

# CHEM 1120 – General Chemistry II

## Syllabus

Instructor: Dr. Shawn M. Miller

## Spring Term, 2017

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Office Hours: Monday/Friday 1:30 PM-  
2:30 PM, Widtsoe 339

### Course Lecture Times & Locations:

Section (CRN)	Time	Day	Location
Lecture 001 (10618)	12:30 AM to 1:20 PM	M/W/F	Widtsoe Hall 007
	4:30 PM to 5:20 PM	R	Widtsoe Hall 007

### Prerequisite:

Chem 1110

### Required Materials:

Text: Timberlake, K. *General, Organic, and Biological Chemistry: Structures of Life*, 5<sup>th</sup> ed.; Pearson Education, Inc. (ISBN: 978-0321967466)

Calculator: A non-programmable scientific calculator is recommended for use in Lecture and on Exams. Programmable calculators (TI-80 and above or similar) are not permitted on the Exams. Other electronic devices, including phones, are not permitted during Exams.

UTF Information: Laysa Frias (contact: [laysa.frias@aggiemail.usu.edu](mailto:laysa.frias@aggiemail.usu.edu) or Canvas)  
Office Hours: Tuesday/Friday 10:30 AM – 11:30 AM in Widtsoe 226

### Course Overview

Chem 1120 is a Lecture course that meets four times a week. It is the second of a two-semester course sequence for non-science majors. There will be assigned online Sapling Learning homework sets and there will be an online Canvas Quiz at the end of each week. There will be three 50-minute Midterm Exams in addition to a Final exam.

### Course Learning Objectives

CHEM 1120 is a course designed to continue the education process you began in Chem 1110. You will build upon the general and organic chemistry concepts previously discussed in Chem 1110 by expanding your knowledge of organic chemistry and biochemistry. By reading the textbook prior to the Lecture period, you will obtain a basic understanding of the upcoming Lectures' topics. By attending, taking notes during, and asking questions during Lecture periods, you will expand and refine your understanding of the course material. You will demonstrate proficiency of the course material through weekly in-Lecture clicker questions, online Canvas

Quizzes, and online Sapling Learning homework problem sets. You will demonstrate mastery of the course material through Midterm Exams and a Final Exam.

**By the end of this course, you will be able to...**

- ...identify the chemical structures of organic functional groups.
- ...describe the common physical and chemical properties of organic molecules.
- ...predict the outcome of organic chemical reactions.
- ...draw organic chemical reaction equations.
- ...describe the common physical and chemical properties of biomolecules such as lipids, carbohydrates, proteins, and nucleic acids.
- ...explain the function of vitamins and enzymes in living systems.
- ...recall the location and function of metabolic pathways for the synthesis and degradation of biomolecules.

A detailed set of Learning Objectives for each chapter is located at the end of this syllabus.

**You will prepare for and practice achieving these objectives by...**

- ...reading the textbook while taking notes.
- ...attending and taking notes during Lecture periods.
- ...completing weekly online Sapling Learning homework sets.
- ...taking weekly graded online Canvas Post-Week Quizzes.
- ...asking for help via Office Hours, Piazza, or e-mail.

**You will be assessed on how you have achieved these objectives using...**

- ...one Getting Started online Canvas Quiz.
- ...the aforementioned online Sapling Learning homework sets.
- ...the aforementioned online Canvas Quizzes.
- ...three Midterm Exams.
- ...one Final Exam.

## Course Communication

**Piazza** is a free online system designed for students to have access to rapid and efficient help from classmates, TAs, and the instructor simultaneously. **Piazza is not to be used to convey personal information.** Email the instructor directly if you need to discuss personal information.

For academic questions, rather than emailing questions about course material to the instructor and hope for a quick response, you are strongly encouraged to post your questions on Piazza. The instructor, TAs, and students can answer the question on Piazza, making it more likely that someone can answer your question quickly. Maybe you'll even get lucky and someone will have already asked the question you were going to ask and got it answered! Students are not to provide complete answers or explanations, but are encouraged to guide their fellow students to complete answers or explanations. You have the option of posting anonymously to each other, but the instructor and TAs will always be able to see your identity. Enroll in the course by following the instructions in Canvas or by creating a Piazza account by going to <https://piazza.com/signup>, searching for "Chem 1120", and enrolling as a student.

