical Microbiology 5.0 Credits

This course offers detailed discussion of immunology and all aspects of the major infectious diseases of bacterial, viral, parasitic and mycotic origins. The course, although designed for medical students, also accommodates graduate students, who will be required to complete additional assignments.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**MIIM 502S Microbiology and Immunology Journal Club 1.0 Credit**

Faculty members rotate in directing this weekly session devoted to increasing the critical analysis skills of students, providing experience in oral presentation of data, increasing student awareness of various sources of literature, and exposing students to current areas of importance in microbiology and immunology. Recent topic themes have included T-cell immunoregulation, molecular virology, regulatory and safety requirements in microbiology research, lymphokines and cytokines, neuroendocrine immunology, bacteriocins, molecular biology of parasites, and regulation of humoral immune responses.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 9 times for 999 credits**MIIM 503S Biomedical Ethics 2.0 Credits**

Explores the key responsible conduct of research topics that are the foundation of scientific integrity. Through reading assignments, learning modules, simulations, cases studies, role-play, and a team project, students learn about, discuss, and debate the ethical dilemmas and challenges research scientists encounter. NOTE: This online course does not fulfill requirements for participation in NIH-sponsored research. Students interested in conducting NIH-sponsored research should instead enroll in IDPT 500S Responsible Conduct of Research.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**MIIM 504S Microbiology and Immunology 1st Rotation 4.0 Credits**

First laboratory rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during the spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**MIIM 505S Microbiology and Immunology 2nd Rotation 4.0 Credits**

Second laboratory rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during the spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit

MIIM 506S Micro. & Immuno. 3rd Rotation 4.0 Credits

Third laboratory rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during the spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 508S Immunology I 3.0 Credits

This is a graduate level introductory course that will cover basic principles of immunology. The format is a lecture series with student participation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: B]

Corequisite: IDPT 521S

MIIM 512S Molecular Pathogenesis I (Viral Pathogenesis) 2.0 Credits

This course introduces fundamental concepts in molecular virology through presentation and discussion of viruses that cause disease in humans. Students learn about important aspects of virus infection, including virus structure, replication, molecular pathogenesis, antiviral immune responses, the development of antiviral drug therapies, and the use of viruses in gene therapy. Students also learn to read, understand, and critically evaluate virology-related papers published in the primary literature.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 513S Molecular Pathogenesis II 3.0 Credits

Designed to convey basic concepts concerning the molecular mechanisms of disease caused by pathogenic microorganisms. Utilizes information derived from in vitro and in vivo model systems as well as studies performed in humans to enhance understanding of diseases caused by bacteria, fungi, parasites and viruses. The immune response and other host defense mechanisms will also be examined. The course is designed to complement the first year graduate core curriculum and will strive to develop analytical thought processes. Students learn to identify gaps in knowledge, formulate important and experimentally approachable questions, and develop sound hypotheses to direct the generation of new scientific discoveries. The development of sound specific aims and experimental design will also be emphasized.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 514S Grant Building 2.0 Credits

This course provides students with training in scientific writing that culminates in the preparation of an NIH-style grant application. Each student prepares an original research proposal based on an assigned primary paper in the microbiology and immunology literature. Assignments during the course are completed in a progressive manner, and are guided by both faculty mentorship and peer review by classmates. At the conclusion of the course, each student submits a written proposal and presents an oral defense of the research outlined in the written proposal.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: B] and IDPT 526S [Min Grade: B]

MIIM 515S Concepts in Biomedicine I 3.0 Credits

Introduces basic concepts of eukaryotic cell organization and function, with emphasis on macromolecules (i.e., proteins, nucleic acids, polysaccharides and membranes) and their microenvironment. Will provide a foundation to normal body functions at the cellular and molecular level.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 516S Concepts in Biomedicine II 2.0 Credits

Introduces basic aspects of fundamental eukaryotic cellular processes that control cell growth and function, with emphasis on biochemical pathways and regulatory mechanisms, cell cycle, intracellular trafficking networks, and cellular communication mechanisms. Will provide a foundation to normal cellular processes that are dysregulated in disease states such as cancer and infections.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 517S Applied Statistics for Biomedical Sciences 2.0 Credits

An intensive introduction to statistical methods. Students learn to apply principles of statistical reasoning, underlying assumptions, and careful interpretation of results. In addition, students learn how to present statistical data within various contexts applicable to the field of biomedicine, such as laboratory research, scientific publications, bioethics, intellectual property, business decisions, entrepreneurship, and visual representation of data. Students will use statistical software to supplement learning and applications of statistics.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

MIIM 518S Foundations of Applied Biomedicine 3.0 Credits

Introduces the fundamental aspects of normal eukaryotic cell structure, function, and the processes that control cell growth and communication. Emphasis is on cellular macromolecules (i.e., proteins, nucleic acids, polysaccharides and membranes) and how normal cellular processes and regulatory mechanisms can be dysregulated in disease states, such as cancer and infections. Will provide the scientific foundations that can be applied to biomedical innovation and discoveries.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 519S Commercialization of Biomedical Technology 3.0 Credits

Introduces students to the different stages of the biomedical technology development and commercialization process from ideation or discovery through its delivery to the hands of consumer. Emphasis is given primarily to FDA-regulated biomedical products (i.e., drugs, devices, and diagnostics).

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 521S Biotechniques I: Molecular and Genomic Methods 2.0 Credits

A review of the molecular, cellular and computational methods that underlie modern biotechnology, drug discovery and development. The focus is on experimental techniques used to manipulate nucleic acids and to research the interaction of proteins with nucleic acids. Strengths and limitations of the procedures are considered, and their suitability for either a basic or industrial research setting evaluated. Complements MIIM 522S Biotechniques II.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 522S Biotechniques II: Immunological Methods 2.0 Credits

A review of current immunologically-based experimental techniques and how they are applied to many different areas of research. Provides basic information central to the concepts and techniques pertinent to the study of immunology, the analysis of immune responses, and development of vaccines. Complements MIIM 521S Biotechniques I.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 523S Molecular Virology 2.0 Credits

This course will provide a comprehensive overview of the molecular aspects of viral pathogenesis, using various host-virus interactions as models.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MMED.

MIIM 524S Vaccines and Vaccine Development 3.0 Credits

This course will provide information pertaining to the history of vaccines, the principles of vaccine design, the concepts of induction of the immune protection, and the choice of vaccine types. Emphasis will be given to current and future methods for vaccine design, and approved tests for safety and efficacy. The concepts of prophylactic and therapeutic vaccines will be discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 525S Principles of Biocontainment 1.0 Credit

Explore the conceptual and practical aspects of biosafety and biocontainment. Gain a greater appreciation for the risks posed by human pathogens. Learn about approaches and procedures used to minimize those risks and contain potentially harmful pathogens. Topics covered in the course include: the classification of biological hazards; collection and storage of biohazardous materials; the practicalities of working in biocontainment facilities, and design considerations for biocontainment in the laboratory and in the field.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 527S Immunology, Immunopathology and Infectious Diseases 3.0 Credits

Explores basic knowledge of immunity from the organism to the cellular level, with a focus on how the immune system elicits protection against invasion by pathogenic organisms, and how these same responses may be damaging to the host.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 528S Structural Bioinformatics 2.0 Credits

Structural Bioinformatics is an interdisciplinary course designed for students with basic biology background to utilize and integrate novel computational methods in their research program. The course consists of basic molecules of programming in bioinformatics and extends to teach all aspects of protein structure modeling, molecular dynamics simulation ligand design and optimization and principles of molecular docking. Lectures are supplemented with hands-on sessions.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: B] or MIIM 530S [Min Grade: B]

MIIM 530S Fundamentals of Molecular Medicine I 3.0 Credits

The first of a three-part course series, which provides a foundation in essential topics in biochemistry, cellular and molecular biology and genetics. Focuses on macromolecules (i.e., proteins, nucleic acids, polysaccharides and membranes) and their microenvironment within the eukaryotic cell. It is recommended that students also enroll in MIIM 534S Molecular Medicine Journal Club I for practical application of concepts learned in the analysis and interpretation of original scientific research and data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 531S Fundamentals of Molecular Medicine II 2.0 Credits

The second of a three-part course series, which provides a foundation in essential topics in biochemistry, cellular and molecular biology and genetics. Focuses on processes that control eukaryotic cell growth and function, with emphasis on biochemical pathways and regulatory mechanisms, cell cycle, and cellular communication mechanisms. It is recommended that students also enroll in MIIM 533S Molecular Medicine Journal Club II for practical application of concepts learned in the analysis and interpretation of original scientific research and data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MIIM 530S [Min Grade: B]

MIIM 532S Fundamentals of Molecular Medicine III 2.0 Credits

The last of a three-part course series, which provides a foundation in essential topics in biochemistry, cellular and molecular biology and genetics. Focuses on normal organismal development and cancer. Includes significant independent reading of primary scientific literature and writing based on such reading.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MIIM 530S [Min Grade: B] and MIIM 531S [Min Grade: B]

MIIM 533S Molecular Medicine Journal Club II 1.0 Credit

In depth discussion of published primary scientific literature. Develop skills to analyze, interpret and represent scientific data in various topics in biochemistry, molecular biology and genetics, with emphasis on mammalian cells. Discussion topics are aligned with topics discussed in MIIM 531S Fundamentals of Molecular Medicine II.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 2 credits

MIIM 534S Molecular Medicine Journal Club I 1.0 Credit

Introduction to the journal club format of in depth discussion of published primary scientific literature. Develop skills to analyze, interpret and represent scientific data in various topics in biochemistry, molecular biology and genetics, with emphasis on mammalian cells. Discussion topics are aligned with topics discussed in MIIM 530S Fundamentals of Molecular Medicine I.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 2 credits

MIIM 535S Biomedical Technology Commercialization I 1.0 Credit

Introduces students to the different stages in the technology development and commercialization, with emphasis on biomedical technology, drugs, devices, and diagnostics. Topics include identification of assessment of emerging technologies, product development strategy and planning, and regulatory requirements. Through faculty and/or guest speaker presentations, and case studies students will develop skills and knowledge necessary to evaluate the commercial viability of new technologies. This is the first of a two-part course series.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 536S Biomedical Technology Commercialization II 1.0 Credit

Builds upon the concepts introduced in part I of this course series. Introduces students to the different stages in the technology development and commercialization, with emphasis on biomedical technology, drugs, devices, diagnostics, biomedical communications and gaming. Topics include market and industry analyses, and development and integration of business and commercialization strategies. Through faculty and/or guest speaker presentations, and case studies students will develop skills and knowledge necessary to evaluate the commercial viability of new technologies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 540S Viruses and Viral Infections 2.0 Credits

Introduces fundamental concepts in molecular virology through presentation and discussion of viruses that cause disease in humans. Students learn about important aspects of virus infection, including virus structure, replication, molecular pathogenesis, antiviral immune responses, the development of antiviral drug therapies, and the use of viruses in gene therapy. Students also learn to read and critically evaluate virology-related papers published in the primary literature.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 541S Bacteria and Bacterial Infections 2.0 Credits

Introduces fundamental concepts in bacteria and the infections they cause, including microorganism structure and replication, pathogenesis and treatment.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 542S Mycology and Fungal Infections 2.0 Credits

Introduces basic aspects of the biology of fungi and fungal infections, such as fungal cell structure, function, replication, pathogenesis, and their impact on humans. Antifungal agents; mode of action and molecular mechanism of resistance are also discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 543S Parasitology and Parasitic Diseases 2.0 Credits

Introduces basic aspects of the biology of parasites and parasitic infections, including microorganism structure, replication and pathogenesis, as well as public health and economic impact of parasitic infections. Antiparasitic drug and vaccine development are also discussed. Primary literature is also read and discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 545S Introduction to Infectious Diseases 4.0 Credits

Introduces known human pathogens that cause infectious diseases of major public health importance. Bacterial, fungal, parasitic, and viral pathogens are comprehensively overviewed, with an emphasis on their transmission, pathogenesis, clinical presentation, prevention, and treatment. Learning materials and approaches are derived from the scientific literature and the medical school curriculum. Offers opportunities for primary literature discussions and evaluation of clinical case studies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 546S Introduction to Immunology 2.0 Credits

This course will provide a comprehensive introduction to Medical Immunology. The basis for the course will be the recorded video of the medical immunology lectures delivered to the medical students, which will be accessed and viewed by the enrolled students during the weeks identified in the schedule. At the end of each week, a review and discussion period (3 hours) will be moderated by one or more faculty members familiar with the material covered by the lectures viewed during the week.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 550S Biomedicine Seminar 3.0 Credits

A seminar series on diverse topics in biomedicine, public health, technology commercialization and entrepreneurship. Faculty and students meet in an informal way to discuss selected subjects, hear guest speakers or discuss scholarly articles and current news. The topics will vary by session, and range from current events in the biomedical industry, to various aspects of new product development, commercialization, entrepreneurship, and/or technical aspects of new discoveries.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 3 times for 12 credits

MIIM 555S Molecular Mechanisms of Microbial Pathogenesis 3.0 Credits

An advanced graduate course involving presentation and in depth discussion of recent and historical literature on the molecular and cellular mechanisms of bacterial pathogenesis. Prerequisite: a previous bacterial pathogenesis or medical microbiology course.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 600S Micro.&Immuno Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department, Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

MIIM 604S Special Topics in Virology 3.0 Credits

Emphasis is directed toward the study of mammalian virus-host interaction at the cellular level.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 605S Experiential Learning 2.0-6.0 Credits

