

**Autumn 2014**

**Chem 1010**

# Instructor- Dr. Deborah Mitchell

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# Office: SGM 251

**Lectures:** M, W, F 1:00-1:50 Olin 205

**Office Hours (Science and Engineering Center):** M 10 AM, T 1 PM, F 11 AM or by appt.

**Required Course Items:**

**Text:** Chemistry: The Molecular Nature of Matter and Change, M.S. Silberg, 7th Ed.(available at DU Bookstore) with Connect Plus account (which is included with the text at the DU Bookstore). While a Connect Plus account is required, you are NOT required to have the 7th edition of the textbook. You may save money by just purchasing the Connect Plus account and using the ebook that comes with this account. You may also purchase an older edition of the textbook from amazon to use as a reference.

**Calculator:** An inexpensive calculator is required. It should have the capabilities for square roots, logarithms, and exponential (scientific) notation operations. The calculator will be used for homework, quizzes, and exams. **Bring your calculator to class each day to work problems.** You are responsible for understanding how to use your calculator.

**Top Hat:** In-class participation and some quizzes will be facilitated with Top Hat, a web-based response system. Top Hat allows you to use your cell phone or computer to respond to questions during class. Students are responsible for purchasing a license for Top Hat. The cost is $20 for access for one quarter or $38 for access for 5 years. Go to TopHat.com to register. A detailed list of instructions is posted in canvas.

**Course Objectives:**

* + Relate atomic spectra to electron transitions
  + Predict trends in atomic properties
  + Predict molecular shapes and polarity
  + Apply molecular bonding theories
  + Complete stoichiometry calculations
  + Balance complex equations
  + Relate pH to molar concentrations of acids and bases
  + Calculate heats of reaction of chemical reactions

**Canvas:** canvas.du.edu will be the website that you can find all of the online aspects of this course. Please look at the weekly checklist to keep track of tasks.

**Lectures:** A lecture schedule is below. As a student you will be expected to read and study the assigned material before each lecture. Class members are encouraged to actively participate.

**Readings and LearnSmart:** Assigned reading should be completed prior to lecture. An adaptive learning software called LearnSmart will be used to reinforce the concepts in the book. **There will be a LearnSmart assignment due before each lecture.** (The link to connect will be available on canvas). This assignment should be completed by 11:59 PM the day prior to lecture.

**Assignments:** Each week, problems related to the lecture material will be assigned. You are required to submit problem sets via an online homework system called Connect. Assignments will be posted on Canvas/Connect and will be due every Friday at 11:59 PM. For every day homework is late, 10% of points will be docked. Computer problems as an excuse for not turning in an assignment will not be tolerated.

**Engaged Fridays:** Every Wednesday, an online lecture will be posted to canvas. It is your responsibility to watch this lecture before class on Friday. There will be a quiz in canvas to gauge comprehension. Friday will be used as a time to go through problems associated with material in online lecture. During weeks of an exam, a test review will be held on Thurs and the Exam will fall on a Friday.

**Science and Engineering Center:** Need extra help? The Science and Engineering Center is a collaborative space staffed by undergraduate and graduate TAs trained to assist students with first and second year chemistry, physics, and engineering lecture and laboratory courses. 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 TAs 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).

**Exams:**

**a)** There will be three one-hour midterm exams and a two-hour final exam.

**b)** If anyone for any reason had to take the exam outside of the scheduled time, arrangements need to be made with the instructor at least one week in advance. Instructor approval of the situation is necessary for any adjustment in exam schedule to occur.

**c)** If any student is a member of the DSP or LEP programs and feels they need special accommodations for exams, please contact the instructor.

**d)** **All exams will be comprehensive encompassing lecture materials, assignments, and in-class assignments. The exams are designed to test your ability to apply the concepts covered in the lecture.**

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

**Grading:**

The breakdown of the course grades is as follows:

Homework 75 points

Initial Assessment 15 points

TopHat/Quizes 35 points

LearnSmart 25 points

Exam 1 100 points

## Exam 2 100 points

## Exam 3 100 points

### Final Exam 100 points

**TOTAL 550 points**

Grades will be based on the following approximate grade scale:

94% A 74%      C

90%      A- 70%   C-

87%      B+              67%    D+

84%      B                64%     D

80%      B- 60% D-

77% C+ <60% F

Students who earn at least 94% of the possible points are guaranteed an A in this class; however, it may not be necessary to earn 94% to receive an A since this scale may be modified downward at the discretion of the instructor. Scores will be recorded on Canvas as they are graded. Each student should check Canvas frequently to make sure scores are recorded correctly. Complaints on grading or recording errors should be made within two weeks of each exam.