You are always welcome to e-mail the instructor with questions. Please include your full name and A-Number in your email. I will attempt to respond to your e-mails in a timely manner, but I have responsibilities outside of the course that may prevent me from doing so, and I ask you to exercise patience after sending e-mail. When contacting the instructor by email, it is recommended that you send the message through Canvas.

The instructor will hold regular office hours as listed in this syllabus as well as by request.

Course announcements will be made using Canvas and the course Piazza page. Do not expect to receive regular mass emails from the instructor. **You are expected to check Canvas and/or Piazza at least once a day and are responsible for any information found in the announcements.** "But I did not know" will not be an acceptable excuse for being unaware of important information located in course announcements.

## Getting Started in the course

Read the course syllabus. Once that is done, your first assessment is a "Getting Started" online quiz located on Canvas that will cover course policy as discussed in the syllabus. This Quiz opens at the start of the semester and remains open until 12:00 PM on Monday, January 23. The Getting Started quiz will be graded immediately upon completion and may be attempted an unlimited number of times. Correct answers will not be shown upon completion of the Getting Started Quiz, but you will be able to view your responses. If multiple attempts are made, the **latest** score will be accepted. **If you see no score in your Gradebook, no attempt was submitted.** The Getting Started Quiz score cannot be dropped.

Qualified students with disabilities may be eligible for reasonable accommodations. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, 797-2444 voice, 797-0740 TTY. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.

## Lectures

**It is assumed that you read textbook sections, as outlined in the schedule at the end of this syllabus, prior to discussing them in Lecture.** You are strongly encouraged to take notes while reading the textbook and then supplement those notes with Lecture. Reading the chapter ahead of time will grant you familiarity with the topic, and the Lecture periods will refine that familiarity into understanding and allow you an opportunity to ask questions to clarify concepts and rectify misconceptions. PDF copies of blank Lecture Powerpoint slides will be available on Canvas to be printed ahead of each Lecture. Each Lecture will be recorded and available on Canvas for viewing at your pleasure.

## iClicker Questions

iClicker questions will be asked through the Lecture period and will be used as a way to assess class understanding of topics by providing immediate feedback to both the instructor and you. These questions must be answered individually, but consulting your notes and discussions with your classmates are allowed. It is your responsibility to register you iClicker either through the iClicker service on Canvas or at iclicker.com, and to remember to bring your iClicker, in working order, to class each day. iClicker questions will be utilized on Day 1, but student performance will not be recorded until the third Lecture period on Friday, January 13.

To encourage you to attend, prepare for, and be attentive during lectures, you **may earn up to 12 points extra credit** via iClicker questions. 6 of those points are allocated to participating in iClicker questions, and the remaining 6 points are allocated to answering iClicker questions correctly. The amount of extra credit awarded will be based on the percentage of iClicker questions answered by each student based on the total number of questions asked and the percentage of correct answered to iClicker questions based on the total number of questions asked. For example, if a student answers 75% of all iClicker questions, they will receive 4.5 extra credit points. If a student answers 50% of all iClicker questions correctly, they will be awarded an additional 3 extra credit points.

## Homework

There will be 10 on-line homework sets, administered through Sapling Learning and must be completed on your own time. Each homework set is worth 10 points and will be due according to the schedule at the end of this syllabus. The homework sets will involve a variety of interactive questions. You may use your textbook and notes, but it is suggested you attempt the problems alone at first. You can have as many attempts as necessary for each problem, but 5% will be deducted for each incorrect answer. No Sapling Learning scores will be dropped at the end of the course.

See the following instructions for Sapling Learning enrollment. **Remember to input your A-number correctly or you cannot be given credit for the Homework assignments.**

## Registering for Sapling

For instructions on how to enroll in Sapling Learning, please proceed to <http://www2.saplinglearning.com/help/higher-education-us/accounts-and-registration>.

Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments. During sign up or throughout the term, if you have any technical problems or grading issues, send an email to [support@saplinglearning.com](mailto:support@saplinglearning.com) explaining the issue. The Sapling Learning support team is almost always faster and better able to resolve issues than your instructor.