Provides practical experience in various areas related to biomedicine (e.g., research, business, entrepreneurship, law, digital media, public health). Students participate in planning and selecting the type of experiential learning that best fits their career plans and professional needs.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 606S Microbiology and Immunology Seminar 1.0 Credit

Faculty and students meet in an informal way to discuss selected subjects, hear guest lecturers or explore topics related to the biomedical sciences of interest to the group.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

MIIM 607S Immunology II 3.0 Credits

This is an advanced course in immunology covering various aspects of contemporary cellular and molecular biology. It consists of some didactic sessions followed by reading and discussion of current literature. The prerequisites for this course are a graduate level course in immunology and permission of the instructor.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 612S MOLEC MECH OF VIRAL PATHOGENSI 2.0 Credits

This is a review course dealing with recent advances in viral pathogenesis. Current literature will be examined in lecture and discussion format.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 613S Emerging Infectious Diseases 2.0 Credits

In depth discussion of the emergence and spread of infectious agents, including species jumping, mutation and global transport. Learn about recently emerged pathogenic agents as well as possible future outbreaks or reemergence of viral, bacterial, parasitic and novel agents.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 615S Experimental Therapeutics 2.0 Credits

In-depth discussion of experimental and emerging therapies for human disease, with emphasis on infectious disease. Analysis of key developments and approaches in drug design representative of experimental therapeutics is presented, with inclusion of pharmacologic, regulatory and basic science perspectives.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 621S Biomedical Research I 2.0-3.0 Credits

Provides hands-on research experience in the broad field of molecular medicine. Student projects will focus on basic, translational, or clinical biomedical research. Host laboratories will be chosen on the basis of their research, as well as student interests and future career goals. While emphasis will be placed on laboratories within Drexel University, research may also be completed in laboratories at other academic institutions or at sites outside of Drexel University involved in molecular medicine research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 6 credits

MIIM 622S Biomedical Research II 2.0-3.0 Credits

Provides hands-on research experience in the broad field of molecular medicine. Student projects will focus on basic, translational, or clinical biomedical research. Host laboratories will be chosen on the basis of their research, as well as student interests and future career goals. While emphasis will be placed on laboratories within Drexel University, research may also be completed in laboratories at other academic institutions or at sites outside of Drexel University involved in molecular medicine research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 6 credits

MIIM 625S Advanced Molecular Virology 3.0 Credits

Provides a comprehensive overview of the molecular aspects of viral pathogenesis and viral-host interactions, using various viral families and selected viruses as models. Builds upon basic concepts introduced in MIIM 512S Molecular Pathogenesis I or MIIM 540S Viruses and Viral Infections.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 630S Advanced Molecular Biology 2.0 Credits

Advanced level course (lecture and discussions) of topics of current interest in the area of molecular biology and molecular genetics. Topics vary in different years and may include aspects of both lower eukaryotic systems and mammalian systems. May be repeated once for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 2 credits

MIIM 631S Biomedical Innovation Development and Management 5.0 Credits

An interdisciplinary capstone course. Students select a biomedical technology, and apply concepts and skills learned throughout the program to develop a full-length technology development and commercialization plan. Students are expected to conduct significant independent research throughout the course to complete this project.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MIIM 518S [Min Grade: B] and MIIM 519S [Min Grade: B]

MIIM 640S EFFECTIVE TEACHING SKILLS 1.0 Credit

This eight-week course is designed to help doctoral candidates in the biomedical science become better teachers. Participants are introduced to behaviors and techniques used by effective teachers and are given the opportunity to make several presentations. Each presentation is videotaped and positive feedback is given to the presenter by other members of the class.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 645S Biomedical Career Explorations 2.0 Credits

This is an open forum for students, faculty and guest speakers to discuss career paths in biomedicine. It will explore traditional biomedical careers such as academia, biotechnology and private industry, as well as less traditional career paths such as bioentrepreneurship, intellectual property law, biomedical communications and media, among others. Students will also have an opportunity to work on their resumes and other job-readiness skills.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 3 times for 8 credits

MIIM 650S Research Internship in Molecular Medicine 4.0-6.0 Credits

Provides laboratory-based or other forms of research experience in the broad field of molecular medicine. Student projects will focus on basic, translational, or clinical biomedical research. Internship hosts will be chosen on the basis of their research, as well as student interests and future career goals. Students will also gain experience with analyzing data that they help to generate or that they gather from the literature, as well as presenting that information in written and oral formats. Internships are primarily completed within laboratories at Drexel University. Requests for off-site internships and enrollment for less than 6 credits require course director approval.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 12 credits

MIIM 651S Research Internship in Immunology 4.0-6.0 Credits

Provides laboratory-based or other forms of research experience in the field of immunology. Student projects will focus on basic, translational, or clinical biomedical research. Internship hosts will be chosen on the basis of their research, as well as student interests and future career goals. Students will also gain experience with analyzing data that they help to generate or that they gather from the literature, as well as presenting that information in written and oral formats. Internships are primarily completed within laboratories at Drexel University. Requests for off-site internships and enrollment for less than 6 credits require course director approval.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 12 credits

MIIM 652S Research Internship in Infectious Disease 4.0-6.0 Credits

Provides laboratory-based or other forms of research experience in the field of infectious disease. Student projects will focus on basic, translational, or clinical biomedical research. Internship hosts will be chosen on the basis of their research, as well as student interests and future career goals. Students will also gain experience with analyzing data that they help to generate or that they gather from the literature, as well as presenting that information in written and oral formats. Internships are primarily completed within laboratories at Drexel University. Requests for off-site internships and enrollment for less than 6 credits require course director approval.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 12 credits

MIIM 653S Clinical Correlations in Infectious Disease 3.0 Credits

This course will serve as an advanced learning experience to correlate the basic aspects of infection with the clinical aspects of diagnosis and treatment. The course will introduce concepts that relate to understanding how the clinical aspects of infectious diseases can be translated into basic research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 654S Clinical Correlations in Immunology 3.0 Credits

This course will serve as an advanced learning experience to correlate the basic aspects of immunology & immunopathology with the clinical aspects of diagnosis and treatment. The course will introduce concepts that relate to understanding how the clinical aspects of abnormal immune responses and immunodeficiencies can be translated into basic research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MIIM 660S Current Concepts in Molecular Medicine I 3.0 Credits

This advanced course provides topical information that builds on the comprehensive basic knowledge underlying molecular medicine, as taught in the course sequence of Fundamentals of Molecular Medicine I and II (MIIM-530, and -531).

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MIIM 531S [Min Grade: B] (Can be taken Concurrently)MIIM 530S [Min Grade: B]

MIIM T580S Special Topics in Microbiology & Immunology 0.0-12.0 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

MIIM T680S Special Topics in Microbiology & Immunology 0.0-12.0 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

Molecular & Cellular Bio & Genetics

Courses

MCBG 501S MCBG 1st Lab Rotation 4.0 Credits

First rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MCBG 502S MCBG 2nd Lab Rotation 4.0 Credits

Second rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MCBG 503S MCBG 3rd Lab Rotation 4.0 Credits

Third rotation. Guided research is conducted on a part-time basis for two or three week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MCBG 506S Advanced Cell Biology 2.0 Credits

This course is designed to introduce the student to current research topics and latest developments in the area of Cell Biology. Topics may include ion transport, signal transduction and apoptosis, cytoskeleton, protein translocation and sorting, protein kinases and phosphatases, cell motility and membrane biogenesis. Topics may vary in different years.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MCBG 510S MCBG Journal Club 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 15 times for 100 credits

MCBG 511S Special Topics In MCBG 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MCBG 512S MCBG Journal Club 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 15 times for 100 credits

MCBG 513S Molec & Cell Biology Seminar 1.0 Credit

Faculty and students meet in an informal way to discuss selected subjects, hear guest lectures or explore topics related to the biomedical science of interest to the group.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 15 times for 100 credits

MCBG 514S Cell Cycle and Apoptosis 2.0 Credits

The main goal of this advanced course is to provide an in-depth molecular understanding of the principles of cell growth and cell death. This course will build upon basic information taught in the Molecular Cell Biology and Genetics Module of the Biomedical Sciences first year graduate core curriculum and intended for advanced graduate students (2nd yr. and higher) looking for further understanding in the fields of cell cycle and apoptosis. This course will also emphasize advanced topics and methods not in the core.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MCBG 600S MCBG Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department, Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 15 times for 150 credits

MCBG 601S MOLE & CELL BIO & GENE SEMINAR 1.0 Credit

Faculty and students meet in an informal way to discuss selected subjects, hear guest lectures or explore topics related to the biomedical science of interest to the group.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 10 times for 50 credits

MCBG T580S Special Topics in Molecular and Cell Biology and Genetics 0.0-12.0 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

MCBG T680S Special Topics in Molecular and Cell Biology and Genetics 0.0-12.0 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

Neurology

Courses

NEUL 8012S Neurology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 8013S NEUROLOGY - 3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 8014S NEUROLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 8015S Neurology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 801S NEUROLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 8212S Acute Stroke/NeuroIntensive 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 8214S ACUTE STROKE/NEUROINTENSIVE CA 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 821S SLEEP MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 8222S CLINICAL NEUROLOGY - 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 8224S Clinical Neurology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 8234S NEUROLOGY SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

NEUL 8242S Outpatient Neurology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUL 8244S Outpatient Neurology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 824S CLINICAL NEUROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8254S COGNITIVE NEUROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8258S Cognitive Neurology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 827S EPILEPSY SUBSPECIALTY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 830S CHILD NEUROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8318S RESEARCH-DEMENTIA & AGING-8WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 831S CHILD NEUROLOGY-2 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 832S NEUROMUSCULAR DISORDERS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 834S ACUTE STROKE/NEUROINTENSIVE CA 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 837S NEURO-OPHTHALMOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 838S PAIN MANAGEMENT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8412S EPILEPSY SUBSPECIALTY - 2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8414S EPILEPSY SUBSPECIALTY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8422S Epilepsy and EEG 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated multiple times for credit

NEUL 8512S MOVEMENT DISORDER - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8514S MOVEMENT DISORDER 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8612S NEUROMUSCULAR DISORDERS - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8614S Neuromuscular Disorders 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

NEUL 8714S NEURO - OPHTHALMOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8814S PAIN MANAGEMENT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 8912S CHILD NEUROLOGY - 2 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

NEUL 8914S CHILD NEUROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 902S NEUROLOGY SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 903S SUBSPECIALTY HEADACHE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 904S RESEARCH-DEMENTIA & AGING-8WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 9092S Elective - Neurology* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 9094S ELECTIVE - NEUROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 9098S ELECTIVE - NEUROLOGY 8WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 9754S RESEARCH - NEUROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

NEUL 9756S RESEARCH - NEUROLOGY 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NEUL 9758S RESEARCH- NEUROLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NEUL 9764S RESEARCH - NEUROEPIDEMIOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit

Neuroscience

Courses

NEUR 500S Statistics for Neuro/Pharm Research 2.0 Credits

This course will provide hands on instruction in how research data are managed and analyzed in neurobiological research. Studies will acquire a basic statistical knowledge with emphasis on application to data sets similar to what they can expect to encounter in their thesis research. Instruction in the use of statistical programs will be included.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**NEUR 501S Neuroscience 1st Lab Rotation 4.0 Credits**

First laboratory rotation. Guided research is conducted on a part-time basis for two or three 10-16 week periods. Rotations are generally conducted during fall, spring and summer of the first and second years. An oral presentation highlighting the background, rationale, methods, results and discussion of the research activity is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**NEUR 502S Neuroscience 2nd Lab Rotation 4.0 Credits**

Second laboratory rotation. Guided research is conducted on a part-time basis for two or three 10-16 week periods. Rotations are generally conducted during fall, spring and summer of the first and second years. An oral presentation highlighting the background, rationale, methods, results and discussion of the research activity is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**NEUR 503S Neuroscience 3rd Lab Rotatin 4.0 Credits**

Third laboratory rotation. Guided research is conducted on a part-time basis for two or three 10-16 week periods. Rotations are generally conducted during fall, spring and summer of the first and second years. An oral presentation highlighting the background, rationale, methods, results and discussion of the research activity is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**NEUR 505S ADVANCED MOLECULAR NEUROBIOL. 1.0 Credit**

This is a graduate course aimed to discuss basic concepts and state-of-the-art techniques in molecular neurobiology. The course also serves as a forum for all members of the Graduate Program in Neurobiology, including faculty, graduate and post-doctoral students, and technical staff, to discuss recent developments in molecular neurobiology. The class meets once a month. Some meetings focus on basic concepts and recent findings in the field, whereas others examine novel biotechniques. The discussion is led by a speaker, who in most cases is a faculty member from the Department of Neurobiology and Anatomy. Occasionally, specialists from other institutions are invited to speak on a particular subject. Students taking the course for credits will be asked to lead one section in a related subject of their choice. Full attendance is required.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**NEUR 508S Graduate Neuroscience I 2.5 Credits**

This course is offered to incoming first year Neuroscience graduate students and covers the basic tenets of Developmental Neuroscience as well as providing a historical context to the progression of Neuroscience as a field of study.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**NEUR 511S Advanced Cellular and Developmental Neuroscience 1.0 Credit**

This course provides didactic teaching and in-depth discussion of topics in cellular and developmental neuroscience. Topics will emphasize the most recent and contemporary issues in the field.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**NEUR 512S Advanced Systems and Behavioral Neuroscience 1.5 Credit**

