General Chemistry II CHEM 1020 - 2 [Winter 2020]

Instructor Dr. Michael Swanson
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Class Lectures: TR 8:00 – 9:50; Sturm 151
Office Hours: TR 7:30-8:00, 9:50-10:30 (by appointment)

In the second quarter of General Chemistry we will explore Thermodynamics, Equilibria, Acid-Base chemistry and Kinetics. The thermodynamics, equilibria and kinetics of chemical systems will be of great importance in future classes such as organic chemistry and biochemistry. In this class we will answer the following questions: How do you know if a reaction will take place? How much of each reactant and product are present after a reaction takes place? What is the pH of a weak acid or weak base solution? How fast will a reaction take place? These are just a few questions we will answer in our continuing journey through general chemistry!

COURSE TOPICS

- **Chapter 20 – Thermodynamics**
- **Chapter 17 – Equilibrium**
- **Chapter 18 – Acid-Base Chemistry and Equilibria**
- **Chapter 19 – Ionic Equilibria**
- **Chapter 16 – Kinetics**

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#
****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 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 before every lecture from the 2nd week on*** (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, the less time you are likely to spend on these assignments. LearnSmart assignments (6.25 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. **There is no way to extend the deadline for these assignments so no late work can be accepted.**

Connect course address: https://connect.mheducation.com/class/chem1020_2_winter2020

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. Attendance 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 100 points and will be ***due weekly*** (by 10 pm Saturday nights). ***Late problem sets will be deducted 20% per day.***

EXAMS. There will be two (2) two-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.

GRADES. Final grades will be determined according to performance on exams, problem sets and completion of LearnSmart modules. There will be a maximum of 600 points for the course:

Component	Points
Hour Exams (100 points each)	200
Final Exam	200
LearnSmart Modules (6.25 points each)	100
Homework (10 points each)	100
Total Points	**600**

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 available before and after each class for one-on-one consultation. 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 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: https://www.du.edu/studentlife/studentconduct/honorcode.html

LECTURE SCHEDULE (Problem Sets, LearnSmart, **Exams)**

DATE	TOPIC	READING	HOMEWORK
WEEK 1 – INTRODUCTION			
Jan 7	Course Introduction		Access Connect
9	1 - Thermo Review	6.1-6.6**	
11			Problem Set 1
WEEK 2 - THERMODYNAMICS			
14	2 - 2nd Law of Thermodynamics	20.1	LearnSmart 1
16	3 - Calculating Entropy	20.2	LearnSmart 2
18			Problem Set 2
WEEK 3 – FREE ENERGY			
21	4 - Free Energy	20.3	LearnSmart 3
23	5 - Intro to Equilibrium (K and Q)	17.1-17.3	LearnSmart 4
25			Problem Set 3
WEEK 4 – EQUILIBRIUM			
28	6 - Solving Equilibrium Problems	17.4-17.5	LearnSmart 5
30	7 - Le Chatelier's Principle and Direction	17.6, 20.4	LearnSmart 6
Feb 1			Problem Set 4
WEEK 5 – INTRODUCTION TO ACIDS AND BASES			
4	**HOUR EXAM I** (Covers Lectures 1-7)		
6	8 - Acids and Bases in Water and pH Scale	18.1-18.2	LearnSmart 7
8			Problem Set 5
WEEK 6 – ACID-BASE EQUILIBRIA			
11	9 - Bronsted-Lowry and Weak Acid Equilibria	18.3-18.4	LearnSmart 8
13	10 - Weak Acids and Bases -Continued-	18.5-18.6	LearnSmart 9
15			Problem Set 6

WEEK 7 – ACID-BASE TITRATION CURVES

18	11 - Salts, Leveling and the Lewis Acids	18.7-18.9	LearnSmart 10
20	12 - Acid-Base Buffers and Titration Curves	19.1-19.2	LearnSmart 11
22			Problem Set 7

WEEK 8 – IONIC EQUILIBRIA

25	13 - Equilibria of Slightly Soluble Compounds	19.3	LearnSmart 12
27	14 - Equilibria of Complex Ions	19.4	LearnSmart 13
29			Problem Set 8

WEEK 9 – INTRODUCTION TO KINETICS

Mar 3	**HOUR EXAM II** (Covers Lectures 8-14)		
5	15 - Reaction Rates and the Rate Law	16.1-16.3	LearnSmart 14
7			Problem Set 9

WEEK 10 – INTEGRATED RATE LAWS AND CATALYTIC MECHANISMS

10	16 - Integrated Rate Laws/Kinetic Theories	16.4-16.5	LearnSmart 15
12	17 - Reaction Mechanisms and Catalysis	16.6-16.7	LearnSmart 16
14			Problem Set 10

WEEK 11 – FINAL

17	**FINAL EXAM**: **8AM to 9:50AM** (Cumulative)

** Review Material