## Inputting A-number

- 1) Click "Profile" on the left hand menu
- 2) Click "Edit Profile" from the top menu
- 3) Click "Show Advanced" on right side
- 4) Scroll to the bottom
- 5) In put your A-number, as A##### (capital A), in the box labeled "ID number"
  
- 6) Click "Update Profile"

## Quizzes

At the end of every week, a Post-Week Quiz will be released. The Quiz will open at 1:30 PM every Friday and will be due the following Monday at 12:00 PM. Post-Week Quizzes will be 30 minutes long, are worth 10 points each, and will contain questions about material covered in the previous week. You may use your textbook and notes when taking the Post-Week Quiz, but you must work alone. You should treat Post-Week Quizzes as practice for the Exams, as both the timed aspect is common with Exams and you should expect some of the questions on Post-Week Quizzes to make an appearance in some form on the Exams. You may take each Post-Week Quiz twice to account for any technical difficulties you encounter, such as losing power or logging out accidentally. After successfully completing the Quiz, you may choose to retake the Quiz to try and maximize your score, but note that only the **last** attempt will be accepted. Therefore, if your second attempt at the Quiz has a lower score than the first attempt, the second attempt's score is still what will be counted as your score for the Quiz. The lowest two Post-Week Quiz scores will be dropped at the end of the course.

## Examinations

There will be three Midterms Exams, worth 100 points each, that are planned to be administered according to the following schedule, although dates may change depending on course pace:

First Exam:               Wednesday, February 8  
Second Exam:            Wednesday, February 29  
Third Exam:              Wednesday, April 5

These dates are subject to change based on course pace. These Examinations will consist of 25 multiple choice questions worth 3 points each and fill-in questions, such as drawing chemical structures, for 25 points total.

Make-up Exams for missed Exams may be granted upon petitioning the instructor only in the following situations: 1) documented and acceptable excuses for illness when verified by a doctor's note; 2) a family emergency when verified by a note from your academic advisor; 3) a regularly scheduled university-sanctioned conflict, such as a sports competition the student is participating in, but only when the instructor is notified well in advance of the conflict and verified with a note from the person in charge of the activity containing the specific reasons for the absence. Absences due to reasons not considered by the university to be excused absences, such as weddings, are not eligible for make-up Exams.

Students arriving late to the Exam will forfeit the lost time. No other materials (including, but not limited to, music playing devices, headphones, cellular phones, textbooks, course notes, calculators, etc.) are permitted.

A Final Examination will be held on Monday, May 1 from 11:30 AM to 1:20 AM.

## Academic integrity

All Utah State University academic integrity policies are strictly enforced. All students at Utah State University agree to be bound by the following Honor Pledge "I pledge, on my honor, to conduct myself with the foremost level of academic integrity." See the following for further information: <https://studentconduct.usu.edu/studentcode/article5>. Students found guilty of academic misconduct on any assignment will, **at minimum, be given a zero for the assignment and have the full value of that assignment deducted from their final course grade**. Actions up to and including a failing grade for the course are options available to the instructor.

## **Grading**

The total score for each type of assignment represent totals after appropriate lowest scores have been dropped. The grade received in the course is based on your performance on the Exams, Quizzes, and Homework. Grades are guaranteed as given below for overall percentage score on all exams. Actual grade ranges may be curved somewhat lower, depending on the overall class average.

Getting Started Quiz	20	Percentage of Points Earned	Grade
Chapter Homework Problems	100	89 – 100	A-, A
Post-Week Quizzes	120	77 – 88	B-, B, B+
First Exam	100	60 – 76	C-, C, C+
Second Exam	100	50 – 59	D, D+
Third Exam	100	< 50	F
Final Exam	200		
Total Points	740		

Final course scores will be rounded to the nearest whole number.

## **Course Assessment**

Approximately halfway through the course, the instructor will solicit feedback through an anonymous survey on Canvas. The purpose of the survey will be to determine student opinions of the course up to that point and ask for suggestions on what could be done to improve the course for the rest of the semester and in subsequent semesters. The instructor will know who completed the survey, but will be unable to match survey responses to students. Each student who responds to the survey will be granted 3 extra credit points.

