

Instructor Dr. Teresa Cowger
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Class Lectures: MWF 1:00 – 1:50 p.m.; Olin Hall 105
Recitation: T 1:00 – 1:50; Olin Hall 105
Office Hours: MWF 1:50 p.m. – 3:00 p.m. or by appointment

This course focuses on basic chemistry, matter, chemical formulas, reactions and equations, stoichiometry and thermochemistry. This course covers the development of atomic theory culminating in the use of quantum numbers to determine electron configurations of atoms, and the relationship of electron configuration to chemical bond theory and molecular orbital theory. The course includes gases, liquids, and solids and problem-solving skills are emphasized through laboratory experiments.

COURSE OBJECTIVES

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

- I. Apply scientific notation and significant figures in measurement and stoichiometric calculations.
- II. Apply atomic theory to the periodic table to explain various kinds of chemical principles and concept.
- III. Illustrate polarity, geometry, bond angle, hybridization, and physical and chemical properties of different compounds using Lewis structures.
- IV. Interconvert masses, moles, numbers of particles, and volume.
- V. Classify the basic types of chemical reactions and predict the products for a given set of reactants.
- VI. Identify oxidation, reduction half reactions and oxidizing and reducing agents in a redox reaction.

REQUIRED COURSE ITEMS

Textbook: Connect Chemistry with LearnSmart and eBook - *Chemistry: The Molecular Nature of Matter and Change, 8th Edition, Silberberg, McGraw-Hill Publishers* - for \$130 (2 Years)
 ****I recommend you purchase directly from McGraw-Hill to avoid getting scammed.**
 No paper text is required but you can buy a used copy of the 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 homework: You will be required to participate in LearnSmart modules and submit 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.

READINGS AND LEARN SMART 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 due usually on Thursdays*** (links on Canvas and Connect). On weeks that there is an exam, they will be due Tuesdays. 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, 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.

Connect course address: <http://connect.mheducation.com/class/t-cowger-chem-1010-05>

CLASS MEETINGS. Important concepts from readings will be highlighted during lectures. Periodically throughout lecture, questions will be posed and you will be given time to work through and discuss them with your fellow classmates. Step-by-step solutions will then be presented to the class. ***Tuesday recitations will be used for students work on lecture-related sample problems as well as ask any questions about homework.*** These recitations will be used as a large, informal office hour / group study session. Attendance for both lecture and recitation is not mandatory but encouraged.

PROBLEM SETS. Practicing problems is very helpful in the mastery of chemical concepts. Thus, problem sets will be assigned throughout the quarter using the on-line Connect system. These homework problems will be worth a total of 17% points and will be ***due weekly*** (by 11:59 pm Sunday nights, and 11:59 pm Thursday nights during the week of an exam). ***Late problem sets will be deducted 10% per day.***

EXAMS. There will be three (3) one-hour exams given during the quarter and a two-hour, cumulative final exam. Dates for these exams are posted below on the lecture schedule. **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. If you miss an exam, then your final exam will be counted twice to replace the missed exam.

If your grade on your final exam is higher than one of your hour exams, your final exam will be counted twice to replace your lowest hour exam grade.

GRADES. Final grades will be determined per performance on exams, problem sets and completion of LearnSmart modules. The weighted distribution will be:

<u>Component</u>	<u>Percent</u>
Hour Exams (100 points each)	50%
Final Exam	17%
LearnSmart Modules (5 points each)	16%
Homework (10 points each)	17%

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 BEFORE class. Don't get behind.
2. Follow check list of assignments (Canvas). Complete every assignment possible.
3. Attend class regularly. Take notes on content learned in lecture (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 after each class for one-on-one consultation. Contact the instructor via email or Skype.
- ***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](https://twitter.com/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 homework and exams. **Copying an exam or homework (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 (recitation dates in blue, subject to change at the discretion of instructor)

DATE	TOPIC	READING
WEEK 1 – MATTER AND ATOMIC STRUCTURE		
Sep 11	Course Introduction	1.2 – 1.5**
12	NO RECITATION	
13	Historical Perspective of Matter	2.1 – 2.4
15	Atomic Structure	2.5 – 2.6
WEEK 2 - QUANTUM-MECHANICAL MODEL OF THE ATOM		
18	Nature of Light and Atomic Spectra	7.1 – 7.2
19	Recitation	
20	Quantum-Mechanical Model	7.3
22	Quantum Numbers	7.4, 8.1

WEEK 3 – PERIODICITY OF THE ELEMENTS

25	Periodic Trends	8.2 – 8.3
26	TUESDAY LECTURE!	8.4
27	Exam Review/Practice	
29	HOURLY EXAM I (Covers Sep. 12 - 28)	

WEEK 4 – CHEMICAL BONDING AND ELECTRONEGATIVITY

Oct 2	Lewis Symbols and Ionic Bonding	9.1 - 9.2, 2.8
3	Recitation	
4	Covalent Bonding and Nomenclature	9.3, 2.8
6	Bond Polarity and Lewis Structures	9.5, 10.1

WEEK 5 - LEWIS STRUCTURES AND MOLECULAR SHAPE

9	VSEPR Theory	10.2
10	Recitation	
11	Molecular Shape and Polarity	10.3, 12.3**
13	Valence Bond Theory and Hybrid Orbitals	11.1

WEEK 6 - COVALENT BONDING THEORIES

16	Orbital Overlap and MO Theory	11.2 – 11.3
17	TUESDAY LECTURE! MO Theory -continued-	11.2 – 11.3
18	Exam Review/Recitation	
20	HOURLY EXAM II (Covers Oct 3 – Oct 19)	

WEEK 7 – Introduction to Chemical Reactions, STOICHIOMETRY AND AQUEOUS CHEMISTRY

23	The Mole and Balancing Equations	3.1, 3.3*
24	Recitation	
25	Chemical Problem Solving and % Yields	3.4*
27	Properties of Water and Aqueous Solutions	12.5**, 4.1

WEEK 8 – ACID-BASE AND OXIDATION-REDUCTION (REDOX) REACTIONS

30	Precipitation Reactions	4.2 – 4.3
31	Recitation	
Nov 1	Acid-Base Chemistry	4.4, 2.8
3	Redox Reactions	4.5 – 4.6

WEEK 9 – GASES

6	The Ideal Gas Law	5.1 – 5.3
7	TUESDAY LECTURE! Kinetic Theory of Gases	5.4 – 5.5
8	Exam Review/Recitation	
10	HOURLY EXAM III (Covers Oct 27 - Nov 9)	

WEEK 10 – THERMOCHEMISTRY

13	Enthalpy and Calorimetry	6.1 – 6.3
14	Hess's Law and Heats of Reaction	6.4 – 6.6
15	Lecture "Overflow" day	
17	Exam Review	

Nov 18 SATURDAY FINAL EXAM: 12:00 PM to 1:50AM (Cumulative), Olin Hall 105

* Review Material

** Chapter 12.3 and 12.5, only responsible for what is in lecture