

CHEM 1120 – General Chemistry II

Syllabus

Instructor: Dr. Shawn M. Miller

Spring Term, 2018

Email: shawn.miller@usu.edu

Office Hours: Monday/Wednesday

1:30 PM – 2:30 PM, Widtsoe 339

Course Lecture Times & Locations:

Section (CRN)	Time	Day	Location
Lecture 001 (10552)	12:30 PM 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*, 5th 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 permitted in Exams only if the Testing Center clears the calculator memory. Other electronic devices, including phones, are not permitted during Exams.

Optional Materials:

iclicker: iclicker 2s are used during the Lecture period and extra credit is awarded through the use of iclickers. iclickers must be registered by the beginning of class. To register an iclicker, use the link in the navigation bar on Canvas.

Supplementary Course Assistance:

SI Information: Kara Swenson (contact: kswenson94@gmail.com)
Session Times: Monday & Wednesday 6:00 PM – 6:50 PM in Widt 007

UTF Information: Noah Thackeray (contact: noah.thackeray@aggiemail.usu.edu)
Session Times: Tuesday 4:00 PM – 5:00 PM in Widt 330
Thursday 5:30 PM – 6:30 PM in Widt 330

Course Overview

CHEM 1120 is the second in a two-semester series of general chemistry courses and is targeted towards non-science major students, particularly those interested in health-related fields, that builds upon the lessons learned in Chem 1110 and meets four times a week. There will be assigned online Sapling Learning homework sets. There will be an online Post-Week Quiz on Canvas at the end of each week designed to help prepare students for the Exams. There will be three 60-minute Midterm Exams in addition to a 120-minute Final exam all of which will be proctored on Canvas via the Testing Center.

Course Learning Objectives

CHEM 1120 is a Lecture course designed to continue the education process began in Chem 1110. 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 and biochemical structures and 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.
- ...optionally attending UTF or SI sessions for problem solving and further assistance.

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 should not be used to convey personal information.** Contact the instructor directly, through Canvas preferably, if you need to discuss personal information, such as grades.

For academic questions, rather than emailing questions about course material to the instructor and hoping for a quick response, you are strongly encouraged to post your questions on Piazza. The instructor, UTF, SI, and your fellow students can answer the question on Piazza, making it more likely that someone can answer your question quickly. Maybe you'll get lucky and someone will have already asked the question you were going to ask and got it answered! Students should not 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 course assistants will always be able to see your identity. Enroll in the course by creating a Piazza account by going to <https://piazza.com/signup> or by clicking on the "Piazza" link in the sidebar on Canvas, searching for "Chem 1120", and enrolling as a student.

You are always welcome to message the instructor with questions. Please include your full name, A-Number, and course name in your message. I will attempt to respond to your messages 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 your message. When contacting the instructor, 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 Piazza. You can set Canvas to send you an email when a course Announcement is made, but the instructor will not send regular mass reminder emails. **You are expected to check Canvas and/or Piazza at least once a day and are responsible for any information in the announcements.** “But I did not know” is not an acceptable excuse for being unaware of information 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 Friday, January 19. 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 Grades, no attempt was submitted.** The Getting Started Quiz score cannot be dropped.

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn #101, 435-797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Lectures

It is assumed that you read textbook chapters prior to discussing them in Lecture. You are strongly encouraged to take notes while reading the textbook and then supplement those notes with Lecture. You are not expected to understand the material simply by reading the textbook, but reading the chapter will build a foundation that we can expand and refine through our discussions in Lecture. PDF copies of blank Lecture PowerPoint slides will be available on Canvas that can be printed ahead of each Lecture if you wish. 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 discussing with your classmates is allowed. It is your responsibility to register your 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 student performance will not be recorded until the third Lecture period on Thursday, January.

To encourage you to attend, prepare for, and be attentive during lectures, you **may earn up to 8 points extra credit** via iClicker questions. 4 of those points are allocated to participating in iClicker questions, and the remaining 4 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 answers to iClicker questions based on the total number of questions asked.

Homework

There will be 10 on-line homework sets, administered through Sapling Learning and must be completed on your own time. Each homework set, worth 10 points, will open on the day the topic of the first question is discussed in lecture and will close at 12:00 PM on the first day the Exam they are associated with is administered. 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 from a problem for each incorrect answer. The lowest Sapling Learning assignment score 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 <https://community.macmillan.com/docs/DOC-5809-sapling-learning-creating-accounts>.

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 issues, the Sapling Learning technical support team can be reached by phone or by webform via the Student Support Community. Here are their hours and contact information: <https://community.macmillan.com/docs/DOC-6915-students-still-need-help>. The Sapling Learning support team is almost always faster and better able to resolve technical issues than your instructor.

Adding Your A-number Into Your Sapling Learning Account

- 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) Input your A-number as A##### (capital A), in the box labeled "ID number"
- 6) Click "Update Profile"

Quizzes

There are 14 graded Post-Week Quizzes in the course. Each week, the Quiz will open at 1:30 PM every Friday and will be due the following Monday at 12:00 PM. These Quizzes contain 10 questions each worth 1 point about material covered in the previous week. You will have 30 minutes to complete the Post-week Quiz and you may use your textbook and notes, but you must work alone. You should treat Post-Week Quizzes as practice for the Exam in terms of both format and content. 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 60-minute Exams, worth 100 points each, that will be administered on Canvas and on paper in the Testing Center according to the following schedule:

First Exam:	Wednesday, February 7 – Friday, February 9
Second Exam:	Wednesday, February 28 – Friday, March 2
Third Exam:	Wednesday, April 4 – Friday, April 6

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.