## Spring 2017 Schedule

**Please look carefully at the following schedule for the correct order of Lectures. Note that this schedule is approximate and may adjust slightly depending on course pace.**

**Red text** denotes the days Exams will be proctored. **Blue text** denotes holidays where Lecture will not be held. Note that President's Day falls on February 20, but class will be held on Tuesday instead. Note that the first Post-Week Quiz (P-Quiz) will be due on Monday, January 16, which is a holiday. The P-Quiz for Week 6 will be due on Tuesday, February 21 instead of Monday, February 20 as that Tuesday is a Monday schedule.

Week	Days	Dates	Chapters	Assignments Due	Notes	Week	Days	Dates	Chapters	Assignments Due	Notes
1	M/W/R/F	1/9–1/13	Intro and Ch 13	None		9		3/6–3/10	<b>Spring Break - No Classes</b>		
2	<b>W/R/F</b>	1/16–1/20	Ch 14 and Ch 15	P-Quiz 1 on Monday	<b>Monday Holiday – No Monday Lecture</b>	10	M/W/R/F	3/13–3/17	Ch 20 and Ch 21	HW 6/P-Quiz 8 on Monday	
3	M/W/R/F	1/23–1/27	Ch 15 and Ch 16	HW 1/P-Quiz 2 on Monday		11	M/W/R/F	3/20–3/24	Ch 21 and Ch 22	P-Quiz 9 on Monday	
4	M/W/R/F	1/30–2/3	Ch 16	HW 2/P-Quiz 3 on Monday		12	M/W/R/F	3/27–3/31	Ch 22	HW 7/P-Quiz 10 on Monday	
5	M/W/R/F	2/6–2/10	Ch 16/ <b>Exam 1</b> and Ch 17	HW 3/P-Quiz 4 on Monday	<b>Exam 1 on Wed., Feb 8</b>	13	M/W/R/F	4/3–4/7	Ch 22/ <b>Exam 3</b> and Ch 23	HW 8/P-Quiz 11 on Monday	<b>Exam 3 on Wed., April 5</b>
6	M/W/R/F	2/13–2/17	Ch 18 and Ch 19	HW 4/P-Quiz 5 on Monday		14	M/W/R/F	4/10–4/14	Ch 23 and Ch 24	P-Quiz 12 on Monday	
7	M/W/R/F	2/20–2/24	Ch 19	HW 5/P-Quiz 6 on Monday		15	M/W/R/F	4/17–4/21	Ch 24	HW 9/P-Quiz 13 on Monday	
8	<b>T/W/R/F</b>	2/27–3/3	Ch 19/ <b>Exam 2</b> and Ch 20	P-Quiz 7 on Monday	<b>Tuesday is Monday Schedule Exam 2 on Wed., March 1</b>	16	M/W/R/F	4/24–4/28	Ch 24	HW 10/P-Quiz 14 on Monday	
						17	M	5/1	<b>Final Exam 11:30 – 1:20 PM, Widtsoe 007</b>		



## Chapter Learning Objectives

### **Chapter 13**

Name alcohols, phenols, ethers and thiols using the IUPAC system and common names.  
Describe the physical properties of alcohols, phenols, ethers and thiols.  
Write chemical equations for the dehydration of alcohols and predict the product distribution.  
Recognize the oxidation and reduction of alcohols and predict the products from oxidation of primary and secondary alcohols.  
Recognize the oxidation and reduction of thiols.

### **Chapter 14**

Identify compounds with aldehydes or ketones.  
Name aldehydes and ketones using the IUPAC system and common names.  
Describe the differences in physical properties of aldehydes or ketones as compared to alcohols, phenols, and ethers.  
Recognize the oxidation and reduction of aldehydes and ketones.  
Write chemical equations for the addition of alcohols to aldehydes and ketones.  
Recognize chiral objects, including molecules, and identify chiral and achiral carbons in molecules.

