

Instructor Dr. Michael Swanson
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Class Lectures: MTWRF 8 – 9:50a; Olin 103
Office Hours: 7:00 – 8:00 am, 9:50 – 10:30 am by appointment

There are only 98 naturally occurring elements in the Universe yet they are responsible for the seemingly infinite diversity we see around us, from the largest super nova to the smallest virus. The Earth itself is comprised primarily of 7 elements (oxygen, silicon, magnesium, sulfur, nickel, calcium and aluminum) which account for approximately 99% of its mass. Part of the remaining 1% of the Earth's mass comes from carbon, hydrogen, nitrogen and phosphorus, the elements of life. All elements contain the same three subatomic particles; the proton, neutron and the electron. Protons and neutrons make up the nucleus of atoms and are responsible for 99.9% of an atom's mass but only about 1/100,000th of the volume. MATTER IS COMPRISED PRIMARILY OF EMPTY SPACE! How do three subatomic particles come together to form 98 unique elements? How do these elements interact to form molecules? How do molecules interact with other molecules and undergo change? What are the driving forces behind these interactions? These are just a few questions we hope to answer in this course. Welcome to General Chemistry!

COURSE OBJECTIVES

After General Chemistry, you should be able to do the following:

- **Relate atomic spectra to electronic transitions**
- **Predict trends in atomic properties**
- **Predict molecular shapes and polarity**
- **Apply molecular bonding theories**
- **Complete stoichiometry calculations**
- **Balance complex chemical equations**
- **Calculate heats of reaction for chemical reactions**

REQUIRED COURSE ITEMS

Textbook: Connect Chemistry with LearnSmart and eBook - *Chemistry: The Molecular Nature of Matter and Change, 8th Edition, Silberberg, McGraw-Hill Publishers* - \$130 (2 Years) (ISBN-13 9781259916175).
<http://www.mheducation.com/highered/product/M1259631753.html#>
***There used to be a 6-month access option but I do not see that anymore.**
****I recommend you purchase directly from McGraw-Hill.**
No paper text is required but you can buy a used copy of the 5th, 6th or 7th editions of the Silberberg text if you wish (The Connect Plus account is still required). Used copies cost about \$15 – 50 on Amazon.

Online Assignments: You will be required to participate in LearnSmart modules and submit in-class problem sets via an online homework system called Connect. Instructions for enrolling in Connect are given on Canvas.

Calculator: An inexpensive calculator that has the capabilities for square roots, logarithms, and (exponential) scientific notation operations. The calculator will be used for homework and exams.

READINGS AND LEARNSMART ASSIGNMENTS. Assigned reading should be completed prior to class. The adaptive learning software LearnSmart will be used to reinforce the concepts from the book and online lectures. **There will be a LearnSmart assignment at the beginning of each class, 8:30a** (links on Canvas and Connect). The length and content of each assignment will vary between students depending on their understanding of the material. The more closely you read the material and view the recorded lectures, the less time you are likely to spend on these assignments. LearnSmart assignments (5 points each) will not be graded based on right/wrong answers but on completion. Students are strongly encouraged to spend extra time using the features in the LearnSmart interface to study.

ONLINE LECTURES. Important concepts from readings will be highlighted in recorded lectures that will be available online (links in Canvas and Connect). Periodically throughout lectures, questions will be posed. It is suggested that the student pause the lecture and try to answer the questions before the solution is presented. It is also suggested that notes be taken during lectures. The student can view the lectures at their convenience. It is up to the student to decide the order in which they complete the reading assignments and view the lectures. To get the maximum amount out of the class meetings, it is strongly suggested that the lectures and readings **be completed before class**.

CLASS MEETINGS. The first 10 – 20 minutes of each class will be used to make announcements and discuss any questions you have about the reading or lecture. Other examples/topics that reinforce what was covered in lecture or the reading may also be presented in this time. The remainder of the class period will be used to work through problem sets (see below). **Problem sets will be completed using the on-line Connect system so it will be helpful to bring your laptop to class.** Students will be allowed to work on the problem sets individually or in small groups (as long as everyone appears engaged). During this time, I will be available to answer any questions you have. Step-by-step solutions to some selected problems will be presented to the class at the end of the class period.

IN-CLASS PROBLEM SETS. Practicing problems is essential in the mastery of chemical concepts so we will use our class time to work through problem sets. These problems will be worth a total of 100 points (10 points each) and will be **due daily at 4:00 pm (except on exam dates)**. **Late problem sets will be deducted 50% per day.** Again, the problem sets will be completed using the on-line Connect interface so you should bring your laptop to class.