This course provides an in-depth understanding of cellular and systems neurophysiology. Topics include: basic mechanisms, emergent network activities, sensory processing, and models of learning and memory. May be repeated once for credit.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 1 times for 3 credits

NEUR 520S Neurobiology Topics I 2.0 Credits

Neurobiology topics is a "journal club" course required of all Neuroscience graduate students beginning in the second year. Students, faculty and staff from Neuroscience and other programs are also encouraged to attend as registered or non-registered participants. The course is offered in the Fall and Spring semesters. Students choose topics of interest and a faculty member conducting research in this field is invited to introduce the topic, either from Drexel University or another local university. Students then present research papers in this area to the class to refine their presentation skills, practice critical thinking, and learn about recent research. Recent topics chosen by the class have included: Analysis of Somatosensory Systems, Neuroimmunology, Neurodegenerative Diseases, and Axon Guidance.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

NEUR 521S Neurobiology Topics II 2.0 Credits

This journal club style course is designed as an exchange of scholarly information through presentation and group discussion of published novel, impactful, and/or controversial neuroscience research that is of interest. It will cover the breadth and depth of neuroscience including molecular, cellular and systems neuroscience.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

NEUR 600S Neuroscience Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department, Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

NEUR 602S Medical Neuroscience 6.0 Credits

This course will provide extensive information regarding structure and function relationships in the central nervous system. It will also provide introductory information on neurophysiology, cellular neuroscience and systems neuroscience topics.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 607S INTEGRATED NEUROSCIENCE 4.0 Credits

This is a core course required of all graduate students in the Neuroscience Program. The prerequisite is completion of Medical Neuroscience. The course meets twice weekly during the fall semester for 2 hour sessions, which include a mix of lecture and discussion. The course emphasizes critical evaluation of experimental methods used for investigation problems in the organization and function of the central nervous system. One major goal of the course is to teach the students a system approach to analyzing the CNS control of behavior and physiology. The topics that are chosen to illustrate these principles of organization include sensorimotor integration; CNS development; neurochemical anatomy: sites and mechanism underlying regulation of ingestion, responses to stress and sexual behavior: central mechanisms of award, learning and memory: and recovery of function after CNS damage. An important second goal is to relate activity at the systems level to underlying cellular and molecular mechanisms. These strategies discussed throughout the course but especially in development; genetic basis of psychopathology: CNS injury and recovery; and use of molecular techniques for modulating behavior. The students are required to write four papers covering information from four separate blocks of the course and one final paper comparing the uses of transgenic knockouts, inducible knockouts and antisense approaches for studying a system of the student's choice. These papers are read by the faculty and defended by the students.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 0 times for NaN credits

NEUR 609S Graduate Neuroscience II 4.0 Credits

Graduate Neuroscience II is didactic in nature with neurological disease as the basis for understanding concepts in Cellular Neuroscience (module I), Systems Neuroscience (module II) and Behavioral Neuroscience (module III).

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 615S ADVANCED SPEC. TOPICS IN NEURO 1.0-3.0 Credit

Graduate students present current research papers in the general areas of systems and behavioral neurobiology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 634S MOTOR SYSTEMS 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 8214S NEUROSCIENCE SENIOR ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUR 900S NEUROSCIENCE RESEARCH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUR 901S NEUROSCIENCE SENIOR ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

NEUR 9096S ELECTIVE - NEUROSCIENCE 6WKS 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NEUR 9750S RESEARCH - NEUROSCIENCE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NEUR 9754S RESEARCH - NEUROSCIENCE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NEUR T580S Special Topics in Neuroscience 0.0-12.0 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**NEUR T680S Special Topics in Neuroscience 0.0-12.0 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

Neurosurgery

Courses

NESU 8212S NEUROSURGERY - 2WKS 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**NESU 8213S Neurosurgery 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NESU 8214S NEUROSURGERY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NESU 8222S ELEC./NEUROSURG PRIMCARE 2WS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**NESU 8224S NEUROSURG FOR PRIM CAREGIVERS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**NESU 8226S NEUROSURG FOR PRIM CAREGVR.6WK 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NESU 8272S NEUROSURGERY-PEDS /ADULT- 2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**NESU 827S NEUROSURG FOR PRIM CAREGIVERS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NESU 854S NEUROSURGERY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NESU 855S NEUROSURGERY RESEARCH 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NESU 895S ELECTIVE - NEUROSURGERY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NESU 9094S ELECTIVE - NEUROSURGERY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NESU 9750S Research - Neurosurgery 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NESU 9754S RESEARCH - NEUROSURGERY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit

Obstetrics & Gynecology

Courses

OBYG 795S Obstetrics and Gynecology: Post Year 1 Research Elective 0.0 Credits

OBYGN research experience taken after completion of first year of medical school.

College/Department: College of Medicine**Repeat Status:** Can be repeated multiple times for credit**OBYG 8010S OBSTETRICS & GYNECOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**OBYG 8015S Obstetrics & Gynecology 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**OBYG 801S OBSTETRICS & GYNECOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**OBYG 8112S AMBULATORY OB/GYN - 2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**OBYG 8114S Ambulatory OB/GYN 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**OBYG 8122S Amb GYN Infect Dis 1.0 Credit****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit

OBGY 8154S PRIMARY OB/GYN 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8172S GENERAL GYN - 2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8174S Genery Gynecology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8212S SUBINTERNSHIP IN OB/GYN-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8214S OB/GYN Subinternship 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8232S GENERAL OB/GYN - 2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OBGY 8234S General OB/GYN 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 823S OB/GYN SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8264S Gynecological Subinternship 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8274S Obstetrical Subinternship 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 827S GYNECOLOGIC ONCOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 828S INPATIENT SERVICE GYNECOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 830S OB/GYN, POCONO 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8312S Maternal Fetal Medicine-2 Wks. 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8314S MATERNAL/ FETAL MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8322S PERINATAL MEDICINE - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OBGY 8324S PERINATAL MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OBGY 832S PERINATAL MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8334S ANTENATAL FETAL ASSESSMENT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 833S ANTENATAL FETAL ASSESSMENT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 835S REPRODUCTIVE ENDOCRIN/INFERT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 837S PELVIC FLOOR DISORDERS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8411S REPROD ENDOCRIN/INFERT- 1 WEEK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8412S REPROD ENDOCRIN/INFERT - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8413S REPROD ENDOCRIN/INFERT- 3WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8414S REPRODUCTIVE ENDOCRIN/INFERT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 841S REPROD ENDOCRIN/INFERT-1 WEEK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 843S REPROD ENDOCRIN/INFERT-3 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8504S OB/GYN Subinternship 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8514S PELVIC FLOOR DISORDERS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8612S Urogynecology - 2WKS (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8614S UROGYNECOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8712S Gynecology Oncology-2 Wks. 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8713S Gynecology Oncology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8714S Gyn Oncology Subinternship 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8774S Women's Health - Clinical 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 8814S GYN MINIMALLY INVASIVE SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OBGY 895S ELECTIVE-OB/GYN 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 9092S Ob/Gyn Elective* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 9093S ELECTIVE-OB/GYN- 3WKS. 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OBGY 9094S ELECTIVE - OB/GYN 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 9098S ELECTIVE - OB/GYN - 8WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 932S AMBULATORY OB/GYN 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 940S MATERNAL/ FETAL MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 941S OB/GYN RESEARCH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 9744S ELEC-CLINICAL RESEARCH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OBGY 9750S RESEARCH-OB/GYN 10 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OBGY 9752S RESEARCH-OB/GYN -2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OBGY 9754S Research - OB/GYN 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

Office of Medical Education

Courses

OMED 8010S Intersession I* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8012S TRANSITION TO RESIDENCY - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8014S Transition to Clinician* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8212S TEACH COMMUNICATION SKLS-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 821S TEACH COMMUNICATION SKLS-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8222S TEACHING CLIN SKILLS EXAMS-2WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 822S TEACHING CLIN SKILLS EXAMS-2WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8232S TEACH HX TAKING&PHYS EXAMS-2WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 823S TEACH HX TAKING&PHYS EXAMS-2WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8242S ED COMMUN-COMP/SCHOLARLY-2WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 824S ADVANCED CLINICAL SKILLS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8252S EVIDENCE BASED MEDICINE-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 825S EVIDENCE BASED MEDICINE-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OMED 8264S ED COMMUN-INTERPERSONAL SKILLS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 826S ED COMMUN-INTERPERSONAL SKILLS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OMED 8272S ED COMMUN-COMP/SCHOLARLY-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 827S ED COMMUN-COMP/SCHOLARLY-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OMED 8282S TEACHING ASSIST TUTOR PRGM.2WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8284S ACAD.ELECT MED ED-PBLFAC-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8292S ACAD.ELECT MED ED-PBLFAC-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OMED 8312S ACAD ELECT/CLINICAL SKILLS-2WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OMED 8322S TEACH CLIN SKILLS YR2 PIL-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8342S Teach Clin Skills to PIL* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8412S MEDIA &PUBLIC HLTH ISSUES -2WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OMED 8413S MEDIA & PUBLIC HEALTH ISSUES 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8414S CHANNEL 6 HEALTH CHECK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

OMED 8462S MINI MEDICAL SCHOOL-2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8500S MD/MBA PRACTICUM - 12 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8522S Simulation Elective* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8632S Projects in Med Education* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8682S Academic Admin. Elec-2wks. 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8714S GYNECOLOGY ONCOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 8752S Translational Research* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 9092S MEDICAL EDUC ELECTIVE-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 9094S MEDICAL EDUC ELECTIVE - 4 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 9096S MEDICAL EDUC ELECTIVE - 6WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

OMED 9752S APPL OF RESEARCH METH - 2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

Orthopedics

Courses

ORTH 3104S METABOLIC BONE DISEASE & AMP; 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

ORTH 795S Orthopaedics: Post Year 1 Research Elective 0.0 Credits

Orthopaedics research elective taken summer after year 1.

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

ORTH 8212S Orthopaedic Surgery* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8213S Orthopaedic Surgery - 3wks 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8214S Orthopaedic Surgery 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8216S ORTHOPAEDIC SURGERY - 6WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8222S GENERAL ORTHOPAEDICS - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8224S General Orthopaedics 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8332S PED ORTHOPEDIC SURG-2WKS (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

ORTH 8334S Pediatric Orthopaedic Surgery 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8414S SPINAL DISEASE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8432S Ortho/Podiatric Surgery* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8434S Orthopaedics/Podiatric Surgery 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 8512S SPORTS MEDICINE - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

ORTH 8514S SPORTS MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 857S GENERAL ORTHOPEDICS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 858S GENERAL ORTHOPAEDICS - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 862S ORTHOPAEDIC SURGERY - 2 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 863S ORTHOPAEDIC SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 895S ORTHOPEDICS ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 9092S ELECTIVE-ORTHOPEDICS- 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

ORTH 9094S ORTHOPEDICS ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 954S SPINAL DISEASE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 957S PEDIATRIC ORTHOPAEDIC SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 958S PED ORTHOPAEDIC SURG - 2 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 959S SPORTS MEDICINE-2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 960S SPORTS MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 961S ORTHOPAEDIC RESEARCH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

ORTH 9754S RESEARCH - ORTHOPAEDICS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ORTH 9758S RESEARCH-ORTHOPAEDICS 8WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Otolaryngology

Courses

OTO 600S General Otolaryngology 3.0 Credits

This course introduces students to basic concepts in diagnoses and treatments of common ear, nose and throat disorders as well as emergent conditions encountered frequently. It includes didactic training in infectious diseases of the head and neck, sudden deafness, epistaxis ear ache, sore throat and other maladies. This course includes lectures and individually supervised clinical encounters.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 601S Otology 3.0 Credits

The student is introduced to embryologic development, anatomy, physiology and functions of the external, middle and internal ear. Concepts in the diagnosis and treatment of common pathologic conditions of the ear including hearing loss, dizziness, tinnitus, otitis externa, otitis media, chronic ear disease, mastoiditis, cholesteatoma, labyrinthitis, otosclerosis, sudden deafness and congenital conditions are addressed. It includes didactic training I facial nerve and 8th cranial nerve function and abnormalities, autoimmune training in facial nerve and 8th cranial nerve function and abnormalities, autoimmune.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 602S Head and Neck Oncology 3.0 Credits

This course introduces the student to the biology, pathology, diagnosis, treatment and prognosis of head and neck neoplastic disease. It includes didactic training in radiation therapy, immunotherapy, chemotherapy and surgery; combined use, indications and contraindications of treatment with an emphasis on acute management and long-term follow up. Tumor classification according to the American Joint Commission Guidelines will be covered. Complications of treatment and non-treatment including carotid artery.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 603S Pediatric Otolaryngology, Introduction 3.0 Credits

This course contains essential information for post-doctoral training (post-M.D. or D.O.) necessary for specialization, and as core knowledge for an academic physician in otolaryngology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 604S Journal Club in Otolaryngology 1.0 Credit

This course is intended to introduce students to critical analysis of published literature. Articles will be assigned in advance and discussed in journal club. The articles will be selected by faculty. Some will be chosen for excellence. Others will be chosen for flaws in scientific design that cast doubt on their validity and probably should have precluded their publication. Students will take turns presenting papers and critiquing them, with the guidance of faculty.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 5 times for 5 credits

