

Applied Chemistry

Chem 151 (3 credits)

Winter, 2014

Course Description:

For business majors. Covers physical and chemical properties of substances used in consumer products. Provides qualitative introduction to required principles, including atomic structure and the elements, bonding and compounds, and the chemistry of carbon compounds and polymers. Uses examples from the areas of food and nutrition, pharmacology, and the petrochemical industry.

Objectives:

- Develop an understanding of the basic principles of atomic and molecular structure.
- Develop basic accounting skills for chemical equations, and solution concentrations.
- Develop an understanding of chemistry of carbon compounds.
- Encourage critical thinking about the role of chemistry in society, health, and the environment.
- Develop an understanding of the role of chemistry in the chemical, food, pharmaceutical, and the petrochemical industries.
- Learning goals for weekly topics are stated in each of the weekly units posted online at the BBLearn site.

Course Schedule (1/6/14-3/22/14)

| Unit | General Topic | Homework Due Date or Exam Date |
|------------|--|--------------------------------|
| 1 | Introduction and Measurements | 1/13/14 |
| 2 | Chemical Bonding and Redox Reactons | 1/20/14 |
| 3 | The Mole and Introduction to Carbon Compounds | 1/27/14 |
| 4 | Molecular Geometry | 2/4/14 |
| | Midterm Exam | 2/5/14 |
| 5 | Salts and ionic compounds | 2/11/14 |
| 6 | Acid & bases. The interaction of light with matter | 2/18/14 |
| 7 | Batteries, dyes, and explosives | 2/25/14 |
| 8 | Naming organic compounds, petroleum products | 3/4/14 |
| 9 | Polymers and fibers | 3/11/14 |
| 10 | Pharmaceutical Drugs | 3/17/14 |
| Final Exam | Final Exam | TBA |

Contact Information:**Instructor:**

Lecture: Daniel A. Kleier

414 Stratton Hall,

tel. 215 895-1861;

email: daniel.a.kleier@drexel.edu

Office Hours: Tues. 11:00-2:00

Laboratory Instructors:

Mr. Wenjian (Vince) Du

Section 061 on Wed @ 4:00 PM

Section 062 on Fri @ 10:00 AM

Disque 415

tele: 215-895-2655

email: wenjian.du@drexel.edu

Office Hours: Tues, 2 - 4 PM

Mr. Xiang Liu

Section 063 on Wed. @ 2:00 PM

Section 065 on Wed @ 10:00 AM

Disque 604

Tel: (215) 895-6951

Email: xiang.liu@drexel.edu

Office Hours: Mon., 1 - 2 PM

Ms. Junyang Xian

Section 066 on Wed. @ 12:00 PM

Sect. 067 on Thurs. @ 12:00 PM

Stratton 416

tel. 215-895-0569

email: junyang.xian@drexel.edu

Office Hours: Tues., 1 - 3 PM

Course web-sites:

<http://www.masteringchemistry.com/>

<http://learn.dcollege.net>

You will always find the most current syllabus (supersedes this version), course schedule and announcements about changes in the course and exams at the BBLearn website. Weekly homework assignments will be available at the Mastering Chemistry website. **You are expected to check these sites regularly.**

Required materials:

- (1) Access to MasteringChemistry (MC) online program for weekly homework.
- (2) "Experiments in General Chemistry Laboratory Manual", by Sally Solomon and Susan Rutkowsky; Wiley; New York. (book store)
- (3) Safety Glasses (book store).
- (4) Lab coat (book store)

Recommended Textbook:

No textbook will be required for the lecture part of this course, but you may find the following text to be both helpful and interesting:

Kimberly Waldron, *The Chemistry of Everything*, Pearson Prentice Hall, 2007 (ISBN 0-13-008522-7). This book was used in previous terms for CHEM 151, but is now out of print. It does appear, however, that reasonably priced used copies are available at Amazon.com. A copy of this book has also been put on reserve in the Hagerty Library.