EXAMS. There will be weekly exams given during the quarter; Two mid-term exams at the end of the first two weeks and a cumulative final exam at the end of the third week. **NO MAKE-UP EXAMS WILL BE ACCEPTED.** There is one exception to this policy. If you will be out of town for a University sanctioned function (e.g., athletic team or music group), you are responsible for making arrangements with Dr. Swanson at least one week in advance to complete the exam prior to the scheduled date.

GRADES. Final grades will be determined according to performance on exams, problem sets and completion of LearnSmart modules. There will be a maximum of 500 points for the course:

<u>Component</u>	<u>Points</u>
Hour Exams (100 points each)	200
Final Exam	150
LearnSmart Modules (5 points each)	50
Problem Sets (10 points each)	100
Total Points	500

SUCCEEDING IN CHEMISTRY. Here are few helpful hints on how to succeed in this class:


Do your best on the exams!

How?

1. Read the material in the text book and view online lectures BEFORE class.
Don't get behind.
2. Follow check list of assignments (Canvas). Complete every assignment possible.
3. Take notes on content of online lecture and problem sets (Problems worked).
4. Be ready to ask questions... and ask them! Get help from course instructor!
5. Study with other students in the class.

SEEKING HELP. If you need help in the class, first be sure that you are following steps 1-3 listed above. If you still require assistance there are several places for you to go:

- **The instructor:** office hours are available for one-on-one consultation. You can also contact the instructor via email or phone.
- **The Science and Engineering Learning center:** TAs are available throughout the week to answer questions on both lecture and lab material (See Below).
- **Peers (Study Groups):** Take opportunities to help those around you and to ask them for help. You can learn a great deal from your fellow classmates.
- **Tutors:** The Chemistry Department office has a list of graduate student tutors.

Science and Engineering Center: Need extra help? The Science and Engineering Center is a collaborative space staffed by undergraduate and graduate learning assistants (LAs) trained to assist students with some first and second year biology, chemistry, physics, computer science and engineering courses. We offer support for both lecture and laboratory courses for chemistry, physics, and engineering courses and lecture only for computer science and biology. Our goal is to help students grow as problem solvers by assisting with homework sets, lab reports, and preparing for exams. The Science and Engineering Center is **not** a one-on-one tutoring center, but is rather a support system where students can get guidance from LAs as well as their peers. This center is open to all DU students. All services are free. Located in the north-west corner of the first floor of the Anderson Academic Commons (west of the writing center). See <http://portfolio.du.edu/sec> for a complete schedule. Please also follow on Twitter for the most up-to-date announcements:  **@SELCatDU**

LECTURE AND TESTING ACCOMODATIONS. Every effort will be made, in complete confidence, to accommodate students diagnosed with a learning disability. Any student requiring these accommodations should inform Dr. Swanson the first week of class. For further information, please see DU's Disability Services' website at <http://www.du.edu/disability/dsp/index.html>.

ACADEMIC DISHONESTY. Collaborative learning and teamwork are very important parts of science but cheating of any kind will not be tolerated. Each student is required to provide their own work on assignments and exams. **Copying another student's work on an exam or assignment (as well as any behavior that could be interpreted as copying) will result in no credit being given on the assignment or exam.** Repeated offences will result in failure of the course and possible expulsion from the University. Please refer to the University's honor code: <http://www.du.edu/ccs/honorcode.html>.

LECTURE SCHEDULE (problem set due dates in red)

DATE	TOPIC	READING	ASSIGNMENT
WEEK 1 – QUANTUM MECHANICAL MODEL, PERIODICITY AND BONDING			
June 18	Introduction/Review		
19	Matter and Atomic Structure	Chapter 2.1-2.6	Problem Set 1
20	Quantum Mechanics	Chapter 7	Problem Set 2
21	Periodic Properties of the Elements	Chapter 8	Problem Set 3
22	HOUR EXAM I (Covers Week 1)		
WEEK 2 – MOLECULAR SHAPE, BONDING THEORIES, CHEMICAL REACTIONS, ACID-BASE CHEMISTRY			
June 25	Electronegativity and Bonding	Chapter 9.1-9.3, 9.5	Problem Set 4
26	Lewis Structures, VSEPR and Polarity	Chapter 10	Problem Set 5
27	VB and MO theories	Chapter 11	Problem Set 6
28	Chemical Problem Solving	Chapter 3.1, 3.3-3.4	Problem Set 7
29	HOUR EXAM II (Covers Week 2)		
WEEK 3 – IDEAL GASES AND THERMOCHEMISTRY			
July 2	Aqueous Chemistry	Chapter 4.1-4.6	Problem Set 8
3	Ideal Gases	Chapter 5.1-5.4	Problem Set 9
4	JULY 4 th HOLIDAY		
5	Thermochemistry	Chapter 6	Problem Set 10
6	FINAL EXAM: 8:00 to 10:00AM (Cumulative)		