OTO 605S Laryngology – Voice, Introduction 3.0 Credits

This course introduces the student to current concepts in anatomy and physiology of phonation, techniques for history and physical examination in patients with voice complaints and common diagnoses and treatments in patients with voice disorders. Voice therapy is introduced. The course includes didactic lectures and individually supervised clinical encounters.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 606S Laryngology – Voice, Advanced 3.0 Credits

This course introduces the student to advanced concepts in voice management including objective voice assessment, stroboscopedaryngoscopy, high-speed laryngeal imaging and related technology. Avenues for voice research also are discussed. Advanced office-based care is included, including indirect laryngeal surgery, office-based laser surgery, EMG guided Botulinum Toxin injection and other techniques.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: OTO 605S

OTO 607S Laryngology – Swallowing 3.0 Credits

The student is introduced to anatomy and physiology of deglutition, as well as diagnoses and treatments of swallowing disorders. Techniques addressed include functional endoscopic evaluation of swallowing and sensory function (FEESST), three-phase barium swallow, transnasal esophagoscopy and esophageal manometry, among others.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 608S Temporal Bone Dissection 3.0 Credits

This intensive, hands-on course includes didactic lectures, evaluation of histology and imaging studies, and extensive supervised cadaver dissection. All students will complete a variety of cadaver dissections including mastoidectomy, translabyrinthine craniotomy, middle fossa approach to the internal auditory canal, stapedectomy, cochlear implantation and others.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 609S Neurotology 3.0 Credits

This course is designed to introduce the student to conditions of the inner ear and ear-brain interface. Didactic lectures introduce concepts in the diagnosis and treatment of vertigo, tinnitus, autoimmune inner ear disease, Meniere's syndrome, cochlear otosclerosis, sudden deafness, acoustic neuroma and other tumors of the ear and cerebellopontine angle. The student will learn techniques for history and physical examination, evaluation of diagnostic testing, histology and imaging studies. Surgical management of patients with neurotological disorders will be introduced in didactic courses.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: OTO 601S

OTO 610S Audiology 3.0 Credits

The student is introduced to anatomy and physiology of hearing and balance as well as tests used in diagnosis and treatment of disorders of hearing and balance. Techniques addressed include audiogram, tympanograms, otoacoustic emission, brainstem evoked response audiogram (ABR), Electronystagmogram (ENG), computerized dynamic posturography (CDP), rotary chair testing, electroneuronography (ENoG), electrocorticogram (ECoG), vestibular-evoked myogenic potential (VEMP), tinnitus matching and masking, and central auditory processing testing.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 611S Endocrine Surgery 3.0 Credits

This course introduces the student to concepts in the diagnosis and treatment of common disorders of the thyroid, parathyroid and pituitary glands. Techniques include serologic testing, imaging studies, nuclear medicine studies, FNA cytology and biopsy. Didactic lectures address autoimmune, malignant and non-malignant disorders, as well as chronic and emergent management of endocrine pathologies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 612S Allergy and Immunology 3.0 Credits

This course introduces the student to the diagnosis and treatment of allergic and immunologic disorders of the ear, nose, throat, head and neck. Basic science and principles of the various components of the immune system are presented. Techniques addressed include skin testing, RAST testing and serologic testing.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 613S Radiology of the Head and Neck 3.0 Credits

This course introduces students to the physics of and indications for imaging of the head and neck. Emphasis is placed on computed tomography, magnetic resonance imaging, magnetic resonance angiography, arteriography and ultrasound. The course also includes nuclear imaging SPECT and PET.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 614S Pathology and Histology 3.0 Credits

The student is introduced to pathologic and histologic diagnoses of surgical pathology of the head and neck. This hands-on course includes didactic lectures and evaluation of pathology specimens and microscopic slide analysis.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 615S Pediatric Otolaryngology, Advanced 3.0 Credits

This course is tailored to introduce students to the diagnosis and treatment of complexly and/or critically ill children. Didactic lectures include pediatric cancer, rare childhood disease, pediatric HIV and AIDS, congenital abnormalities and prematurity, with emphasis on acute, chronic and emergent care.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: OTO 603S

OTO 616S Otolaryngology Practice 3.0 Credits

This course focuses on practice management issues for the otolaryngologist including procedural terminology and coding, patient registration, surgical scheduling, precertification, documentation of services, legal issues including contract law and privacy issues. Economic issues and practice building will also be covered in didactic lectures. A special emphasis is placed on academic practice.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 617S Research Methodology and Publication 3.0 Credits

This introductory course focuses on the fundamentals of basic clinical research and research involving human subjects. Institutional, state and federal laws and regulations are covered. A special focus is placed on clinical relevance, research design and publication of research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 618S Facial Plastic and Reconstructive Surgery 3.0 Credits

The student is introduced to the basic concepts of facial plastic and reconstructive surgery. Didactic training in rhinoplasty, open reduction internal fixation of frontal sinus fractures, mandibular, malar, orbital and maxillary fractures, blepharoplasty, rhytidectomy, orbital decompression, local flap closure, MOHS reconstructive surgery, techniques and facial reanimation procedures and other topics are included.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 619S Sleep Disorders 3.0 Credits

This course introduces the student to the pathophysiology, evaluation and treatment of snoring, upper airway resistance syndrome and obstructive sleep apnea. Testing techniques, treatment options and outcomes assessment are included.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 620S Taste and Smell 3.0 Credits

Didactic instruction introduces the student to the pathophysiology, evaluation and treatment of patients with disorders of taste and smell. Emphasis is placed on issues including nutrition and quality of life, and especially on current diagnostic technology and research potentials.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 621S Rhinosinusology 3.0 Credits

This course introduces the student to anatomy and physiology of the nose, and a variety of techniques for evaluation of the nose and sinuses. Direct examination, nasal endoscopy, open sinus surgery and functional endoscopic sinus surgery are stressed. Variations and infectious diseases involving those in paranasal sinuses are included.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 622S Bronchoesophagology 3.0 Credits

This course introduces the student to anatomy and diagnostic techniques for disorders of the larynx, trachea, bronchial tree and esophagus. Pathophysiology of a wide variety of disorders is included. This course is intended to provide the foundation for surgical training in flexible and rigid endoscopy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 700S General Otolaryngologic Surgery 6.0 Credits

General otolaryngology trains the student in surgical procedures common in general otolaryngologic practice. These include, among others, septoplasty, tonsillectomy, adenoidectomy, uvulopalatopharyngoplasty and other surgery for sleep disorders, submandibular gland resection, and resection of skin lesions of the head and neck. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 701S Otologic Surgery 6.0 Credits

Supervised training in microsurgical techniques including middle ear and mastoid surgery is provided. Procedures will include myringotomy, tympanoplasty, ossiculoplasty, stapedectomy, tympanomastoidectomy and others. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 702S Head and Neck Oncologic Surgery 6.0 Credits

This course requires mastery of surgery for cancer of the head and neck including glossectomy, mandibulectomy, laryngectomy, modified radical neck dissection, radical neck dissection, flap reconstruction and related procedures. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 703S Pediatric Otolaryngologic Surgery 6.0 Credits

Pediatric otolaryngology trains the student in management of common and specialized otolaryngologic problems involving children. Common problems include pediatric approach to tonsillectomy and adenoidectomy, septoplasty, and direct laryngoscopy. This course of training also includes more complex issues including congenital malformations of the face, head and neck, benign and malignant neoplasms of the head and neck, pediatric airway disorders and bronchotracheal reconstruction. Pediatric cochlearimplantation also may be included. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 704S Neurotologic Surgery 6.0 Credits

This course involves advanced otologic surgery including cochlear implantation, translabyrinthine and middle cranial fossa approaches to the internal auditory canal for resection of ear-brain interface tumors, skull base surgery, facial nerve reanastomosis and related procedures. This also includes acquisition of knowledge about lumbar drainage, management of cerebral spinal fluid leaks and other issues common to neurotologic surgery. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 705S Laryngologic Surgery 6.0 Credits

Laryngology includes knowledge of the special microsurgical techniques required for delicate surgical management of benign and malignant disorders of the larynx. It includes microdirect laryngoscopy, techniques for vocal fold injection, injection medialization, use of cold instruments, appropriate laser use and safety, and other surgical techniques. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 706S Rhinologic Surgery 6.0 Credits

The hands-on training in rhinological surgery includes complex septoplasty, repair of nasal fracture, extensive nasal turbinate surgery, rhinotomy, transnasal approaches to the sphenoid sinus and other complex rhinologic procedures. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 707S Surgery of the Sinuses 6.0 Credits

Sinusology trains the otolaryngologic surgeon in external and functional endoscopic surgical approaches to the paranasal sinuses. It includes training in maxillary antrostomy, Caldwell-Luc, endoscopic surgery of the maxillary and ethmoid sinuses, external ethmoidectomy, intranasal and external frontal sinus procedures, and sphenoid sinus procedures. Special emphasis is placed on recognition and protection of the cribriform plate and four of the anterior cranial fossa. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 708S Bronchoesophagology 6.0 Credits

Bronchoesophagology provides training in flexible and rigid direct laryngoscopy, bronchoscopy and esophagoscopy. This also includes transnasal esophagoscopy and flexible and rigid endoscopic laser surgical techniques. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 709S Cosmetic Plastic and Reconstructive Surgery 6.0 Credits

The cosmetic and reconstructive surgery experience includes training in theory and practice of procedures such as rhinoplasty, blepharoplasty, rhytidectomy, chin implantation, skin resurfacing, regional free flaps, and may include training and free flap techniques. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO T680S Special Topics in Otolaryngology 0.0-12.0 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

OTO T780S Special Topics in Otolaryngology 0.0-12.0 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

Otolaryngology

Courses

OTOL 8212S Otolaryngology * 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL 8213S OTOLARYNGOLOGY - 3 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL 8214S Otolaryngology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL 8334S Pediatric Otolaryngology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL 858S OTOLARYNGOLOGY - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL 859S OTOLARYNGOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL 895S OTOLARYNGOLOGY ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL 9092S OTOLARYNGOLOGY-2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL 9094S OTOLARYNGOLOGY ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

OTOL 9752S RESEARCH-OTOLARYNGOLOGY-2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

OTOL 9754S RESEARCH- OTOLARYNGOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

Pathologists Assistant

Courses

MSPA 500S Gross Anatomy 5.0 Credits

Dissection of the human body with particular attention to the morphological relationships of individual organ systems. Emphasis is placed on internal anatomy as a major facet of this instruction which is designed for eventual autopsy evisceration and subsequent dissection, as well as surgical pathology gross examinations.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 10 credits

MSPA 510S Laboratory Management 2.0 Credits

The organization and function of an Anatomic Pathology laboratory is investigated to include ordering supplies, financial management, computerization, laboratory safety, billing, personnel managements, organizational compliance (JCAHO, CAP, OSHA) and quality assurance.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 4 credits

MSPA 520S Medical Terminology 3.0 Credits

Study of the etymology of medical and surgical terms with emphasis on the principles of word analysis, construction, and evolution.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPA 530S Biomedical Photography 4.0 Credits

Basic introductory photography course with special emphasis on macro, close-up and photomicrographic techniques. Special techniques relative to the biomedical field, such as digital imaging and basic radiographic techniques are explored.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

MSPA 540S Histotechnology I 3.0 Credits

Basic histology and histochemistry techniques are covered through formal lecture and laboratory experience.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

MSPA 541S Histotechnology II 3.0 Credits

Advanced histology and histochemistry techniques are covered through formal lecture and laboratory experience. This course is a continuation of MSPA 540S.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

Prerequisites: MSPA 540S [Min Grade: C]

MSPA 550S Applied Anatomic Pathology 4.0 Credits

The course is designed to bring the students through the clinical aspects of chart review as well as academic autopsy and surgical pathology practices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

MSPA 560S Medical Ethics 2.0 Credits

"MedEthEx OnLine" is a series of exercises in medical ethics and communication skills. The goal of the program is to enable students to improve their knowledge of medical ethics and their skills in communicating about ethical issues with patients and their families.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 4 credits

MSPA 570S Medical Pathology I 6.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

MSPA 571S Medical Pathology II 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

MSPA 580S Medical Microbiology I 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

MSPA 581S Medical Microbiology II 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

MSPA 590S Leadership Skills for the Medical Profession 3.0 Credits

This course is designed to help students develop leadership skills in order to facilitate success in their professional and personal lives. Students will be given the opportunity to discover and practice several leadership strategies and techniques. Topics will include leadership skills, communication skills, time-management, team-building, conflict resolution and stress management.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPA 600S Surgical Pathology I 6.0 Credits

Clinical practicum designed to teach the students the methods of gross tissue description, dissection and preparation of surgical specimens for light, immunofluorescent, immunochemical, frozen and electron microscopy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

MSPA 601S Surgical Pathology II 6.0 Credits

Clinical practicum designed to teach the students the methods of gross tissue description, dissection and preparation of surgical specimens for light, immunofluorescent, immunochemical, frozen and electron microscopy. A continuation of Surgical Pathology I.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

Prerequisites: MSPA 600S [Min Grade: C]

MSPA 602S Surgical Pathology III 6.0 Credits

Clinical practicum designed to teach the students the methods of gross tissue description, dissection and preparation of surgical specimens for light, immunofluorescent, immunochemical, frozen and electron microscopy. A continuation of Surgical Pathology II.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

Prerequisites: MSPA 601S [Min Grade: C]

MSPA 610S Autopsy Pathology I 6.0 Credits

Clinical practicum designed to teach the students techniques of autopsy evisceration and dissection as well as special skills and procedures necessary for the performance of post-mortem examinations.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

MSPA 611S Autopsy Pathology II 6.0 Credits

Clinical practicum designed to teach the students techniques of autopsy evisceration and dissection as well as special skills and procedures necessary for the performance of post-mortem examinations. A continuation of Autopsy Pathology I.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

Prerequisites: MSPA 610S [Min Grade: C]

MSPA 612S Autopsy Pathology III 6.0 Credits

Clinical practicum designed to teach the students techniques of autopsy evisceration and dissection as well as special skills and procedures necessary for the performance of post-mortem examinations. A continuation of Autopsy Pathology II.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

Prerequisites: MSPA 611S [Min Grade: C]

MSPA T580S Special Topics in Pathologists' Assistant 0.0-12.0**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

MSPA T680S Special Topics in Pathologists' Assistant 0.0-12.0**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

Pathology

Courses

PATH 502S PATHOLOGY 1ST LAB ROTATION 4.0 Credits

First rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 503S Pathology Journal Club 1.0 Credit

Students enroll for a minimum of four semesters for this twice monthly meeting.