Access to Online Tutorials and Homework:

I will be using **MasteringChemistry (MC)**, an online program that includes tutorials, and exercises. This is where you will do your weekly homework assignments. You will first need to register for MasteringChemistry and then enroll in the MC online course that I have created for the spring quarter called **MCKLEIERCHEM151W14**.

Access can be purchased by visiting the MC home page (www.masteringchemistry.com), selecting "US or Canada" as your location, clicking on the "Students" button, selecting "No, I need to buy access" and then following the steps indicated to register. You will want to register for the MasteringChemistry program that is associated with a textbook written by Timberlake (Chemistry: An Introduction to General, Organic, and Biological Chemistry, 11e). You will need to scroll to an image of the text in order to select it. There are several selections authored by Timberlake, so make sure you get the correct one. The text has a picture of an orange flamingo on the cover. In step 3 of the registration process you are offered an opportunity to purchase the eText. You need not purchase the eText. You only need access to the MasteringChemistry program.

Once you have registered, you will want return to the MC website (www.masteringchemistry.com) using the login name and password that you created during registration in order to enroll in MC online course **MCKLEIERCHEM151W14**.

Weekly Course Units

You will find a separate folder for each unit at the BBLearn website. The course units will correspond with the weeks of the quarter. A course unit will generally run from Tuesday morning to the following Monday evening. Homework assignments will be posted at the MasteringChemistry website at 7:00 AM on Tuesday mornings, and are due the following Monday evening at 11:00 PM. **Assignments are to be submitted at the MasteringChemistry website, not at the BBLearn website.**

Each unit will contain two recorded lectures on topics as indicated in the schedule above. The lectures will be delivered as narrated Flash movies. They will be posted in the weekly unit folders at the BBLearn site. Unless otherwise noted, lectures require that you have Flash player installed on your computer. [Install Flash Player](#) before you view any lectures. **Please note that you may be responsible for additional material not covered in the lectures. For example, supplementary readings that may be assigned as part of the unit activities.** Powerpoint files for the lectures will also appear in a folder entitled "Lectures in Powerpoint". Some students prefer to print the Powerpoint files for study purposes, but be reminded that printed copies of some of the animated slides may have oddly positioned graphic objects.

When you open a folder for a unit, you will see lecture files for the topic being covered during the week at hand. Files for topics covered during previous weeks will still be available under earlier unit headings. Within each unit, you will find individual lecture files labeled as "Lecture x: Subject" where x is the sequence number for the lecture, and "Subject" is a short subject line describing the content of the lecture. Usually, there will be two lecture files per weekly unit. When you click on the lecture file, it will begin running. You will see my animated notes, and hear me speaking to you. You can view the recording in full screen mode, pause the lecture at any point, and jump directly to slides that may be of interest using the ISpring tool bar at the bottom of the screen. Each Tuesday, the lecture notes for that week will become available, and will remain available throughout the remainder of the quarter.

Grading Policy

The following table describes the contributions of exams, homework and lab reports to your final numerical grade.

| Graded Item | Time | Due Date | Room(s) | Contribution to final grade |
|--------------|----------|--|------------|-----------------------------|
| MC Homework | 11:00 PM | Monday of each week | Online | 25% |
| Midterm Exam | 8:00 AM | 2/5/14 | Disque 103 | 20% |
| Final | TBA | TBA | TBA | 30% |
| Lab | | At end of lab or one week later depending on lab | Disque 302 | 25% |

- NO MAKEUP WILL BE GIVEN FOR THE MIDTERM EXAM.
- THE SCORE FOR A MISSED MIDTERM EXAM WILL BE REPLACED BY YOUR SCORE ON THE FINAL EXAM.
- STUDENTS MUST BE PRESENT FOR THE FINAL EXAM.
- THE FINAL EXAM WILL BE CUMULATIVE.
- LABORATORY ATTENDANCE IS MANDATORY (See below for details).
- IF YOU FAIL THE LAB YOU FAIL THE ENTIRE COURSE EVEN IF YOU ARE PASSING THE LECTURE. A 60% OR HIGHER LAB AVERAGE IS REQUIRED TO PASS THE LAB.