The only materials permitted in the Testing Center will be writing utensils and calculators (scientific preferred, graphing only if the Testing Center clears the memory). The Testing Center will provide laptops and scratch paper. Appointments for the Testing Center are

made through their website at <http://testing.usu.edu/>. Ensure you bring a form of ID with you in order to Check-in for your Testing Center appointment.

A Final Examination will be held in the Testing Center from Wednesday, May 2 to Friday, May 4.

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.

Course Assessment

After the first Exam, the instructor will solicit feedback through optional midterm evaluations on Canvas. The purpose of these surveys 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 midterm evaluation will be granted extra credit points. At the end of the course, end-of-term IDEA evaluations administered through University will be sent to students via email. The instructor will know who completed the survey, but will be unable to match survey responses to students. Each student who responds to the end-of-term evaluation will be granted extra credit points.

A Pre-test/Post-test approach will be used to measure comprehension and teaching of important concepts. The Pre-test will be administered online through Canvas. The Pre-test will be comprised of 20 questions with duration of 60 minutes. The multiple choice questions of the Pre-test will reappear in the Final Exam, in some form, to assess teaching and learning progress during the semester. If weaknesses are observed in specific subject areas, teaching methods will be reevaluated. An all-or-nothing 10-point reward will be given for completing the Pre-test. The Pre-test opens at the beginning of the course and is due at 12:00 PM on Monday, January 15.

Grading

The total score for each type of assignment in the below table represent totals after appropriate lowest scores have been dropped.

Getting Started Quiz	20	Percentage of Points Earned	Grade
Pre-Test	10	89 – 100	A-, A
Chapter Homework Problems	90	78 – 88	B-, B, B+
Post-Week Quizzes	120	66 – 77	C-, C, C+
First Midterm Exam	100	53 – 65	D, D+
Second Midterm Exam	100	< 53	F
Third Midterm Exam	100		
Final Exam	200		
<hr/> Total Points	740		

Letter grades are assigned by taking the total numerical score, rounding to the nearest whole number, finding the percentage of total points earned, and then assigning a letter grade according to the table above. The grade thresholds may be lowered depending on course performance, but will never be increased. The administration of Chem 1120, including the issuing of grades of Incomplete, will adhere to the outlines in the USU General Catalog.

Spring 2018 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 Lecture is cancelled due to Exams. **Blue text** denotes holidays where Lecture will not be held. Note that Lecture will not be held on Monday, February 19, but will be held on Tuesday, February 20. Note that the Pre-test and the first Post-Week Quiz (P-Quiz) will be due on Monday, January 15, which is a holiday where no Lecture is held. The P-Quiz for Week 6 will be due on Tuesday, February 20 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	1/8–1/12	Intro and Ch 13	None		9		3/5–3/9	Spring Break - No Classes		
2	W/R/F	1/15–1/19	Ch 14 and Ch 15	P-Quiz 1 on Mon. Pre-test on Mon. GS Quiz on Fri.	MLK Jr. Day on Mon. – No Lecture	10	M/W/R/F	3/12–3/16	Ch 20 and Ch 21	P-Quiz 8 on Mon.	
3	M/W/R/F	1/22–1/26	Ch 15 and Ch 16	P-Quiz 2 on Mon.		11	M/W/R/F	3/19–3/23	Ch 21 and Ch 22	P-Quiz 9 on Mon.	
4	M/W/R/F	1/29–2/2	Ch 16	P-Quiz 3 on Mon.		12	M/W/R/F	3/26–3/30	Ch 22	P-Quiz 10 on Mon.	
5	M/W/R/F	2/5–2/9	Ch 16/ Exam 1 then Ch 17	P-Quiz 4 on Mon. HW 1–3 on Wed.	Exam 1 Wed. Feb 7 – Fri. Feb 9	13	M/W/R/F	4/2–4/6	Ch 22/ Exam 3 then Ch 23	P-Quiz 11 on Mon. HW 6–8 on Wed.	Exam 3 Wed. April 4 – Fri. April 6
6	M/W/R/F	2/12–2/16	Ch 18 and Ch 19	P-Quiz 5 on Mon.		14	M/W/R/F	4/9–4/13	Ch 23 and Ch 24	P-Quiz 12 on Mon.	
7	T/W/R/F	2/19–2/23	Ch 19	P-Quiz 6 on Mon.	Pres. Day on Mon. – No Lecture Tuesday is a Monday Schedule	15	M/W/R/F	4/16–4/20	Ch 24	P-Quiz 13 on Mon.	
8	M/W/R/F	2/26–3/2	Ch 19/ Exam 2 then Ch 20	P-Quiz 7 on Mon. HW 4–5 on Wed.	Exam 2 Wed. Feb 28 – Fri. March 2	16	M/W/R/F	4/23–4/27	Ch 24	P-Quiz 14 on Mon. HW 9–10 on Wed. May 2	
						17		4/30–5/4	Final Exam Wed. May 2 – Fri. May 4		

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⁺ 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 β -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.