College/Department: COM School of Biomedical Sciences Professional Studies

PATH 505S PATHOLOGY 2ND LAB ROTATION 4.0 Credits

Second rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 506S PATHOLOGY 3RD LAB ROTATION 4.0 Credits

Third rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 507S MEDICAL PATHOLOGY PART 1 7.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 509S Pathologic Processes 3.0 Credits

An abridged pathology course focusing primarily on aspects of general pathology (inflammation, wound healing and repair, immunopathology and autoimmunity, coagulation, vascular biology, and principles of neoplasia). Histopathology and cytology will be introduced. This course is a subset of PATH-507-05 Medical Pathology I geared toward the needs of graduate students.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 600S Pathology Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department, Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

PATH 601S CELL MOL PATHBIO CANCER ANGIOG 4.0 Credits

An advanced course addressing the cell and molecular processes associated with the biology of cancer progression. Major topics include cytogenetic abnormalities, the role and function of oncogenes and tumor suppressor genes, growth factor receptor interactions, cell cycle control and regulation of cell death, angiogenesis and the role of the extracellular matrix, viruses and cancer, tumor immunobiology, and tumor metastases. Although didactic in nature, the course requires extensive exposure to the current literature on topics at the forefront of cancer research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 751S PATHOLOGY AND LABORATORY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 819S ANATOMIC PATH & LAB MED- 3 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 820S ANATOMIC PATH & LAB MED- 1 WK 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8214S LABORATORY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 821S ANATOMIC PATHOLOGY- 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8222S ANATOMIC PATHOLOGY - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PATH 8223S Anatomic Pathology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PATH 8224S ANATOMIC PATHOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PATH 822S ANATOMIC PATHOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8232S CLINICAL PATHOLOGY- 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PATH 8234S Clinical Pathology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 823S CLINICAL PATHOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8242S Diagnostic Cytology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PATH 8244S DIAGNOSTIC CYTOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 824S CLINICAL PATHOLOGY-2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 825S DIAGNOSTIC CYTOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 826S ANATOMIC PATH & LAB MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 828S DIAGNOSTIC CYTOLOGY - 2 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 829S PATHOLOGY SUBSPECIALTY - 2 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8311S ANATOMIC PATH & LAB MED - 1 WK 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8312S ANATOMIC PATH & LAB MED - 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8313S ANATOMIC PATH & LAB MED- 3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8314S Anatomic Path & Lab Medicine 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8412S PATHOLOGY SUBSPECIALTY- 2 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8414S PATHOLOGY SUBSPECIALTY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 9092S Forensic Pathology* 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 9094S ELECTIVE - PATHOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 955S LABORATORY MEDICINE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 956S PATHOLOGY RESEARCH 2 WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 9752S RESEARCH - PATHOLOGY - 2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 9754S RESEARCH - PATHOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 9756S RESEARCH-PATHOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH T580S Special Topics in Pathology 0.0-12.0 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**PATH T680S Special Topics in Pathology 0.0-12.0 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

Pediatrics

Courses

PEDS 8010S Pediatrics 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 8015S Pediatrics 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 801S PEDIATRICS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 8112S PEDS.-GASTROENTEROLOGY -2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**PEDS 8114S Adolescent Medicine 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 8212S Pediatric Allergy*** 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 8213S PEDIATRIC ALLERGY/IMMUN.- 3WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 8214S PEDIATRIC ALLERGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 8224S Pediatric Pulmonary/Allergy 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 822S PEDIATRIC PRIMARY CARE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 823S GENERAL PEDIATRICS (PED. MED.) 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 824S NEONATAL INTENSIVE CARE-2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 825S NEONATAL INTENSIVE CARE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 827S PEDIATRIC ELECTIVES 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 828S PEDIATRIC ENDOCRINOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 829S NEURODEVELOPMENTAL PEDIATRICS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 830S SUBINTERNSHIP IN PEDIATRICS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 8312S AMBULATORY PEDIATRICS- 2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PEDS 8314S Ambulatory Pediatrics 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit

PEDS 831S CLINICAL GENETICS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8324S Outpatient Peds & Advocacy 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 832S DEVELOPMENTAL PEDIATRICS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8332S Peds Palliative Care* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8334S Pediatric Palliative Care 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 833S PEDIATRIC INFECTIOUS DISEASE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 834S PEDIATRIC NEPHROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 835S PEDIATRIC ALLERGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 836S PED.GENETICS/DYSMORPHOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 837S PEDIATRIC CARDIOLOGY - 2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 838S PEDIATRIC ENDOCRINOLOGY - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8412S PEDIATRIC CARDIOLOGY - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PEDS 8414S PEDIATRIC CARDIOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 841S CHILD NEUROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 845S PEDIATRIC PATHOLOGY-2 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8504S Pediatric Subl in Hospital Med 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8514S DEVELOPMENTAL PEDIATRICS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8516S DEVELOPMENTAL-PEDIATRICS-6WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PEDS 8524S Pediatric Crit Care Med Sub 1 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8552S Subinternship Ped. Surgery* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8554S SUBINTERNSHIP IN PED. SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8612S Pediatric Emergency Med* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8614S Pediatric Emergency Medicine 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8712S PEDIATRIC ENDOCRINOLOGY - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8714S Pediatric Endocrinology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8812S Pediatric Gastroenterology-2wk 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8813S PEDIATRIC GASTROENTEROLOGY 3WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PEDS 8814S PEDIATRIC GASTROENTEROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8912S PEDIATRIC GERIATRICS - 2 WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 8914S Ped Genetics/Dysmorphology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 895S ELECTIVE - PEDIATRICS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 898S ELECTIVE/PEDIATRICS 3.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 899S AMBULATORY PEDIATRICS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9012S PEDS.-HEMATOLOGY/ONCOLOGY 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9014S PEDIATRIC HEMATOLOGY/ ONCOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9022S Pediatric Hematology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9024S Pediatric Hematology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9034S Pediatric Rheumatology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 903S NEONATAL MED SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9042S CHILD MALTREATMENT & NEGLECT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9044S Child Maltreatment & Neglect 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 904S NEONATAL RESEARCH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 905S PEDIATRIC PULMONARY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9092S ELECTIVE-PEDIATRICS, 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9093S ELECTIVE-PEDIATRICS -3WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9094S ELECTIVE - PEDIATRICS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9112S PEDS HIV&OTHER IMMUN DIS-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9114S Pediatric Rheumatology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9212S Ped Infectious Disease* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9214S PEDIATRIC INFECTIOUS DISEASE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9312S NEONATAL INTENSIVE CARE - 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9314S Neonatal Intensive Care 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9324S Pediatric Intensive Care 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated multiple times for credit

PEDS 934S PEDIATRIC GASTROENTEROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9414S PEDIATRIC NEPHROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9514S PEDIATRIC OPHTHALMOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9612S PEDIATRIC DENTISTRY- 2 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9613S PEDIARTIC DENISTRY - 3 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 9614S PEDIATRIC DENTISTRY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 962S PEDIATRIC HEMATOLOGY/ONCOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PEDS 963S PEDIATRIC EMERGENCY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 964S PEDIATRIC OPHTHALMOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9652S Pediatric Pathology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9654S PEDIATRIC PATHOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 966S PEDIATRIC PATHOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 967S PEDIATRIC SURGERY 3.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 968S CHILD ADVOCACY/COMMUNITY HEALT 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 969S PEDIATRIC DENTISTRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 970S PED HIV & OTHER IMMUN DISORDER 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9712S Pediatric Primary Care-2 weeks 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9714S PEDIATRIC PRIMARY CARE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 971S PEDS HIV&OTHER IMMUN DIS-2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9723S PEDIATRICAL ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9724S PEDIATRICALS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PEDS 972S PEDIATRIC DENTISTRY-2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9754S RESEARCH PEDIATRIC 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9756S RESEARCH-PEDIATRICALS 6WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9758S Research Pediatric 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9764S RESEARCH - NEONATAL 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 980S ADOLESCENT MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9814S PEDIATRIC PULMONARY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 981S PEDIATRIC SURGERY ROTATION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9852S Pediatric Surgery* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9854S PEDIATRIC SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9864S PEDIATRIC NEUROSURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PEDS 9912S NEONATAL MED-SUBINTERNSHIP 2WK 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PEDS 9914S Neonatal Med Subinternship 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Pharmacology

Courses

PHRM 502S Current Topics in Pharmacology & Physiology 1.0 Credit

Current topics in experimental pharmacology are presented via a journal club alternating with research presentations. In addition to active student participation, all members of the department of pharmacology and physiology (research assistants, postdoctoral fellows and faculty) participate.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

PHRM 503S Pharm & Phys 1st Lab Rotation 4.0 Credits

First rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 504S Pharm & Phys 2nd Lab Rotation 4.0 Credits

Second rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 505S Pharm & Phys 3rd Lab Rotation 4.0 Credits

Third rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 507S Prin of Neuropharmacology 3.0 Credits

This course covers basic concepts in Neuropharmacology, all of the major neurotransmitter systems, behavioral pharmacology and addiction, approaches to molecular and cellular physiology including photoactivated biomolecules, electrophysiology, phosphorylation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 508S Fundamentals in Neuropharmacology 1.5 Credit

This is an interactive and interdisciplinary course that introduces students to fundamental aspects of neuropharmacology. It is devoted to the study of drugs that affect nervous tissue and alter behaviors. The course will give an introduction to pharmacokinetics, receptor binding theory, signal transduction, neurochemical methods, and behavioral pharmacology. This is followed by lectures on individual neurotransmitter systems. The course will be taught at Drexel University College of Medicine.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521 [Min Grade: B] or IDPT 550 [Min Grade: B]

PHRM 512S Graduate Pharmacology 3.0 Credits

This team taught course provides a basic knowledge of the pharmacologic mechanisms of action, effects on organ systems, routes of administration, pharmacokinetics, therapeutic uses, adverse reactions, contraindications, and drug interactions of drugs.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 516S Advanced Topics in Physiology 1.0 Credit

PHRM516S is presented in several formats throughout the semester to discuss cellular physiology, neurophysiology, muscle physiology, cardiovascular physiology, pulmonary physiology, gastrointestinal physiology, endocrinology, and renal physiology. These formats include review of past scientific findings that led to the current understanding of a physiological principle, journal club style format, self-directed problem sheets, development of a working model based on past and present scientific knowledge, and point/counter-point discussions where students debate pros and cons of a controversy in physiology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Corequisite: PHGY 503S

PHRM 517S Advanced Topics in Pharmacology 1.0 Credit

This course will expand upon the Graduate Pharmacology course for graduate students enrolled in Graduate Pharmacology 512S. The intent is to provide more in-depth coverage of selected topics that will be beneficial to students pursuing a career where pharmacology is a principle component of training, education and/or employment.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Corequisite: PHRM 512S

PHRM 518S New Frontiers in Therapy 1.0 Credit

This course will provide a glimpse of what could revolutionize diagnosis and treatment with emphasis on personalized medicine. Scientific impact, technical challenges, and sociopolitical repercussions will be discussed. Students will be required to write a research proposal in NIH format and are expected to participate in peer review.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 519S Methods in Biomedical Research 2.0 Credits

A primary goal for the course is to introduce students in the Graduate School of Biomedical Sciences and Professional Studies graduate programs to the breadth of techniques used within biomedical research, and thus at their disposal as they progress through their training. In parallel, it is expected that students will gain insight into not only the technical aspects of a variety of methodologies, but also how to critically examine techniques in both their own research and the literature for strengths, weaknesses, caveats and limits. At the end of the course, students should have a greater appreciation for the modalities used outside of their own rotation or dissertation labs, and an understanding of how those technologies are moving bench science forward.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 520S Internship in Drug Discovery and Development 4.0 Credits

The Internship in Drug Discovery and Development provides the student with a unique opportunity to apply the principles and skills learned in the classroom and acquire valuable professional experience and critical insight in a specific field. The internship is integrated into the curriculum such that it complements classroom activities and permits the student to explore an area of interest that they may ultimately pursue as a career path. Students are paired with experienced professionals who supervise their work and act as mentors and advisors. Internships can be arranged with an extensive network of pharmaceutical corporations, biotechnology companies, foundations and universities in the region as well as Drexel University itself.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: PHRM 512S [Min Grade: C] and PHGY 503S [Min Grade: C] and PHRM 525S [Min Grade: C]