### **Chapter 15**

Recognize monosaccharide as aldoses and ketoses with respect to the number of carbon atoms.  
Draw the D- and L- configuration of glucose, galactose, and fructose.  
Draw and identify the cyclic structures of monosaccharides.  
Recognize the products from oxidation and reduction of monosaccharides.  
Recognize the monosaccharide units and linkages in oligosaccharides. systems  
Calculate acid/base titration curves and predict end-point conditions  
Describe and apply  $K_{sp}$  values to determine solubility of inorganic solids  
Describe the precipitation and separation of ions utilizing  $K_{sp}$  information

### **Chapter 16**

Name carboxylic acids and esters using the IUPAC system and common names.  
Recognize the physical properties of carboxylic acids and esters.  
Write the equations for esterification and hydrolysis of esters.

### **Chapter 17**

Describe the classes of lipids.  
Write the structures of fatty acids and identify as saturated or unsaturated.  
Write the structural formula of a wax, fat or oil produced by the reaction of a fatty acid and an alcohol or glycerol.  
Draw the structure of products from hydrogenation, hydrolysis and oxidation of triacylglycerol.  
Describe the properties of glycerophospholipids.  
Describe the types of lipids that contain sphingosine.  
Describe the general structures of steroids.  
Describe the composition and function of the lipid bilayer in cell membranes.

### **Chapter 18**

Name amines using the IUPAC system and common names.

Differentiate primary, secondary, and tertiary amines.

Recognize the physical properties of amines.

Recognize heterocyclic amines.

Provide both IUPAC and common names for amides and write the equations for amidation from amines.

Write the equations for the hydrolysis of amides.

### **Chapter 19**

Draw the structure for an amino acid and be able to identify nonpolar and polar neutral, acidic, and basic amino acids.

Understand the acid/base properties of amino acids and be able to write the ionic forms of an amino acid at different pHs.

Understand the reactions involved in forming and hydrolyzing peptides.

Describe how to name simple peptides.

Understand different levels of protein structure, i.e., primary secondary, tertiary, and quaternary, and describe what the factors that influence structure.

### **Chapter 20**

Describe how enzymes function as biological catalysts, and name and classify them.

Describe the effect of temperature, pH, concentration of enzyme and concentration of substrate on enzyme activity.

Describe reversible and irreversible inhibition.

Describe the role of zymogens, feedback control and allosteric enzymes in regulating enzyme activity.

### **Chapter 21**

Describe the components that make up the nucleic acids.

Describe the primary structures of RNA and DNA.

Describe the double helix of DNA.

Describe the process of DNA replication.

Identify the different RNAs and describe the synthesis of mRNA.

Describe the function of codon in genetic code.

Describe the process of protein synthesis from mRNA.

Describe the correlation between altered DNA and the sequential mutation.

Describe the preparation and uses of recombinant DNA.

Describe the methods by which a virus infects a cell.

### **Chapter 22**

Describe three stages of metabolism.

Describe the role of catabolic and anabolic reactions.

Describe the components and functions of the coenzymes FAD, NAD<sup>+</sup> and coenzyme A.

Give the sites and products of digestion for carbohydrates.

Describe the conversion of glucose to pyruvate in glycolysis.

Give the conditions for the conversion of pyruvate to lactate, ethanol and acetyl coenzyme A.

Describe the breakdown and synthesis of glycogen.

Describe how glucose is synthesized from noncarbohydrate molecules.

**Chapter 23**

Describe the oxidation of acetyl CoA in the citric acid cycle.

Describe the electron carriers involved in electron transport.

Describe the roles of electron carriers in electron transport.

Describe the process of oxidative phosphorylation in ATP synthesis.

Account the ATP produced by the complete oxidation of glucose.

**Chapter 24**

Describe the sites and products obtained from digestion of triacylglycerols.

Describe the metabolic pathway of  $\beta$ -oxidation.

Calculate the total ATP produced by the complete oxidation of a fatty acid.

Describe the pathway of ketogenesis.

Describe the biosynthesis of fatty acids from acetyl CoA.

Describe the hydrolysis of dietary protein and absorption of amino acids.

Describe the reaction of transamination and oxidative deamination in the degradation of amino acids.

Describe the formation of urea from ammonium ion.

Describe where carbon atoms from amino acids enter the citric acid cycle or other pathway.

Illustrate how some nonessential amino acids are synthesized from intermediates in the citric acid cycle and other metabolic pathways.