Students who meet all the requirements will earn letter grades according to the following map of numeric grades to letter grades.

| | | | |
|---------------------------|--------------------------|--------------------------|--------------------------|
| 96 - 100 → A ⁺ | 84 - 88 → B ⁺ | 70 - 76 → C ⁺ | 54 - 58 → D ⁺ |
| 92 - 96 → A | 80 - 84 → B | 64 - 70 → C | 50 - 54 → D |
| 88 - 92 → A ⁻ | 76 - 80 → B ⁻ | 58 - 64 → C ⁻ | < 50 → F |

Any questions about final course grades should be raised as soon as possible.

Incomplete Policy:

A grade of "INC" will only be entered under exceptional circumstances. At the discretion of an instructor, the grade of "INC" (Incomplete) may be reported in place of a letter grade for any course in which the instructor deems that the work has not been completed and that the student can complete the work within an agreed upon time (which must be in accordance with University policy and the statute of limitations governing grade changes). A grade of "INC" may be entered for a student at the time grades are submitted for the course. The conditions and terms for the completion of the course are at the discretion of the instructor and are to be mutually agreed upon by the instructor and the student. It is recommended that a written agreement be developed between the student and instructor to clarify expectations and process. If the grade is not submitted within one full academic year, the "INC" will turn into an "F" on the student's record and be reflected in the student's GPA. The grade of "F" will be considered a permanent grade.

Academic Dishonesty / Cheating: Students are held to the highest expectations and standards regarding honesty in all aspects of the course. Drexel University's academic, ethical, and honesty policies apply. Cheating, including misrepresentation of the work of others as your own, will not be tolerated. The honor system requires that all exam work be yours alone and unassisted. Cases of cheating will be reported to the University and the College of Arts and Sciences. Academic dishonesty may result in failure or expulsion.

As part of this policy, students are permitted to use the class discussion board to post questions, and share information related to the weekly homework assignments. See the section on "Homework and Readings" below for more details.

More information on the "Academic Dishonesty" policy is provided by the provost's office at:

http://www.drexel.edu/provost/policies/academic_dishonesty.asp

E-mail and web-based communication

E-mail communications from the instructor will be sent to the student's official Drexel University e-mail address. The instructor will usually communicate to the

students via the "Announcements" section of BBLearn. Students should routinely check their Drexel email and BBLearn for the latest class announcements. Please limit your e-mail to the instructor to personal questions. All technical and logistical questions about the course should be posted on the course discussion board.

If you are having trouble with your e-mail account, go to <http://accounts.drexel.edu>. For help with your BBLearn account, try the context sensitive help available by clicking on the button at the upper right hand corner of any BBLearn page.

Discussion Board:

Each week a link to a new discussion forum will be available at the bottom of the BBLearn unit for that week. The discussion board can be used to pose problems, questions and requests related to material covered in the class or homework. Please also feel free to ask logistical questions about the operation of the class, and its administration. I will try to answer questions posted on the discussion board within 24 hours on weekdays and 48 hours on weekends. Occasionally, a forum may be opened based on a thought-provoking question or assertion designed to generate discussion.

Examinations:

One midterm exams will be administered during the common exam period as indicated in the course schedule (see above). It will cover all course material for the first four units of the course including any supplementary readings that may have been assigned.

The exam will consist of multiple choice, matching and short response questions. You will need an operational calculator to complete some of the questions. You will also be allowed to have one 8.5" by 11" reminder sheet completed on one side with any information that you would like. Grades will not be curved.

Final Examination:

The final exam will be comprehensive with questions based on all course materials including assigned readings. You will need an operational calculator to complete some of the questions. You will also be allowed to have one 8.5" by 11" reminder sheet

completed on both sides with any information that you would like. The final exam will be administered during the exam week. Grades will not be curved.

Homework and Readings:

It is the student's responsibility to study the lectures and assigned reading materials associated with each course unit.