PHRM 521S Intensive Internship in Drug Discovery and Development 9.0 Credits

The Intensive Internship in Drug Discovery and Development provides the student with a unique opportunity to apply the principles and skills learned in the classroom and acquire valuable professional experience and critical insight in a specific field. The internship is integrated into the curriculum such that it complements classroom activities and permits the student to explore an area of interest that they may ultimately pursue as a career path. Students are paired with experienced professionals who supervise their work and act as mentors and advisors. Internships can be arranged with an extensive network of pharmaceutical corporations, biotechnology companies, foundations and universities in the region as well as Drexel University itself.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: PHRM 512S [Min Grade: C] and PHGY 503S [Min Grade: C] and PHRM 525S [Min Grade: C]

PHRM 525S Drug Discovery and Development I 3.0 Credits

This course, the first of two, will provide in-depth exposure to the concepts and processes involved in drug discovery and development as practiced in the biopharmaceutical industry cover all facets from target identification through to the submission of the investigational New Drug Application (IND). Current unmet medical needs and case histories from difference therapeutic areas will be reviewed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 526S Drug Discovery and Development II 3.0 Credits

This course will provide in-depth exposure to the concepts and processes involved in drug discovery and development as practiced in the biopharmaceutical industry. It will follow the first course (Drug Discovery and Development I) and will cover all aspects from roval process to the submission of the NDA to regulatory approval and post-marketing surveillance.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: PHRM 525S [Min Grade: B]

PHRM 527S Current Topics in Drug Discovery and Development 1.0 Credit

This is a student-driven course in a journal club format. Students select journal articles or news reports that highlight recent discoveries or developments that are particularly important or relevant to the field of drug discovery and development. Topics for presentation and discussion will include scientific, technical, commercial, legal, regulatory, and ethical issues as well as in-depth case studies of recently developed blockbuster or breakthrough drugs. Students will prepare and give presentations on their chosen topic, provide discussion prompts, answer questions related to their presentations, review the presentations of other students and pose relevant questions.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

PHRM 600S Pharmacology Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department, Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

PHRM 602S Research Methods in Pharmacology 2.0 Credits

A research course in which the student participates in several research projects under the direction of different staff members in order to become familiar with the specific areas of expertise of the faculty. This course emphasizes not only experimental methods but also the conceptual bases for investigating current problems in pharmacology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 605S Research in Drug Discovery and Development 4.0 Credits

This course is designed to provide opportunities for the student to pursue research in the area of drug discovery and development. This can be done either in an academic or pharmaceutical laboratory under the supervision of a mentor. An alternative or an additional aspect can be the conduct of research for this thesis that is not laboratory research but library research based on an approved topic for the thesis requirement. Both alternatives, laboratory or library research must be approved by the course directors.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 3 times for 16 credits

PHRM 610S Practicum in Drug Discovery and Development 4.0 Credits

This course prepares students for transition into or advancement in the field of drug discovery and development and can be used as the basis for the scholarly document that is required for completion of the program. It consists of an independent project that involves in-depth exposure to a specific topic that is relevant to a discipline in drug discovery and development that the student wishes to pursue in the future. The training consists of hands-on research or development of technical expertise under the guidance of a mentor who has experience in the field.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 751S MEDICAL PHARMACOLGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 823S CARDIOVASCULAR PHARMACOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 9092S PHARMACOLOGY - ELECTIVE - 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 9094S PHARMACOLOGY -ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PHRM 9750S RESEARCH-PHARMACOLOGY-16 wks 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 9754S PHARMACOLOGY RESEARCH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 999S Special Topics in Pharmacology & Physiology 1.0-4.0 Credit

This is a special topics course that will focus on graduate level topics in the area of Pharmacology & Physiology. The exact content, readings, and grading will be determined by the professor on a course by course basis.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 3 times for 16 credits

PHRM T580S Special Topics in Pharmacology 0.0-12.0 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

PHRM T680S Special Topics in Pharmacology 0.0-12.0 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

Physical Med & Rehabilitation

Courses

PMRM 8712S Physical Medicine & Rehab* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PMRM 8714S Physical Medicine and Rehabilitation 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 3 times for 0 credits

PMRM 9092S Spinal Cord Injury Rehab* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PMRM 9094S ELECTIVE-PHYSICAL MED & REHAB. 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Physiology

Courses

PHGY 502S ION CHANNELS IN CELLULAR PHYS. 2.0 Credits

This elective advanced course covers all aspects of ion channel physiology. In depth lectures on voltage-gated and ligand-gated ion channel structure and function are presented in the first part of the course. The second part of the course delves into electrophysiology and its application to cell physiology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHGY 503S Graduate Physiology 4.0 Credits

This lecture course is designed to introduce graduate students to the major organ systems of the body and their integration. A major focus will be on the basic biological/biophysical processes that underlie the integration functioning of these systems. The focus is on general principles, and examples will be drawn from both human and animal physiology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

PHGY 701S MEDICAL PHYSIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 9 times for NaN credits

PHGY T580S Special Topics in Physiology 0.0-12.0 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

Pre - Medical

Courses

PMED 800S Registered for Degree Only 0.0-6.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Program in Integrated Learning

Courses

PILM 710S PIL BLOCK I 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 711S GROSS ANATOMY AND EMBRYOLOGY 0.0 Credits

This course is part of PIL BLOCK I (PILM 710S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 712S MICROANATOMY AND CELL BIOLOGY 0.0 Credits

This course is part of PIL BLOCK I (PILM 710S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 713S PATIENT AS A PERSON 0.0 Credits

This course is part of PIL BLOCK I (PILM 710S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 714S BEHAVIORAL SCIENCE AND PSYCHOPATHOLOGY 0.0 Credits

This course is part of PIL BLOCK I (PILM 710S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 715S CLINICAL SKILLS 0.0 Credits

This course is part of PIL BLOCK I (PILM 710S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 720S PIL BLOCK II 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 721S MEDICAL NEUROSCIENCE 0.0 Credits

This course is part of PIL BLOCK II (PILM 720S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 722S MEDICAL PHYSIOLOGY 0.0 Credits

This course is part of PIL BLOCK II (PILM 720S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 723S PATIENT AS A PERSON 0.0 Credits

This course is part of PIL BLOCK II (PILM 720S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 724S BEHAVIORAL SCIENCE AND PSYCHOPATHOLOGY 0.0 Credits

This course is part of PIL BLOCK II (PILM 720S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 725S CLINICAL SKILLS 0.0 Credits

This course is part of PIL BLOCK II (PILM 720S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 730S PIL BLOCK III 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 731S Immunology & Fund Microbiology 0.0 Credits

This course is part of PIL BLOCK III (PILM 730S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 732S Medical Biochemistry & Nutrition 0.0 Credits

This course is part of PIL BLOCK III (PILM 730S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 733S PATIENT AS A PERSON 0.0 Credits

This course is part of PIL BLOCK III (PILM 730S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 734S Biopsychosocial Determinant in Health and Illness 0.0 Credits

This course is part of PIL BLOCK III (PILM 730S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 735S CLINICAL SKILLS 0.0 Credits

This course is part of PIL BLOCK III (PILM 730S).

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 736S Medical Genetics 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PILM 738S PBL Process - Yr1 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 740S PIL BLOCK IV 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 741S Primary Care Practicum 0.0 Credits

This course is part of PIL BLOCK IV (PILM 740S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 742S Community Health Component 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 750S PIL BLOCK V 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 751S BEHAVIORAL SCIENCE AND PSYCHOPATHOLOGY 0.0 Credits

This course is part of PIL BLOCK V (PILM 750S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 752S PATHOLOGY AND LABORATORY MEDICINE 0.0 Credits

This course is part of PIL BLOCK V (PILM 750S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 753S PATHOPHYSIOLOGY 0.0 Credits

This course is part of PIL BLOCK V (PILM 750S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 754S MEDICAL PHARMACOLOGY 0.0 Credits

This course is part of PIL BLOCK V (PILM 750S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 755S CLINICAL SKILLS 0.0 Credits

This course is part of PIL BLOCK V (PILM 750S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 756S PATIENT AS A PERSON 0.0 Credits

This course is part of PIL BLOCK V (PILM 750S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 758S MEDICAL MICROBIOLOGY 0.0 Credits

This course is part of PIL BLOCK V (PILM 750S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 760S PIL BLOCK VI 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 761S BEHAVIORAL SCIENCE AND PSYCHOPATHOLOGY 0.0 Credits

This course is part of PIL BLOCK VI (PILM 760S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 762S PATHOLOGY AND LABORATORY MEDICINE 0.0 Credits

This course is part of PIL BLOCK VI (PILM 760S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 763S PATHOPHYSIOLOGY 0.0 Credits

This course is part of PIL BLOCK VI (PILM 760S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 764S MEDICAL PHARMACOLOGY 0.0 Credits

This course is part of PIL BLOCK VI (PILM 760S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 765S CLINICAL SKILLS 0.0 Credits

This course is part of PIL BLOCK VI (PILM 760S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 766S PATIENT AS A PERSON 0.0 Credits

This course is part of PIL BLOCK VI (PILM 760S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 768S MEDICAL MICROBIOLOGY 0.0 Credits

This course is part of PIL BLOCK VI (PILM 760S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 770S PIL BLOCK VII 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 771S Intro to Clinical Psychiatry 0.0 Credits

This course is part of PIL BLOCK VII (PILM 770S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 772S PATHOLOGY AND LABORATORY MEDICINE 0.0 Credits

This course is part of PIL BLOCK VII (PILM 770S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 773S PATHOPHYSIOLOGY 0.0 Credits

This course is part of PIL BLOCK VII (PILM 770S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 774S MEDICAL PHARMACOLOGY 0.0 Credits

This course is part of PIL BLOCK VII (PILM 770S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 775S CLINICAL SKILLS 0.0 Credits

This course is part of PIL BLOCK VII (PILM 770S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 776S PATIENT AS A PERSON 0.0 Credits

This course is part of PIL BLOCK VII (PILM 770S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 778S MEDICAL MICROBIOLOGY 0.0 Credits

This course is part of PIL BLOCK VII (PILM 770S).
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PILM 780S PBL Process - Yr2 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

Psychiatry

Courses

PSYC 701S Biopsychosocial Determinant in Health and Illness 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 9 times for NaN credits

PSYC 751S Intro to Clinical Psychiatry 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8010S PSYCHIATRY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8015S Psychiatry 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 801S PSYCHIATRY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8112S SR.ELECT.CHILD&ADOLESCENT PSYC 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

PSYC 8114S CHILD & ADOLESCENT PSYCHIATRY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8115S Child/Adolescent & Adult Psysc 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8212S CONSULT-LIAISON PSYCH-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8214S Consult-Liaison Psychiatry 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 824S CHILD & ADOLESCENT PSYCHIATRY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 827S CONSULT-LIAISON PSYCHIATRY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 829S GERIATRIC PSYCH. & NEUROPSYCH. 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8314S PSYCHIATRY - ADULT INPATIENT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 831S EMERGENCY PSYCHIATRY-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8324S PSYCHIATRY- INPATIENT SERVICES 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 832S INPATIENT & C/L PSYCHIATRY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8334S Caring Together 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 833S NEUROPSYCHOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 834S CLINICAL RESEARCH IN NEUROPSYCH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 836S ADDICTION MEDICINE - 2 WEEKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 837S EMERGENCY PSYCHIATRY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 838S NEUROPSYCHIATRY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 840S PSYCHIATRY- ADULT INPATIENT 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

PSYC 8414S PSYCHIATRIC MEDICAL CARE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 8416S PSYCHIATRIC MEDICAL CARE -8WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 841S PSYCHIATRY- INPATIENT SERVICES 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 8614S SUBSTANCE ABUSE AND DEPENDENCE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 8814S Eating Disorders 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 884S ADDICTION PSYCHIATRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 8874S Dual Diagnosis Psychiatry 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 9092S ELECTIVE/PSYCHIATRY 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 9094S Elective - Psychiatry 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 9312S Adult Inpatient 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 9314S PSYCHIATRY- ADULT INPATIENT 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 962S PSYCHIATRIC MEDICAL CARE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 970S CORRECTIONAL SERVICE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 971S PSYCHIATRY RESEARCH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PSYC 9754S RESEARCH- PSYCHIATRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Public Health

Courses

PBHL 503S Independent Study 1.0-14.0 Credit

Independent Study.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 525S MD/MPH Introduction to Public Health Seminar Series 1.0-3.0 Credit

This seminar has been designed to provide an examination of the integrative nature of public health and the historical influences which still resonate in the current challenges of improving the health of populations. Readings focus on the roots of contemporary public health knowledge and policy and students are asked to reflect and discuss how that history impacts on the current context of public health in the United States, as well as globally. The highlighted cases touch upon all of the public health core disciplines – biostatistics, environmental health, epidemiology, health behavior, and health care organization and policy.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 590S Emergent Public Health Issues 1.0 Credit

Public health is a multi-disciplinary field, drawing from the disciplines of Biostatistics, Environmental Health Sciences, Epidemiology, Health Policy Management and Social and Behavioral Sciences. Through the use of archived online presentations, this self-directed course allows students to draw from a library of lectures which focus on the five core disciplines of public health. After viewing online lectures, students will then analyze and synthesize newly learned concepts with their own understanding of public health and public health practice.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 2 times for 3 credits

Restrictions: Can enroll if major is PHEX.

