

General Chemistry
CHEM 1010
Fall Quarter, 2015

Instructor	Dr. Keith Miller
Office:	SGM 105
Contact info:	phone: 303.871.7721; email: keith.miller@du.edu
Class Lectures:	MWF 10:00 – 10:50; Sturm 134
Discussion:	Thursday 10:00 – 10:50; Sturm 134
Office Hours:	Announced first week in class

REQUIRED COURSE ITEMS

Textbook: You will have choices for a text in this course. One choice is *Chemistry: The molecular nature of matter and change*, 7th Edition, Martin S. Silberberg and Patricia Amateis (2015) McGraw-Hill (available at the DU Bookstore). The 5th and 6th editions are also acceptable. The second choice is an open-source textbook from OpenStax that is available online. The downloadable text is free. The link is: <https://openstaxcollege.org/textbooks/chemistry/get>

TopHat: Everyone will be required to purchase a license to TopHat for at least one quarter. The license is available online or for purchase in the Bookstore. This license already includes a significant amount of the assigned reading from the OpenStax Chemistry text.

Homework: You will be given a **choice** of homework options. First, a Connect Plus license is needed to access some of the homework. When you purchase your textbook at the DU Bookstore, this license is included. If you already have a text, you can purchase a Connect Plus license from the Bookstore or directly online from McGraw-Hill. The latter license option will be made available when you attempt your first online assignment in Connect Plus. Second, homework will be assigned via TopHat software. You can choose either or both of the options.

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. You are responsible for understanding how to perform each of the operations on your calculator. **NO PHONES WILL BE PERMITTED ON QUIZZES OR EXAMS.**

READINGS. I strongly urge you to complete the assigned readings prior to lecture. Make your best attempt to understand the material, try to solve the problems in the text prior to proceeding to the next section, and come to class with questions on topics/concepts that might confuse you. I will also provide links to online materials that provide explanations to difficult concepts. Please take time to explore these additional materials.

CLASS MEETINGS. I will highlight important concepts from your readings during lectures. I will stop periodically and ask you to answer questions. To facilitate these discussions, we will be using the **Top Hat** response system. In general, each week will start with a lecture on Monday that introduces the major concepts; you will then build on these discussions using materials and links provided online. On Wednesday and/or Thursday, students will work in small groups to complete in-class activities. Attendance to the **Wednesday** session is mandatory, and work will be collected and graded. Each Friday's class meeting will begin with a short quiz, followed by a wrap-up of the week. Depending on the progress of the course, modifications to the weekly schedule may occur throughout the quarter. Every three (3) weeks an exam will be given on Friday.

ON-LINE COMPONENTS. Some topics in this course will not be covered in lecture sessions; rather these topics will be introduced and made available online. Often this type of course is referred to as a "hybrid" or "blended" course. What this means is that part of your instruction and learning will occur outside of the class, directed by materials and resources found on the Canvas site for the course. There will be three (3) areas of this course where your learning will be facilitated using online technology. You may select one, two or all of these options. **You must select at least one of the options.**

First, weekly online homework will be assigned using the Connect Plus system that is linked to this course. These assignments will be graded. **With the exception of the 1st and 10th week, these assignments will be due every Friday at 9:55 AM (Denver time.)** The homework will be submitted automatically at the designated time.

Second, an adaptive learning program, LearnSmart, is provided in the Connect Plus system. In addition to the weekly online homework, you will be required to complete at least one LearnSmart activity each week. These modules test your understanding of chemical concepts, and the program will lead you through a series of questions depending on how confident you are in your answers and if you answer the questions correctly. You will receive credit for the completion of LearnSmart activities when you complete them **on time**; however, you will not be graded on how "fast" you get through or how many questions you answered correctly in the activity. Typically, **completion of the LearnSmart activities will be required by Friday at 9:55 AM (Denver time.)**

The third component online component will be reading and homework sessions assigned through **Top Hat**. These activities will be similar to the Connect homework; however there is no automated feedback provided to you if you have difficulty solving problems. However, links will be provided in the text to help you go back to readings and/or short videos to show you how to solve similar problems.

In addition, there will be short review sessions that cover topics I expect you already understand from previous chemistry or science courses you have completed. The "Fundamental Sessions" will include short readings and/or videos, and assigned homework. These sessions are optional and will not be graded; however, I encourage everyone to at least attempt the homework since they are representative of questions that cover material I expect you already know and understand.

IN-CLASS ACTIVITIES/QUIZZES. In-class activities will occur on a frequent basis to allow you to apply your knowledge. Some, if not most, of these activities will be more challenging than the assigned homework. I will have you work in small groups to complete these activities. In addition, I will give short quizzes (5-10 minutes) on most Fridays to assess the progress of everyone in the class. Both the in-class activities and quizzes will be graded. In addition, a knowledge

assessment will be given the first Friday of the course. This is to help me better understand your background knowledge in the course and better tailor the course to best meet the needs of all students. I will also end the course with a supplement assessment so that you can provide feedback on your learning process. You will receive credit for completing both of these assessment pieces.

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 on the tentative 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) or military service, you are responsible for making arrangements with Dr. Miller 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 you take all three, hour exams AND your grade on your final exam is higher than one of your hour exams, **then your final exam will be counted twice to replace your lowest hour exam grade.**

GRADES. At the end of the quarter, your final grade will be determined according to your performance on the exams, online homework/activities, and in-class activities/quizzes. Cooperative learning is encouraged. As such, I will not grade on a curve. If most students do well, there will be a significant number of higher grades. The opposite, however, can also be true! Your final grade will be determined with the following components:

<u>Component</u>	<u>Percentage</u>
Hour Exams	60
Final Exam	20
Quizzes/assessments	10
Online homework/in-class activities/participation	10

Total **100**

Your final grade will be determined by the following scale:

	A		B			C			D		
Letter	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
Percentage minimum	95	90	86	82	77	74	70	65	61	57	55

The values listed in the table are the guaranteed minimum values. So, if your average is 90, you will receive an A- for the course.