Homework assignments will be posted on the MasteringChemistry website which can be accessed directly using the Weblinks Tool at the bottom of the tools list on the left side of the BBLearn homepage. Alternatively, you can go directly to www.masteringchemistry.com. Unit homework assignments will generally be posted by 7:00 AM on Tuesdays. The completed assignments are due by 11:00 PM on the following Monday. Late assignments are normally not considered for grading. Allow extra time for technology glitches. Under exceptional circumstances, extensions may be granted, but under no circumstances will assignments be accepted after the final Monday of the last unit. Homework will be worth 25% of your final grade.

MasteringChemistry is an online tutoring and problem solving system. The assignments will include many questions and problems aligned closely with material covered in the recorded lectures, but some of the tutorials will introduce new material that builds on subject matter covered in the class. The system encourages students to work through problems, moving incrementally toward a procedural understanding of problem types. For many, but not all problems roadblocks are removed with wrong-answer-based feedback and on-demand hints.

Students must work individually to submit their assignments at the MasteringChemistry website, but should feel free to consult with other students about methods and sources for solving homework problems. You are also encouraged to work with each other and the instructor through the medium of the class discussion board at the BBLearn site. The goal of these discussions should be help one another come to a better understanding of the concepts and procedures required to solve the homework problems. Please refrain, however, from simply requesting or providing the answer to a homework question. Questions about problem solving strategies, sources of information, relevant concepts and applicable formulae are good ways to open a meaningful dialogue. Responses that suggest an improved problem solving approach, or point to relevant concepts or equations covered in the

lectures or elsewhere are preferred. The instructor plans to monitor the discussions, and will occasionally add to the discussion thread.

Disability Services: Students with disabilities who wish to request accommodations and services at Drexel University need to present a current accommodation verification letter ("AVL") to the instructor before accommodations can be made. AVL's are issued by the Office of Disability Resources ("ODR"); <http://www.drexel.edu/oed/disabilityResources/students/>

Course drops or withdrawals

For the latest course drop and withdrawal policy check the following documents: http://www.drexel.edu/provost/policies/course_drop.asp and http://www.drexel.edu/provost/policies/pdf/course_withdrawal.pdf

Course Drop Policy:

Courses may only be dropped during the "drop period" lasting from the beginning of the enrollment period through the end of the second week of the quarter. Dropping a course results in the course being removed from the student's academic record without a "W" appearing on the transcript—specifically, neither the course nor the grade of "W" appears on the student's transcript. Freshmen and new first-term transfer students must meet with their academic advisors to drop courses during the first quarter. Undergraduate upper-class and graduate students may use BannerWeb to drop courses; no approvals are required for upper-class and graduate students.

Course Withdrawal Policy:

For students on the quarter system, the withdrawal period lasts from the beginning of the third week through the end of the seventh week of the term. Specifically, withdrawal from a course taken on the quarter system must be executed by close of the business day on the Friday of the seventh week of the term.

Before withdrawing from a course, students should consult with the instructor. All students must obtain their advisor's written authorization before withdrawing from courses. Written authorization is obtained once the instructor has signed the "ENROLL/WITHDRAW" form.

Laboratory

Required:

- 1) Safety Goggles,
- 2) Lab coat and
- 3) "Experiments in General Chemistry Laboratory Manual" by Solomon and Rutkowsky

All required lab materials can be purchased at the bookstore.

Safety Glasses and lab coats must be worn at all times in the laboratory.

LABORATORY ATTENDANCE IS MANDATORY.

Bare legs, shorts and open shoes are prohibited.

All lab reports must be turned in to instructors.