PBHL 591S Research Methods 1.0 Credit

This 1 credit self-paced course is designed to provide students the opportunity to increase their understanding of and to strengthen their skills in the scientific methods underlying epidemiologic research and use of publicly available data for description and decision making.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 2 times for 3 credits

Restrictions: Can enroll if major is PHEX.

PBHL 592S Public Health History and Ethics 1.0 Credit

This course provides a historical overview of the field of public health – focusing on its encompassing principles, values and methods of prevention and intervention, and selected ethical issues entailed. Topics include responses to epidemics, vaccination policy and public health law, health disparities and cultural competency, and policy approaches to public health problems. Students reflect upon how historical experience affects our current understanding of public health in the United States and how ethical complications in the practice of public health, past and present, influence -- and sometimes inform -- decision making.

College/Department: Dornsife School of Public Health

Repeat Status: Can be repeated 2 times for 3 credits

Restrictions: Can enroll if major is PHEX.

PBHL 604S INTRO TO HLTH FINANCE 0.0 Credits

This course is part of a block of courses. Credit hours are tracked for PBHL 600 only.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 701S Intro Descript Epidemi/Biostats 3.0 Credits

Introduction to Descriptive Epidemiology and Biostatistics. Epidemiology and biostatistical concepts and methods to be covered include techniques for describing and summarizing observations, for assessing associations among variables, and for determining the extent to which chance may be explaining and or/or influencing the observed results.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

PBHL 702S Intro Analytic Epidem/Biostats 3.0 Credits

Introduction to Analytic Epidemiology and Biostatistics. Key biostatistics methods and epidemiologic concepts covered during course include types of rates, rate calculations, rate adjustments, data display and interpretation, two-way ANOVA and Kaplan Meier survival curves.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: PBHL 701S [Min Grade: B] or PBHL 701S [Min Grade: S]

PBHL 703S Design/Analysis Epidem Studies 2.0-3.0 Credits

Design and Analysis of Epidemiological Studies. This course will demonstrate the applicability of the goals and approaches from descriptive and analytical methods in biostatistics and epidemiology courses to real world problems. The project will provide the student with the opportunity to use methods in an area of their choice.

College/Department: Dornsife School of Public Health

Repeat Status: Not repeatable for credit

Prerequisites: (PBHL 701S [Min Grade: B] and PBHL 702S [Min Grade: B]) or (PBHL 701S [Min Grade: S] and PBHL 702S [Min Grade: S])

PBHL 900S Registered for Degree Only 1.0 Credit

College/Department: Dornsife School of Public Health

Radiation Oncology

Courses

RAON 8112S Radiation Oncology* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

RAON 8113S RADIATION ONCOLOGY - 3 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 8114S RADIATION ONCOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 823S RADIATION ONCOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 824S RADIATION ONCOLOGY - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 8724S Multidisciplinary Oncology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 895S RADIATION-ONCOLOGY ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 9092S RADIATION - ONCOLOGY ELE 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for NaN credits

RAON 9093S RADIATION ONCOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 9094S RADIATION - ONCOLOGY ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 9752S Research-Radiation Oncology2wk 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 9754S RESEARCH-RADIATION ONCOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RAON 9756S Research-Radiation Oncology6wk 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Radiation Sciences

Courses

Radiologic Sciences

Courses

RADI 8112S NEURORADIOLOGY- 2WS (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

RADI 8113S NEURORADIOLOGY- 3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8114S Neuroradiology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8152S Comprehensive Breast Care-2wks 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

RADI 8154S Comprehensive Breast Care 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8212S NUCLEAR MEDICINE - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8214S NUCLEAR MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 821S DIAGNOSTIC RADIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 822S NUCLEAR MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 825S RADIOLOGIC SCIENCE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 826S NEURORADIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 827S CLINICAL RADIOLOGY & NUCLEAR 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8412S DIAGNOSTIC RADIOLOGY - 2WKS. 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8413S Diagnostic Radiology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8414S DIAGNOSTIC RADIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8512S VASCULAR & INTERVENT RAD- 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8514S VASCULAR & INTERVENTIONAL RAD 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8612S Interventional Radiology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8613S Interventional Radiology - 3wk 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 8614S Interventional Radiology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 895S ELECTIVE - RADIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 906S PEDIATRIC RADIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 907S PEDIATRIC RADIOLOGY-2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 9092S ELECTIVE-RADIOLOGY -2WS (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

RADI 9093S ELECTIVE-RADIOLOGY-3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

RADI 9094S ELECTIVE - RADIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 9312S PEDIATRIC RADIOLOGY - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

RADI 9314S Pediatric Radiology 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 958S VASCULAR & INTERVENT RAD-2 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 959S NUCLEAR MEDICINE - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 960S NUCLEAR MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 961S VASCULAR & INTERVENTIONAL RADI 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

RADI 9754S RESEARCH-NEURORADIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

RADI 9756S RESEARCH-RADIOLOGY (6WKS) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

RADI 9757S RESEARCH-RADIOLOGY-7 WKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

RADI 9758S RESEARCH-RADIOLOGY (8 WKS) 0.0 Credits
College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

Surgery

Courses

SURG 8010S SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 801S SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 802S GEN SURG WITH PRIMARY CARE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8114S AMBULATORY SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8168S ORAL& MAXILLOFACIAL SURG -8WKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8214S COLON AND RECTAL SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 825S AMBULATORY SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 828S ELECTIVE IN OPHTHALMOLOGY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 829S ELECTIVE:ORAL & MAXILLO. SURG 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 830S ELECTIVE IN ORTHOPEDIC SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8314S COMMUNITY SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 832S ELECTIVE IN ENT,HEAD & NECK SU 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 833S PLASTIC & RECONSTRUCTIVE SURG 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 834S ELECTIVE IN TRAUMA/CRITICAL CA 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 836S SURGERY FOR NON-SURGEONS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 838S GENERAL SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 839S SUBINTERN IN GENERAL SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 840S GENERAL SURGERY-2 WEEKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8414S GENERAL AND VASCULAR SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8423S VASCULAR SURGERY - 3 WEEKS 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8424S VASCULAR SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 842S SUBINT. IN CARDIOTHORACIC SURG 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 843S SUBINT. IN NEUROLOGICAL SURGER 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 845S ORTHOPEDIC SURGERY 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 846S SUBINT. IN ENT,HEAD & NECK SUR 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 847S SUBINTERNSHIP IN PLASTIC SURGE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 848S TRAUMA/CRITICAL CARE 0.0 Credits
College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 849S SUBINTERNSHIP IN UROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8503S SURGERY SUB INTERNSHIP 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8504S Subinternship in Surgery 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

SURG 8505S Subinternship in Surgery 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 850S ELECTIVE IN GENERAL SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8514S GASTROINTESTINAL SURG/SURG ONC 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8522S General Surgery* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8523S General Surgery - 3 Weeks 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8524S GENERAL SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 852S GENERAL SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8532S Gen Surg/Min Invasive Surg* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8534S GEN SURG/MIN INVASIVE SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 853S CARDIOTHORACIC SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8544S TRANSPLANTATION/PEDIATRIC SURG 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8554S ADV MINIMALLY INVASIVE SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 855S OPHTHALMOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8564S ADVANCED HEPATOBILIARY SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 856S ORAL & MAXILLOFACIAL SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8574S GEN SURG W/ PRIM CARE EMPHASIS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8612S Oral & Maxillofacial Surgery* 0.0 Credits**

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8614S Oral & Maxillofacial Surgery 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8618S ORAL & MAXILLOFACIAL SURG 8WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 861S TRAUMA CRITICAL CARE, AGH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8624S General/Vascular Surg/Wound 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 862S UROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8632S DENTISTRY & ORAL MED 2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 863S ORTHOPEDIC SUBINTERNSHIP 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 864S ELECTIVE IN PEDIATRIC SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 865S VASCULAR SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 866S SURGERY RESEARCH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 8712S SURGICAL ONCOLOGY -2WKS(S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8714S SURGICAL ONCOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8724S Min Invasive/Bariatric Surg 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8732S BREAST SURGERY - 2 WKS (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8734S BREAST SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8812S PED PLAST&RECONSTRUC SURG(S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8814S Ped Plastic & Reconstruct Surg 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 881S ORAL & MAXILLOFACIAL SURG-2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8822S PLASTIC & RECON. SURGERY- 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

SURG 8823S Plastic & Reconstructive Surg 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8824S PLASTIC & RECONSTRUCTIVE SURG 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8825S Plastic/Reconstrutive Surgery 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8833S Pediatric Surgery 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8834S Pediatric Surgery 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 888S 3RD YEAR C. T. SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8914S SUBSPECIALITY SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 8934S WOMEN IN SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 895S ELECTIVE-SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 898S BURN SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 9012S SURGICAL INTENSIVE CARE UNIT 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 9013S Trauma/Critical Care 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for NaN credits

SURG 9014S Trauma/Critical Care 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

SURG 9022S Transplant Surgery* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

SURG 902S CARDIAC SURGERY - A 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 9052S SURGICAL INTENSIVE CARE- 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

SURG 9054S SURGICAL INTENSIVE CARE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 9092S ELECTIVE-SURGERY -2WKS (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

SURG 9093S ELECTIVE-SURGERY 3WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

SURG 9094S ELECTIVE-SURGERY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 9112S UROLOGY- 2WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

SURG 9113S UROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 9114S UROLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 9134S Pediatric Urology 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated multiple times for credit

SURG 958S TRAUMA 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 961S VASCULAR SURGERY RESEARCH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 971S KIDNEY/PANCREAS TRANSPLANTATIO 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 973S COLON AND RECTAL SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 974S MUSCULOSKELETAL 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 9752S Research - Surgery 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 9754S RESEARCH - SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 9756S RESEARCH-SURGERY 6WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

SURG 9758S RESEARCH-FETAL WND HEALING 8WK 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 2 times for 0 credits

SURG 975S COMMUNITY SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 976S GENERAL AND VASCULAR SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 977S GASTROINTESTINAL SURG/SURG ONC 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 978S GEN SURG/MIN INVASIVE SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 979S TRANSPLANTATION/PEDIATRIC SURG 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 980S GEN SURG W/ PRIM CARE EMPHASIS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 981S SURGICAL ONCOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 982S PED PLASTIC & RECONSTRUCT SURG 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

SURG 983S SUBSPECIALTY SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

SURG 984S ADV MINIMALLY INVASIVE SURGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

SURG 985S ADVANCED HEPATOBILIARY SUGERY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Can be repeated 0 times for 0 credits

SURG 988S PED PLAST&RECONSTRUC SURG-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

Women's Health Ed. Program

Courses

WOMN 8112S WOMEN'S HEALTH AMBULATORY-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

WOMN 8114S WOMEN'S HEALTH - AMBULATORY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

WOMN 8122S WOMENS HLTH EDUCATION-2WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

WOMN 8124S WOMEN'S HEALTH EDUCATION 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

WOMN 8132S WOMN HLTH/COLL PRIM CARE 2-WKS 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

WOMN 8134S WOMEN'S HLTH IN THE COMMUNITY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

WOMN 8144S Womens Health Primary Care Set 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

WOMN 8152S WOMEN'S HEALTH-CLINICAL-2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

WOMN 8154S COMP BREAST CARE-MAMMOGRAPHY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

WOMN 8164S Women's Health & Public Policy 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

WOMN 820S WOMEN'S HEALTH - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

WOMN 821S WOMEN'S HEALTH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

WOMN 822S WOMEN'S HEALTH CARDIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

WOMN 823S WOMEN'S HEALTH EDUCATION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

WOMN 824S WOMEN'S HLTH IN THE COMMUNITY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

WOMN 895S WOMEN'S HEALTH ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

WOMN 9094S WOMENS HEALTH-ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Index

A

About Drexel University	7
Academic Medicine	41
Accounting	172
Accounting	421
Accreditation	10
Adult Education	424
Adult Education and Organization Development	321
Adult-Gerontology Acute Care Nurse Practitioner Post-Master's Certificate	163
Adult-Gerontology Primary Care Nurse Practitioner Post-Master's Certificate	163
Advanced Certificate in Bioinformatics	319
Advanced Certificate in Biomedical Technology Development	319
Advanced Certificate in Information Studies and Technology	38
Advanced Certificate in Tissue Engineering	319
Advanced Teaching and Curriculum Certificate	367
American Legal Practice	409
Anatomy	728
Anesthesiology	729
Applied Behavior Analysis	321
Architectural Engineering	241
Architectural Engineering	424
Architecture	425
Archives Specialist Certificate	37
Art History	427
Art Therapy and Counseling	104
Arts Administration	199
Arts Administration	427

B

Biochemistry	42
Biochemistry	730
Biological Sciences	210
Biomedical Engineering	306
Biomedical Engineering & Science	430
Biomedical Science	311
Biomedical Studies	42
Biomedicine and Business	43
Biomedicine and Digital Media	47
Biomedicine and Entrepreneurship	50

Biomedicine and Law	54
Bioscience & Biotechnology	438
Biostatistics	390
Biotechnology	57
Business Administration	183
Business Analytics	186
Business Statistics	442