**Help**

Students who need help in this class have several options:

**(1)** The Science and Engineering Center, located on the first floor of the library, is a great resource! TAs are available throughout the week to answer questions on both lecture and lab material. A schedule is available on canvas.

**(2)** The instructor has office hours for consultation. If you cannot make the set office hours, you can schedule an appointment.

**(3)** Peers (Study Groups): Take opportunities to help those around you and to ask for help. You can learn a lot you’re your fellow classmates. If you come to the Science and Engineering Center, perhaps you will find a group of classmates to study with!

TAs and the instructor are willing to help anyone in need. There is no excuse for not getting help. Your best help may come from your fellow students. Meeting regularly with a study group, for discussing ideas and working together on homework will be one of the best helps in learning and understanding the material. Even if you don't think you need the help from others, you will often find that teachers learn more than the students.

**Formula for Success (a partial list):**

1. Study topics in textbook before class
2. Attend class regularly
3. Be ready to ask questions… and ask them!
4. Take notes on content learned in lecture
5. Follow to-do list on Canvas.
6. Study with other students in the class
7. Get help from course instructor
8. Don’t get behind

**Academic Honesty in General Chemistry:**

1. You are encouraged to study with other students in preparing for exams and discussing assigned problems to be submitted as homework.
2. However, each student is required to provide their own work on homework and exams. Copying an exam or homework is a violation that will not be tolerated in this class, and a zero will be given for the assignment or exam. Repeated offences will result in failure of the course.

**TENTATIVE LECTURE SCHEDULE (Fall 2014)**

**DATE TOPIC READING**

**WEEK 1**

**Quantum-mechanical model of the atom**

Sep 8 Introduction/Nature of Light 7.1

10 Wave-Particle Duality of Matter and Light Atomic Spectra 7.2–7.3

11 *Online Lecture 1, Many-Electron Atoms*

12 Atomic spectra, Many-Electron Atoms 7.4-8.1

**WEEK 2**

**Chemical Periodicity**

15 Periodic Table and Quantum Mechanical Model 8.2

17 Atomic Properties 8.3

18 *Online Lecture 2, Chemical Reactivity*

19 Chemical Reactivity 8.4

**WEEK 3**

**Chemical bonding and molecular shape**

22 Ionic and Covalent Bonding 9.1-9.3

24 Lewis Structures 10.1

25 *Exam 1 Review (Location and time TBA)*

26 **HOUR EXAM I** (Covers Sep. 8 – 19)

**WEEK 4**

Sep 29 VSEPR theory 10.2

Oct 1 Valence Bond Theory and Hybridization 11.1

2 *Online Lecture 3, Bond and Molecular Polarity*

3 Bond and Molecular Polarity 10.3

**WEEK 5**

6 Molecular Orbital Theory 11.2-11.3

8 Limitations of Lewis 10.1,11.2-11.3

9 *Online Lecture 4, Water and precipitation Rxns*

10 Water and precipitation reactions 4.1-4.3

**DATE TOPIC READING**

**WEEK 6**

**Chemical reactions**

13 Acid-Base Reactions and pH 4.3

15 Oxidation Reduction Reactions 4.4-4.6

16 *Exam 2 Review* *(Location and time TBA)*

17 **HOUR EXAM II** (Covers Sep 8 – Oct 10)

**Last day for Automatic Withdraw**

**WEEK 7**

20 Ideal Gas Law 5.1–5.3

22 Introduction to thermodynamics 6.1 and 20.1

23 *Online Lecture 5, Enthalpy*

24 Enthalpy 6.2

**WEEK 8**

**Thermochemistry and thermodynamics**

27 Calorimetry 6.3

29 Hess’s Law 6.4–6.6

30 *Online Lecture 6, 2nd Law of Thermodynamics*

31 2nd Law of Thermodynamics 20.1

**WEEK 9**

Nov 3 Calculating Entropy 20.2

5 Free Energy 20.3

6 *Exam 3 Review (location and time TBA)*

7 **HOUR EXAM III** (Covers Sep 8 - Oct. 31)

**WEEK 10**

10 Balancing Redox Reactions 21.1

12 Galvanic Cells and Spontenaity 21.2–21.4

13 *Review for Final Exam (location and time TBA)*

14 Review for Final Exam

**Nov 19** **FINAL EXAM (OLIN 205)**: **12 PM to 1:50PM** (Cumulative)