Lab Descriptions

Labs will be performed in the following sequence on the dates shown for your section on the Lab calendar below.

| Solomon & Rutkowsky Chap. No. | Experiment Title |
|-------------------------------|--|
| 1 | Density Experiment |
| 6 | Beer's Law (Lab report must include a graph of absorbance (y-axis) versus wavelength and a graph of absorbance (y-axis) versus concentration as well as calculations: also determine the concentration of the unknown cobalt solution from the absorbance versus concentration graph)) |
| 2 | Boyle's law (Lab report must include 2 graphs of volume(Y-axis) versus 1/pressure and 2 graphs of pressure versus volume, and calculations of the Boyle's law constant (using a spread sheet for the calculations and the computer to make the graph & to get the slope will save time; you may use graph paper) |
| Soap HandOut (HO) | Preparation of soap from fat (Lab report: record mass of the soap and observations of reactions; allow soap to dry over the week and note its appearance) - A Handout will describe the procedure for this lab. |
| 10 | Titration of acetic acid in vinegar (Lab report must include a graph of pH (y-axis) versus volume of sodium hydroxide used as well as calculations: the % concentration of acetic acid in the vinegar; compare this % value to the value on the bottle of vinegar (a hand out will be given for calculations and changes) Experiment # 10 parts A and C using vinegar as modified. |
| 19 | Analysis of phosphorous in plant food (calculations are required and a handout will be given for this; compare your answer to the value on the box of the plant food). |
| 20 | Preparation of salicylic acid from aspirin. Parts A and B Part D is completed the following week |
| 12 | Voltaic cell (batteries) |
| 25 | Water of hydration in copper sulfate -- a hand out (Lab report: calculations to be done in Lab) Turn in reports at end of this lab and any late lab reports |

Lab Calendar:

| Wk | Wed. 4 PM (061) | Fri 10AM (062) | Wed. 2 PM (063) | Wed 10AM (065) | Wed 12PM (066) | Thur 12PM (067) |
|----|-----------------------|----------------------|-----------------------|----------------------|----------------------|-----------------------|
| 1 | No Lab | No Lab | No Lab | No Lab | No Lab | No Lab |
| 2 | #1 | #1 | #1 | #1 | #1 | #1 |
| 3 | #6 | #6 | #6 | #6 | #6 | #6 |
| 4 | #2 | #2 | #2 | #2 | #2 | #2 |
| 5 | HO | HO | HO | HO | HO | HO |
| 6 | #19 | #19 | #19 | #19 | #19 | #19 |
| 7 | #20 | #20 | #20 | #20 | #20 | #20 |
| 8 | #20 & #10 | #20 & #10 | #20 & #10 | #20 & #10 | #20 & #10 | #20 & #10 |
| 9 | #12 | #12 | #12 | #12 | #12 | #12 |
| 10 | #25 | #25 | #25 | #25 | #25 | #25 |

Notes:

- Lab numbers refer to the chapter in the Lab Manual.
- No labs during the first week of classes.
- All labs meet in Disque 302

Lab attendance is required. Roll will be taken each week. In order to earn full credit for participation, you must show up for lab on time wearing required personal protective equipment, and you must observe safety regulations and practice good housekeeping. Up to 10 points may be deducted from your participation grade for unsafe laboratory practice, or poor housekeeping.

Some lab reports are to be completed in the lab and submitted on the day of the experiment. Other lab reports are due at the beginning of the following week's lab. Every week the instructor is to initial your data sheets for the data collected that day. A penalty of 5% off per day will be assessed for late lab reports. All lab reports must be submitted by the last lab period of the term for your section. Failure to turn in a lab report for an experiment that was performed will result in a 50% grade for that lab. For most labs, students will need to work in groups because

of limited equipment and bench space. **However, each student is to write and submit their own lab report with calculations and graphs done independently. Answers to questions should be in your own words.**

If you fail the lab you fail the course even if you are passing the lecture. A 60% or higher lab average is required to pass the lab.

Your lab grade will be calculated based on the best 8 grades out of 9. You will receive a grade for each lab period. A grade of zero will be assigned for each missed lab. The zero for the first of several missed labs would not be included in your average, but the zeros for all missed labs beyond the first would have a very detrimental effect when averaged into your lab grade.

There are no make up labs. Missing 4 or more lab periods will result in failure of the entire course. Unless one has a proven medical or other valid excuse for missing the labs, you will have to complete the labs during another term.

Note: Snow closing information: phone 215-895-melt, check the DrexelOne Web page, or listen to KYW Radio.