C

Cancer Biology	58
Cancer Biology	732
Cardiothoracic Surgery	733
Career Integrated Education	445
Center for Hospitality and Sport Management	13
Certificate in Adult Education	367
Certificate in Advanced Business	191
Certificate in Advanced Practice in Hand and Upper Quarter Rehabilitation	155
Certificate in Autism Spectrum Disorders	369
Certificate in Clinical Research	96
Certificate in Collaborative Special Education Law and Process	369
Certificate in Community College Administration and Leadership	370
Certificate in Construction Management	297
Certificate in Continuity Management	38
Certificate in Couple and Family Therapy	153
Certificate in Creativity and Innovation	370
Certificate in Criminal Law	417
Certificate in Cybersecurity, Law and Policy	38
Certificate in E-Learning Leadership	371
Certificate in Education Policy	371
Certificate in Epidemiology and Biostatistics	405
Certificate in Forensic Trends and Issues in Contemporary Healthcare	153
Certificate in Global Health	406
Certificate in Health Care Compliance	417
Certificate in Homeland Security	38
Certificate in Human Resource Development	372
Certificate in Human Resources Compliance	418
Certificate in Instructional Design	372
Certificate in Intelligence	38
Certificate in Leadership	191
Certificate in Lesbian, Gay, Bisexual and Transgender (LGBT) Health	407
Certificate in Math Leadership & Coaching	373
Certificate in Mathematics Learning & Teaching	374

Certificate in Medical Family Therapy	157	Competitive Intelligence and Knowledge Management Specialist Certificate	37
Certificate in Multisensory Reading Instruction Level 1	374	Complement & Integrative Therapy	462
Certificate in NCAA Compliance	419	Computer Engineering	255
Certificate in Pediatric Rehabilitation	167	Computer Science	16
Certificate in Quantitative Principles for Clinical Research	98	Computer Science	465
Certificate in Real Estate	298	Computing & Security Technology	470
Certificate in Student Development and Affairs	384	Construction Management	260
Certificate in Substance Use Disorder Treatment	169	Construction Management	471
Certificate in Sustainability and Green Construction	298	Cooperative Management	473
Certificate in Systems Design and Development	299	Couple & Family Therapy	473
Certificate in Systems Engineering Analysis	299	Couple and Family Therapy PhD	108
Certificate in Systems Engineering Fundamentals	300	Course Descriptions	420
Certificate in Systems Engineering Integrated Logistics	300	Creative Arts in Therapy	482
Certificate in Systems Reliability Engineering	300	Creative Arts Therapies PhD	106
Certificate in Veterinary Medical Science	99	Creativity and Innovation	323
Certificate of Advanced Study in Complementary and Integrative Therapies	152	Creativity Studies	495
Certificate of Advanced Study in Holistic Hospice and Palliative Care ..	155	Criminalistic Science	63
Certificate of Advanced Study in Integrative Addiction Therapies	156	Critical Care	741
Certificate of Advanced Study in Women's Integrative Health	170	Cybersecurity	261
Chemical Engineering	245	D	
Chemical Engineering	445	Dance/Movement Therapy and Counseling	110
Chemistry	214	Dermatology	741
Chemistry	447	Design and Merchandising	497
Civil Engineering	250	Design Research	497
Civil Engineering	450	Digital Curation Specialist	38
Clinical Nurse Leader Post-Master's Certificate	158	Digital Libraries Specialist Certificate	38
Clinical Research	733	Digital Media	199
Clinical Research for Health Professionals	60	Digital Media	498
Clinical Research Health Prof	737	Doctor of Nursing Practice	123
Clinical Research Organization and Management	62	Doctor of Physical Therapy	142
Close School of Entrepreneurship	14	Doctorate in Business Administration (DBA)	179
College of Computing & Informatics	16	Drexel Pathway to Medical School	64
College of Medicine: Graduate School of Biomedical Sciences and Professional Studies	39	Drexel Pathway to Medicine	742
College of Nursing and Health Professions	102	Drug Discovery and Development	65
Communication	217	E	
Communication	455	E-Learning	502
Communication & Preventative Medicine (noncredit)	738	Economics	192
Communication & Preventive Medicine (credit)	740	Economics	194
Communication, Culture and Media	220	Economics	503
Communication, Culture and Media	459	Education Human Resource Development	507
Community Health and Prevention	391	Education Improvement & Transformation	509

Education Improvement and Transformation 326

Education Learning Technologies 510

Educational Administration 330

Educational Administration 513

Educational Leadership and Management 336

Educational Lifelong Literacy 515

Educational Policy 519

Electrical & Computer Engineering 520

Electrical & Computer Engineering - Computers 521

Electrical & Computer Engineering - Electroph 525

Electrical & Computer Engineering - Power Engineering 528

Electrical & Computer Engineering - Systems 531

Electrical Engineering 265

Electrical Engineering/Telecommunications Engineering 271

Emergency Medicine 742

Engineering, General 541

Engineering Geology 535

Engineering Management 276

Engineering Management 535

Engineering Technology 279

Engineering Technology 539

Entrepreneurship and Innovation 14

Entrepreneurship and Innovation 541

Environmental & Occupational Health 393

Environmental Engineering 280

Environmental Engineering 543

Environmental Policy 222

Environmental Policy 547

Environmental Science 224

Environmental Science 547

Epidemiology MPH 396

Evening Post-Baccalaureate Pre-Medical Certificate Program 97

Executive Master of Public Health 404

Executive MBA Program 178

F

Family Medicine 743

Family/Individual Across the Lifespan Nurse Practitioner Post-Master's Certificate 164

Fashion Design 204

Fashion Design 552

Finance 187

Finance 554

Food 556

Food Science 557

Forensic Criminalistic Analysis 744

Forensic Science 67

Forensic Science 559

Forensic Science 745

G

General Business 559

Geography Education 563

Global & International Education 564

Global and International Education 341

Goodwin College of Professional Studies 100

Graduate 420

Graduate 727

Graduate Catalog 12

Graduate Certificate in Project Management 297

Graduate Intern Teaching Certificate 381

Graduate Minor in Computational Engineering 297

Graduate Minor in Computer Science 37

Graduate Minor in Entrepreneurship & Innovation 15

H

Health Administration 114

Health Informatics 21

Health Management and Policy 398

Health Policy and Social Justice 401

Higher Education 345

Higher Education 566

Higher Education Compliance 417

History 569

Histotechnology 68

Histotechnology 751

Homeland Security Management 569

Hotel & Restaurant Management 570

Human & Molecular Genetics 751

Human Nutrition 115

Human Resource Management 572

I

Immunology 70

IMS Prog. Interdepartmental Sciences 751

Industrial Design 573

Infectious Disease 72

Information Science & Systems	573	Master of Science in Sport Management	13
Information Studies	25	Materials Engineering	596
Information Systems	25	Materials Science and Engineering	283
Instructional Technology Specialist Certificate	373	Mathematics	227
Integrated Biomedical Engineering and Business	316	Mathematics	600
Interdepartmental	753	Mathematics Education	605
Interdepartmental Medical Science	75	Mathematics Learning & Teaching	351
Interdisciplinary Health Sciences	75	MBA Programs	174
Interdisciplinary Health Science	756	Mechanical Engineering & Mechanics	608
Interior Architecture and Design	206	Mechanical Engineering and Mechanics	286
Interior Design	581	Medical and Healthcare Simulation	782
International Business	583	Medical and Healthcare Simulation	80
Intra Professional Studies	584	Medical Family Therapy	617
Issues in Human Trafficking Certificate	157	Medical Science	78
J		Medical Science Preparatory	781
Joint JD/PhD Law-Psychology Program	226	Medicine	784
L		Microbiology and Immunology	81
Laboratory Animal Science	76	Microbiology and Immunology	790
Law	758	MMS Prog. - Masters in Med. Science	778
Leadership in Health Systems Management	162	Molecular & Cellular Bio & Genetics	796
Learning Technologies	348	Molecular and Cell Biology and Genetics	84
LeBow College of Business	172	Molecular Medicine	86
LeBow College of Business: School of Economics	192	MSN in Nurse Anesthesia	121
Legal Studies	588	MSN "Bridge" Program	133
Legal Studies	775	MSN: Adult-Gerontology Acute Care Nurse Practitioner	134
Library and Information Science	30	MSN: Adult-Gerontology Primary Care Nurse Practitioner	135
Linguistics	589	MSN: Clinical Nurse Leader Concentration	125
M		MSN: Clinical Trials Research Concentration	127
Management	589	MSN: Family/Individual Across the Lifespan Nurse Practitioner	136
Management of Information Systems	592	MSN: Nursing Education Concentration	127
Marketing	187	MSN: Nursing Innovation Concentration	129
Marketing	594	MSN: Nursing Leadership in Health Systems Management Concentration	131
Master of Engineering	276	MSN: Pediatric Acute Care Nurse Practitioner	137
Master of Family Therapy	112	MSN: Pediatric Primary Care and Pediatric Acute Care Dual Option ...	139
Master of Lab Animal Science	778	Museum Education	617
Master of Legal Studies	412	Museum Leadership	209
Master of Science in Biological Science	42	Museum Leadership	618
Master of Science in Design Research/graduate/ collegeofmediaartsanddesign/	199	Music Therapy and Counseling	119
Master of Science in Food Science	13	N	
Master of Science in Hospitality Management	13	National Security Management	32
Master of Science in Leadership	187	National Security Management	620

Neurology	797	Physics - Environmental Science	666
Neuroscience	88	Physiology	819
Neuroscience	620	Political Science	666
Neuroscience	799	Post-Baccalaureate Certificate in Computer Science	37
Neuroscience, Learning and online Instruction	158	Post-Baccalaureate Certificate in Integrated Nursing Care of Autism Spectrum Disorder (ASD)	160
Neurosurgery	801	Post-Baccalaureate Certificate in Nursing Education	161
Nursing	620	Post-Baccalaureate Certificate in Nursing Innovation	159
Nursing and Health Professions	644	Post-Bachelor's Certificate in Special Education Leadership	382
Nutrition & Food Science	646	Post-Bachelor's Teaching Certificate: Elementary Education	375
Nutrition Sciences	145	Post-Bachelor's Teaching Certificate: Secondary Education	376
O		Post-Master's Certificate in Applied Behavior Analysis	368
Obstetrics & Gynecology	801	Post-Master's Certificate in Geriatrics	154
Office of Medical Education	803	Post-Master's Certificate in Music Therapy	157
Operations Management	648	Post-Master's Certificate in Nurse Anesthesia	158
Operations Research	649	Post-Master's Certificate in Nursing Education	162
Organizational Behavior	650	Pre - Medical	820
Orthopedics	804	Production Operations Management	667
Otolaryngology	806	Professional Studies	100
Otolaryngology	809	Professional Studies	670
P		Program in Integrated Learning	820
Pathologists' Assistant	91	Project Management	290
Pathologists Assistant	810	Project Management	671
Pathology	811	Property Management	294
Paul F. Harron Television Management Program	209	Property Management	673
Pediatric Acute Care Nurse Practitioner Post-Master's Certificate	165	Psychiatric Mental Health Nurse Practitioner	140
Pediatric Primary Care and Pediatric Acute Care Dual Nurse Practitioner Post-Master's Certificate	166	Psychiatric Mental Health Nurse Practitioner Post-Master's Certificate ..	166
Pediatric Primary Care Nurse Practitioner	138	Psychiatry	822
Pediatric Primary Care Nurse Practitioner Post-Master's Certificate ...	165	Psychology	674
Pediatrics	813	Psychology MS	234
Pharmacology	817	Public Health	681
Pharmacology and Physiology	93	Public Health	823
PhD in Educational Leadership Development and Learning Technologies	341	Public Health MPH	401
PhD in Nursing	121	Public Policy	236
Physical Med & Rehabilitation	819	Public Policy	685
Physical Therapy Rehab Science	652	Publishing	237
Physician Assistant	658	Publishing	686
Physician Assistant (PA)	146	Q	
Physician Assistant Post-Professional Master's Program	149	Quarter	420
Physics	229	R	
Physics	664	Radiation Oncology	824
		Radiation Sciences	824

Radiologic Sciences	824
Reading Specialist Certificate	381
Real Estate	687
Rehabilitation Sciences	149
Rehabilitation Sciences	151
Rehabilitation Sciences	688
Research	690

S

School Principal Certificate	374
Science, Technology, and Society	238
Science, Technology and Society	691
Semester	727
Service to Veterans	167
Sexual Health and Wellness	168
Software Engineering	32
Special Education	354
Special Education	695
Special Education 7-12 Post-Bachelor's Certificate	380
Special Education PreK-8 Post-Bachelor's Certificate	382
Sport Coaching Leadership	13
Sport Coaching Leadership	701
Sport Management	703
STEM Education Certificate	383
Supply Chain Management and Logistics	189
Surgery	826
Systems Engineering	707

T

Taxation	710
Teacher Education	712
Teaching English as a Second Language	384
Teaching, Learning and Curriculum	359
Telecommunications	721
Television Management	723
The Antoinette Westphal College of Media Arts & Design	198
The College of Arts and Sciences	210
The College of Engineering	241
The College of Medicine	302
The Doctor of Medicine (MD) Program	302
The Dornsife School of Public Health	386
The JD Program	409
The School of Biomedical Engineering, Science, and Health Systems .	305
The School of Education	320

Thomas R. Kline School of Law	408
Trial Advocacy and Dispute Resolution	414

V

Vince and Judy Vidas Program in Systems Engineering	294
Visual Studies	726

W

Westphal Studies	727
Women's Health Ed. Program	829
Women's Health/Gender Related Nurse Practitioner	141
Women's Health/Gender-Related Nurse Practitioner Post-Master's Certificate	167

Y

Youth Services Specialist Certificate	38
---	----