CELLULAR PHONE, PAGER AND LAPTOP POLICY. I respect the need for each individual to stay in contact with family and friends. The use of cellular phones and pagers, however, is disrupting to the learning environment. Thus, I request that the ringers of all cellular phones and pagers be muted during class. If an emergency arises, and you need to make a call on your phone, I request that you quietly leave the room and conduct your conversation out in the hallway. Laptops can also be quite disrupting in class; therefore, **ONLY** laptops used for taking notes will be allowed. If you use your laptop, I might request that a copy of your notes.

LECTURE AND TESTING ACCOMODATIONS. I will make every effort to accommodate students diagnosed with a learning disability. I will do this in complete confidence. I do, however, request that any student requiring these accommodations inform me the first week of class. For further information, please see the University Disability Services' website at <http://www.du.edu/disability/dsp/index.html>.

RELIGIOUS ACCOMODATIONS. It is University policy to grant students excused absences from class or other organized activities for the observance of religious holy days, unless the accommodation would create an undue hardship. I will do my best to accommodate your requests if you make arrangement with me *in advance* of your absence. Please examine the course syllabus, including the tentative schedule, for any potential conflicts with holy days and notify me prior to the end of the second week of classes of conflicts that may require your absence from class and/or prevent you from completing an assignment. More information can be found at: <http://www.du.edu/studentlife/religiouslife/about-us/policy.html>.

ACADEMIC DISHONESTY. While I advocate collaborative learning and teamwork, I also firmly believe that each individual should maintain the highest ethical standards in all of life's endeavors. As such, I support and will strictly enforce the Honor Code of the University of Denver. For your reference, the link to the Honor Code Student Conduct Policy and Procedures is: <http://www.du.edu/studentlife/studentconduct/>.

***TENTATIVE LECTURE SCHEDULE (9.13.2015)**

DATE	TOPIC	READING		
		SILBERBERG	OPENSTAX	
WEEK 1				
QUANTUM-MECHANICAL MODEL OF THE ATOM				
Sep	14	Introduction/Nature of Light	1.1, 1.2, 7.1	1.1-1.3, 6.1
	16	Atomic spectra/Quantum-Mechanical Model	7.2 - 7.4	6.2 - 6.3
	17	Many-Electron Atoms	8.1	6.3
	18	Knowledge assessment		
		Online Fundamentals Session	1.4-1.5	1.4 - 1.6
WEEK 2				
CHEMICAL PERIODICITY				
	21	Periodic Table	2.6, 8.2	2.5, 6.4
	23	Atomic Trends and Properties	8.3, 8.4	6.4
	24	Discussion		
	25	Chemical Reactivity	8.4	6.4
		Online Fundamentals Session	2.1-2.5	2.1- 2.3
WEEK 3				
CHEMICAL BONDING AND MOLECULAR SHAPE				
	28	Ionic Bonding	2.7, 9.1-9.2	2.6 - 2.7, 7.1
	30	Covalent Bonding	9.3	7.2, 7.5
Oct	1	Discussion		
	2	HOURLY EXAM I (Covers Sep 14 - 30)		
		Online Fundamentals Session	2.8	
WEEK 4				
	5	Lewis Structures	10.1	7.3 - 7.4
	7	VSEPR Theory	10.2	7.6
	8	Discussion		
	9	Bond and Molecular Polarity	9.5, 10.3	7.6
		Online Fundamentals Session	3.1	3.1
WEEK 5				
	12	Valence Bond Theory	11.1	8.1
	14	Types of Covalent Bonds	11.2	8.2 - 8.3
	15	Discussion		
	16	Molecular Orbital Theory	11.3	8.4
		Online Fundamentals Session	3.2-3.3	3.2, 4.1

DATE	TOPIC	READING	
WEEK 6		SILBERBERG	OPENSTAX
	CHEMICAL REACTIONS		
19	Water as a Solvent	4.1	
21	Aqueous ionic and Precipitation Reactions	4.2-4.3	4.2
22	Discussion		
23	HOURLY EXAM II (Covers Sep 14 – Oct 21)		
23	Last day to drop course via PioneerWeb		
	<i>Online Fundamentals Session</i>	3.4	4.3, 4.4
WEEK 7			
26	Acid-Base Reactions, and pH	4.4, 18.1-18.2	4.2, 14.1-14.3
28	Oxidation-Reduction Reactions	4.5-4.6	4.2
29	Discussion		
30	Balancing Redox Reactions	21.1	17.1
WEEK 8			
	THERMOCHEMISTRY AND THERMODYNAMICS		
Nov 2	Enthalpy	6.1-6.2	5.1, 5.3
4	Calorimetry	6.3-6.4	5.2
5	Discussion		
6	Heats of Reaction	6.5-6.6	5.3
WEEK 9			
9	Heats of Reaction (continued)	9.4	
9	Last day to drop course with instructor's permission		
11	Entropy	20.1	16.1
12	Discussion		
13	HOURLY EXAM III (Covers Sep 14 – Nov 11)		
WEEK 10			
16	Entropy (continued) and Free energy	20.2-20.3	16.2 - 16.4
18	Free energy	20.3	16.4
19	Review/wrap up		
20	FINAL EXAM (10:00 – 11:50 am; Cumulative)		

* Tentative means that this is my best approximation of the schedule for the quarter. Actual lecture topics and materials may change.